ntepa Northern Territory Environment Protection Authority

Statement of Reasons

TM GOLD PTY LTD – SPRING HILL GOLD PROJECT

PROPOSAL

The Mining Management Plan (MMP) for the Spring Hill Gold Project (the Proposal), by TM Gold Pty Ltd (the Proponent) was referred by the Department of Primary Industry and Resources (DPIR) to the Northern Territory Environment Protection Authority (NT EPA) on 31 March 2017 for consideration under the *Environmental Assessment Act* (EA Act).

To inform the NT EPA's decision, further information was provided by the Proponent on 1 September 2017 (revised MMP), 17 October 2017 (3D imagery of stopes and bat exclusion zones), 15 December 2017 (Ghost Bat Monitoring Plan), 22 January 2018 (Blasting Analysis Report), 28 February 2018 (revised MMP – February 2018), and 17 May 2018 (response to specific comments). For the purposes of this assessment, the NT EPA has considered the MMPs and further information during the consultation process in making this decision.

The Proposal is to construct and operate a gold mine using conventional open cut methods. Drilling and blasting would be required to enable excavation of the ore and waste rock and would proceed on a continuous basis with blasting scheduled every two to three days. The Proposal is located approximately 200 km southeast of Darwin and approximately 25 km north of Pine Creek. It overlies mining licence 23812 (ML23812), which covers an area of 1035 hectares (ha).

The proposed life of mine is ten months scheduled to begin at the end of the Wet season. It would include: vegetation clearing, removal and stockpiling of topsoil and infrastructure construction (month 1); active mining operations (months 2-8); and offsite processing, site rehabilitation, closure and decommissioning (months 9-10). It would include the following infrastructure components and activities:

- overall disturbance area of about 17 ha
- ROM pad with mobile crusher and sediment basin (1.2 ha)
- administration offices (demountable, within ROM pad footprint)
- extraction of 152 342 bank cubic metres (bcm) of oxide ore
- waste rock dump (5.7 ha, approx. 75 m in height, volume 513 909 bcm)
- access tracks, including a haul road from the ROM pad to Mt Wells Road (4.2 ha)
- three open cut pits with a total footprint of 3.31 ha:
  - Hong Kong Pit 1: Depth 70 m, 2.70 ha
  - Hong Kong Pit 3: Depth 10 m, 0.27 ha
  - Main Pit 2: Depth 30 m, 0.34 ha
- water demand of about 170,000 L/day mainly for dust suppression and potable water, to be sourced from local bores and/or a raw water tank
- workforce of about 10 staff; accommodated at nearby Pine Creek and Emerald Springs.

Ore would be trucked on Mt Wells Road to the Union Reefs processing plant for treatment. Tailings disposal would take place at Union Reefs into existing tailings infrastructure.

The Proposal area has been subject to substantial disturbance, including clearing of native vegetation for exploration and mining activities over the last 130 years leaving exposed stopes, mullock heaps and waste rock dumps around the current mining lease. In 2017, approximately 50 000 tonnes of legacy waste material were crushed and transferred offsite to Union Reefs processing plant or backfilled into one of the numerous dry stopes in the area.

The Proponent referred the Project to the Australian Government under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). On 23 May 2018 the Australian Government decided that the proposed action is a controlled action for listed threatened species and communities under sections 18 and 18A of the EPBC Act. The Proposal will require assessment and approval under the EPBC Act before it can proceed. The assessment approach is yet to be advised.

CONSULTATION

The MMPs and further information have been reviewed as a notification under the EA Act in consultation with Northern Territory Government (NTG) advisory bodies (see Attachment A) and the responsible Minister, in accordance with clause 8(1) of the Environmental Assessment Administrative Procedures (EAAP).

JUSTIFICATION

The MMP was assessed against the NT EPA's environmental factors and objectives.

1. Terrestrial flora and fauna

Objective: Protect the NT's flora and fauna so that biological diversity and ecological integrity are maintained.

