Submission on the Supplement to the Draft Environmental Impact Statement

PNX Metals Limited – Fountain Head Gold Project

Government authority: Aboriginal Areas Protection Authority (the Authority)

Section of Supplement to Draft EIS	Theme or issue	Comment
Section 5.1.1	Regulatory requirements – Sacred Sites	The Supplement states that the Proponent is committed to complying with the conditions of Authority Certificate C2021/019, issued by the Authority on 24 March 2021.
Section 5.2.17	Potential impacts to downstream sacred sites	The Authority considers that the Supplement has effectively outlined the measures to be undertaken to avoid biophysical impacts to a downstream sacred site (a billabong/waterhole), including additional monitoring of surface water quality and contingency measures to be put in place in the case of adverse results. In addition, the Supplement explains that groundwater modelling indicates a negligible change in groundwater levels at the site and therefore no changes to the hydrology of this sacred site is expected. The Authority considers this response to be appropriate and it demonstrates that there is only minimal risk of impact to a downstream water-based sacred site, and that the proponent has measures in place to mitigate such impact.

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Our ref: DEPWS2021/0292

Ms Kylie Fitzpatrick