Flora

The majority of flora species observed throughout the study area are common and widespread throughout the region in eucalypt woodland communities. No threatened or near threatened flora species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or the *Territory Parks and Wildlife Conservation Act* (TPWC Act) were identified to be under significant threat from the Proposal. A targeted survey for *Acacia praetermissa* (Vulnerable, TWPC Act) did not find the species and the likelihood of occurrence is considered low. Targeted vegetation surveys identified the values of a small area of riparian monsoon forest (approximately 0.5 ha) and as a result the location of the waste rock dump was slightly modified to avoid impacts to this sensitive vegetation type.

Fauna

Historical small-scale mining activity in the Proposal area resulted in abandoned below surface stopes that created suitable habitat for cave-dependent bat species. Targeted microbat surveys confirmed the presence of both ghost bat and the Northern leaf-nosed bat utilising historical mine stopes within the Proposal area. The targeted surveys also observed widespread evidence of stope disturbance in the form of burnt tyres, smoke flares, signal flares, chemical propellant, fine ash around openings or stopes partially filled in with woody debris and rocks.

The ghost bat (*Macroderma gigas* – Vulnerable, EPBC Act, Near Threatened, TPWC Act) is restricted to isolated populations throughout their range, which is likely due to specific habitat and roosting requirements (i.e. mine chambers completely absent of light). The main threatening processes impacting ghost bats are cave disturbance and tampering from human visitation, habitat loss and predation on poisonous cane toads. Females are highly philopatric; returning to the roosts of their birth. Breeding season is in May with pups born from July to August in the Top End. Pups are fully weaned by March in the following year. Recent surveys indicate that the ghost bat population in one of the abandoned stopes in the Proposal area is approximately 100 individuals. Given recent declines in Ghost bat populations in Kakadu National Park[1], the Spring Hill colony may be the fourth largest currently known population of ghost bats in the Northern Territory and this locality is considered highly significant.

[1] Threatened Species Scientific Committee (TSSC) 2016. Conservation Advice. *Macroderma gigas,* Ghost Bat. 5 May 2016

The Northern leaf-nosed bat (*Hipposideros stenotis* – Vulnerable, TPWC Act) roosts in sandstone caves, boulder piles, road culverts and disused mines. It has been recorded only rarely and from a small number of locations in the Northern Territory, so the records from Spring Hill are considered potentially significant, although the size and importance of any colony occurring there remains uncertain.

The Proposal has the potential to impact the ghost bat and Northern leaf-nosed bat through loss of habitat caused by blasting and vibration resulting in collapse of occupied mine stopes. Disturbances from mining activity could lead to bats moving to alternative roost sites, dislodgement of pups if startled or in rapid take-offs, and potential strikes by vehicle traffic at dawn and dusk.

To reduce the potential for significant impacts to bats, the Proponent applied the mitigation hierarchy – avoid, minimise and rehabilitate. The open cut operations were redesigned to avoid bat roosting habitat, and three open cut pits were removed from the Proposal to avoid direct impacts to threatened bat species in their roosts. A Threatened Fauna Species Management Plan was developed and includes the following mitigation measures:

- a minimum of 85 m buffer zone around the stopes identified with known bat records and 130 m from ghost bat roosting locations (refer to Figure 1)
- the majority of pit development work would occur from April to July to avoid sensitive periods (i.e. gestation and when females are carrying young or leaving young in nurseries). Minor blasting after this period would occur from July to October and be limited to deep within the Hong Kong Pit 1
- mine and hauling activities and other vehicle/machinery movements (i.e. staff movement at start and end of shifts) would be restricted to daylight hours to minimise collision and impacts with threatened bats
- blasting (design and vibration) would be limited to below the established disturbance threshold (predicted by the Proponent monitoring bat response to each blast and establishing a minimum threshold) in line with the report Prediction of Blast-Induced Ground Vibration and Air Overpressure (likely to be less than 10mm/sec at old mining stopes)
- implementation of dust, weed and feral animal control strategies
- pit development would be sequenced to minimise disturbance to the roost habitat areas. Sequential pit development would limit the disturbance to one side of the main roost habitat area at any given time
- implementation of the Ghost Bat Monitoring Plan
- identification of suitable old collapsed stopes that could be stabilised and reopened to increase available microbat habitat.

The NT EPA considers that significant impacts to threatened species are likely to be avoided if these above mitigation measures are implemented. The NT EPA has made a number of recommendations for specific controls to be incorporated into management plans to further minimise potential impacts including scheduling major pit development outside of the sensitive period when ghost bats give birth, re-opening of suitable stopes prior to commencement of mining activities and establishing more clearly the status of Northern leaf-nosed bats in the Proposal area to ensure appropriate monitoring and management is incorporated into a species specific management plan.

The Proponent has committed to implementing an adaptive Ghost Bat Monitoring Plan designed to (i) provide one full breeding season cycle as baseline data prior to mining activity; (ii) avoid impacts to ghost bats during mining activities; and, (iii) provide measurable impact minimisation measures with appropriate management responses. The monitoring plan encompasses monitoring post mining over a two year period to monitor changes to bat populations over time after cessation of mining.

The monitoring plan integrates monitoring vibration from blasting and bat disturbance during operations and commits to monitor each blast event for ground vibration, over-pressure, noise and changes in bat vocalisation (as an indicator of disturbance). Any exceedance of predicted levels or established trigger values would lead to identified corrective actions. The Proponent has detailed a procedure for monitoring disturbance of bats by blasting and the NT EPA considers the

implementation of this procedure would ensure impacts to bats from blasting remain low. Given the significance of the population of ghost bats in the Proposal area, the NT EPA has recommended that any failure to undertake corrective action or non-conformance of the blasting procedure, must be reported as an environmental incident under section 29 of the *Mining Management Act.*

Advice from the Flora and Fauna Division (DENR) supports the implementation of the adaptive ghost bat monitoring plan to mitigate the potential impacts to ghost bats. To ensure the mitigation measures are successful in reducing impacts to the ghost bat population, short-term (during operations) and longer term (two years post operations) monitoring of a population index is proposed to ensure there is no gradual decline in cave occupancy outside of normal fluctuations. The NT EPA has recommended the Proponent clearly define the specific population measures and detail the mitigation measures that would be enacted if those thresholds are reached.

The NT EPA considers the ghost bat monitoring plan would provide baseline data, performance criteria and adaptive management methods that could be used for future assessment and management of impacts on ghost bats and other threatened cave-dependent bat species and provide a broader understanding of ghost bat ecology in the Northern Territory. The NT EPA has recommended the Proponent liaise with the DENR to further refine details of the ghost bat monitoring plan including pre-impact monitoring and selection of appropriate reference sites. Liaison with the WA EPA is also recommended as similar potential impacts on leaf-nosed bats in the Pilbara were examined in assessments with eventual approval of Fortescue Metals Group and Rio Tinto iron ore mines.

The NT EPA considers that the above mitigation measures prescribed in the Threatened Fauna Species Management Plan and species specific management and monitoring plans for threatened bat species provide an appropriate approach to minimising potential for significant impacts of disturbance on these species. The NT EPA considers that the Proposal is not likely to result in a significant impact to regional populations of any of the threatened fauna species that occur in the Proposal area.

The NT EPA is satisfied that potential impacts and risks to threatened bat species would be addressed through the measures outlined in the MMP (including the Threatened Fauna Species Management Plan and the adaptive Ghost Bat Monitoring Plan) and recommendations provided to the Proponent, so that its objective for Terrestrial flora and fauna is likely to be met.

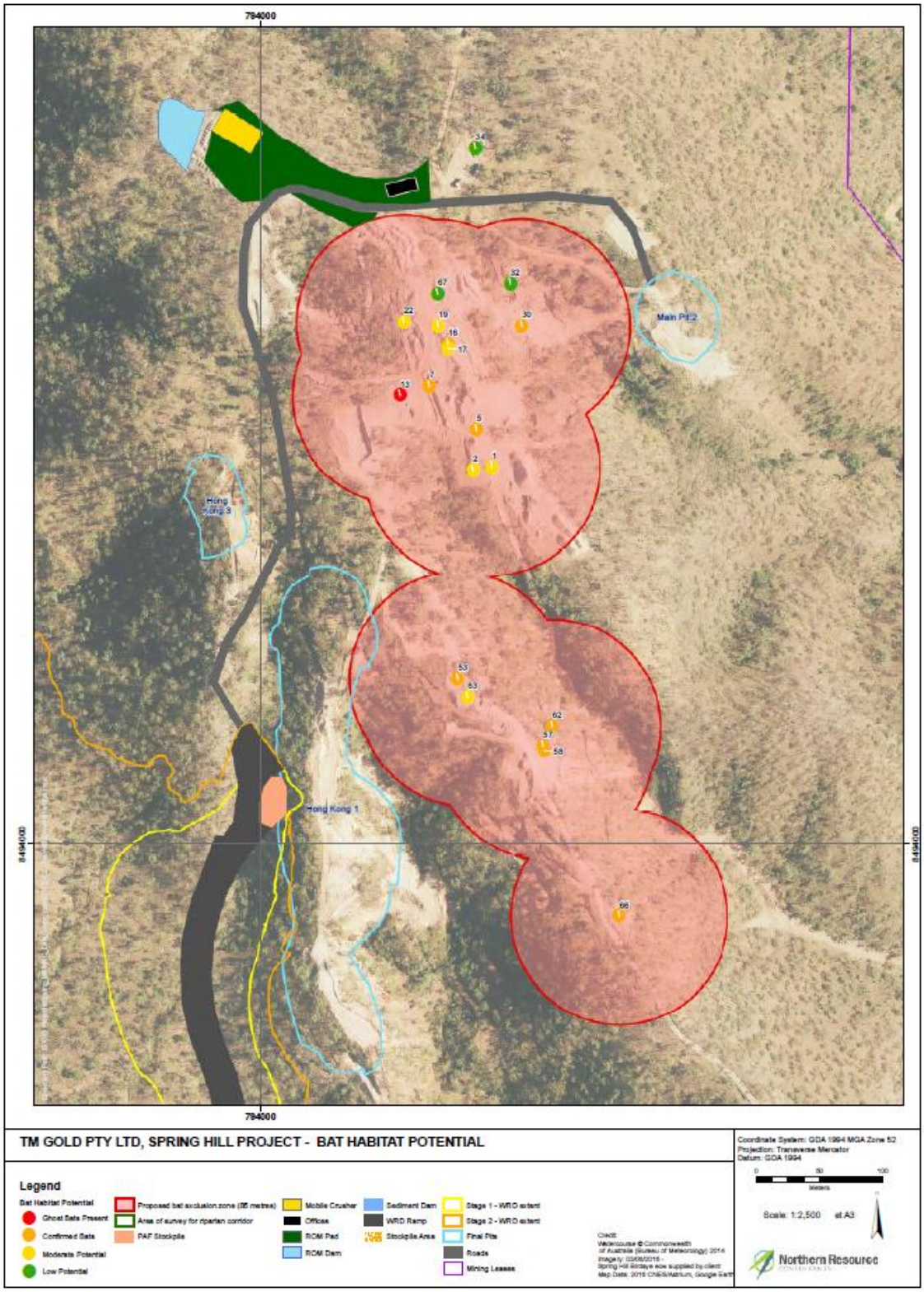

Figure 1. Bat habitat potential (stopes and adits) in relation to the Spring Hill Project Proposal by TM Gold. Source (ibid Figure 1, Appendix P, Mining Management Plan)

2. Inland water environmental quality

Objective: Maintain the quality of groundwater and surface water so that environmental values including ecological health, land uses, and the welfare and amenity of people are protected.

The Proposal lies within the upper Mary River catchment and is located on steep ridge crests. All natural water onsite is derived from rainfall. First order ephemeral streams convey runoff to the McKinlay River which lies about 2 km east of the mining lease. The Proposal lies within the Beneficial Use zone declared for the McKinlay River for aquatic ecosystem protection. The Proposal is not located within a Water Control District or a Water Allocation Plan area.

Groundwater depth at the site is variable but generally deep. Preliminary data indicate that the groundwater tables are below the bottom of the proposed pits during the Dry season and the pits would not need dewatering. Substrates are highly permeable and it is expected that groundwater may seep into the Hong Kong Pit 1 during the Wet season, albeit from a small catchment.

There is potential for the Proposal to impact on surface water or groundwater environmental quality at the site and downstream from it via runoff and/or seepage that could be affected by:

- potential acidic and/or metalliferous drainage and/or neutral mine drainage (AMD/NMD) from the proposed waste rock dump, ROM and pit-walls
- potential for onsite spills of hydrocarbons, such as diesel fuel, oils or lubricants
- erosion and increased turbidity and sedimentation.

Potential AMD/NMD from waste materials

The Proponent assessed the potential for AMD and NMD by testing 53 waste rock samples from representative lithologies. One quarter of the samples were from the proposed mine pits, and the remainder from within 150 m in areas previously proposed to be mined but since excluded to avoid impacts to conservation significant bats. Results indicated that approximately 75% of waste material would be non-acid forming (NAF), 2-3% (~ 20 000 bcm) potentially acid forming (PAF), and 22% 'uncertain', with the Proponent applying a PAF classification to this 'uncertain material'. All potentially PAF material would originate only in the deeper Hong Kong Pit 1. Results also indicated that several metals, including arsenic, were present at elevated levels in some of the rock samples.

Leachability results showed that a high proportion of samples generated concentrations of several metals above the ANZECC Guidelines[2] for 95% protection of aquatic species, indicating that these metals could be present in runoff that has come in contact with the waste rock. This runoff and any contaminants could leave the site and enter the McKinlay River, potentially affecting aquatic ecosystems in the upper Mary River catchment.

There is some uncertainty regarding the depth of groundwater at the pit/s and potential for seepage of groundwater into the pit. Any interaction of groundwater with the pit and/or removal of groundwater from the pit could have implications for groundwater quality in the vicinity of the pit and downstream from it, especially if pit walls contain non-benign material. The Proponent has committed to installing three additional groundwater monitoring bores to fill data gaps for groundwater quality and levels and provide a better understanding of the groundwater flow system at Spring Hill.

The Department of Primary Industry and Resources (DPIR) has noted that the Proposal is in an area of known AMD and/or NMD issues. The Proponent confirmed that the proposed pits all sit within the oxidised zone and that the majority of waste rock is considered benign that presents a lower risk of AMD. The DPIR advised that an adequate AMD/NMD assessment would be required as part of the authorisation process under the *Mining Management Act*. The Proponent has committed to undertaking progressive rock characterisation at site on an ongoing basis throughout the operation. This would identify any problematic material that would require appropriate storage or other management that would prevent impacts to water quality.

The Proposal includes a waste rock dump (WRD) that is designed to prevent contact of waste rock with environmental water and prevent contaminants from entering the downstream environment

[2] Australian and New Zealand Environment Conservation Council (ANZECC) Guidelines for Fresh and Marine Water Quality (2000)

into the future. The waste rock dump would cover an area of 11.6 ha and be constructed using a valley fill method, ensuring NAF material is used to form a compacted floor for the dump. Potentially problematic material encountered and characterised during mining would be encapsulated by NAF material at the surface of the WRD and contouring to ensure that drainage of the PAF encapsulation area is directed to Hong Kong Pit 1.

The Proposal includes a surface water and groundwater monitoring program and a commitment to use the ANZECC Guidelines 95% species protection levels (or alternative baseline levels for arsenic and barium that are known to be naturally elevated in the area) as a trigger for management action. The DPIR advised that such monitoring would be required until closure criteria are met. The NT EPA considers that it is important to ensure wastes would be stored and pits closed appropriately such that there is no future risk of AMD/NMD discharge that may impact downstream environmental water quality.

The MMP states that '*where possible, back filling pit voids with waste rock will be undertaken'* to reduce the footprint of the WRD and reduce the depth and size of the pits. The NT EPA has a strong preference for backfilling of pits and supports this consideration, noting that partial or full back filling of the pits would address some of the potential impacts outlined above.

The NT EPA has recommended to the Proponent and the DPIR that prior to authorisation, the MMP must contain a specific plan for how the appropriate rock characterisation and groundwater data would be obtained during operations, with suitable contingency plans for the case where rocks are more problematic than currently understood and/or groundwater would interact with the pit/s. Uncertainty remains on the risks of potential for AMD/NMD and management to minimise water quality impacts to groundwater and surface water runoff. The NT EPA has made recommendations that if progressive waste characterisation indicates significantly different concentrations or quantities to the current understanding or if groundwater interacts with the pit/s requiring removal and management, a notification under section 14A of the Environmental Administrative Procedures (EAAP) would be required.

The NT EPA considers that the further development of the MMP (specifically on waste characterisation, WRD design, potential pit backfill, and management of any groundwater in pits), to the satisfaction of the DPIR as part of the authorisation process under the *Mining Management Act*, would be adequate to mitigate the potential impacts of the Proposal on water quality due to AMD/NMD.

Potential spills

Operation of the Proposal presents a risk of hydrocarbon or hazardous material spills onsite that could result in contamination of local soils, downstream water resources and dependent ecosystems. The NT EPA considers that the management and mitigation measures outlined in the spill response procedure and hazardous material management plan in the MMP would adequately address this risk.

Erosion and sedimentation

The Proposal would require the disturbance of substrates in areas with very steep slopes (40% of the study area has slopes over 20 degrees) which are highly susceptible to severe erosion. Sediment could be mobilised during rainfall events and be transported downstream, potentially impacting water quality in ephemeral streams and the McKinlay River. The Proponent has prepared an Erosion and Sediment Control Plan (ESCP) in accordance with the International Erosion Control Association 2008 Guidelines. The DENR advised that once final designs for the Proposal have been completed, the ESCP should be revised accordingly and subsequently reviewed and approved by a Certified Professional in Erosion and Sediment Control (CPESC) third party auditor. The NT EPA has recommended to the DPIR that the ESCP must be reviewed and approved by a CPESC auditor prior to authorisation under the *Mining Management Act*.

The NT EPA is satisfied that, given the small size and scale of the Proposal, potential impacts and risks to surface water and groundwater quality would be addressed through the authorisation process under the *Mining Management Act* so that its objective for Inland water environmental quality is likely to be met.

Conclusion

The NT EPA considers that significant environmental impacts are unlikely due to the small disturbance footprint and short duration of mining activities and the commitment by the Proponent to manage its activities by implementing mitigation measures outlined in the MMP, Threatened Fauna Species Management Plan, adaptive bat monitoring plans and with ongoing progressive waste rock characterisation and assessment for AMD/NMD and water monitoring

The NT EPA therefore considers that the potential environmental impacts and risks associated with the Proposal are not significant and that the Proposal does not require assessment under the EA Act.

Comments from NTG advisory bodies have been provided to the Proponent and the NT EPA has provided recommendations to the Proponent to ensure that potential impacts on the environment are minimised and responsibilities under the legislation can be met.

Given the nature of the environmental issues and their proposed management, it is recommended that this proposal be given a priority for auditing of compliance with approval conditions to ensure that predicted outcomes are achieved.

DECISION

The proposed action, which was referred to the NT EPA by TM Gold Pty Ltd has been examined by the NT EPA and preliminary investigations and inquiries conducted. The NT EPA has decided that the potential environmental impacts and risks of the proposed action are not so significant as to warrant environmental impact assessment by the NT EPA under provisions of the *Environmental Assessment Act*. However, the proposed action will require assessment and approvals under the *Mining Management Act* to ensure the environmental issues associated with the proposed action are effectively managed.

This decision is made in accordance with clause 8(2) of Environmental Assessment Administrative Procedures, and subject to clause 14A the administrative procedures are at an end with respect to the proposed action.

DR PAUL VOGEL

CHAIRMAN

NORTHERN TERRITORY ENVIRONMENT PROTECTION AUTHORITY

JULY 2018

Attachment A:
Northern Territory Government Advisory bodies consulted on the Notice of Intent

Department	Division
Department of Environment and Natural Resources	Flora and Fauna Water Resources Weeds Environment Bushfires NT Rangelands
Department of Infrastructure, Planning and Logistics	Lands Planning Infrastructure Transport
Department of Primary Industry and Resources	Fisheries Mining Compliance Petroleum Primary Industry
Department of Tourism and Culture	Heritage Tourism NT Arts and Museums Parks and Wildlife
NT Police, Fire and Emergency Services	Business Improvement and Planning
Department of Health	Environmental Health Medical Entomology
Department of Trade, Business and Innovation	Economics and Policy Strategic Policy and Research
Department of Housing and Community Development	Maintenance Planning Housing supply
Power and Water Corporation	
Aboriginal Areas Protection Authority	Technical
Department of the Attorney-General and Justice	Commercial Division NT Worksafe
Department of the Chief Minister	Economic and Environmental Policy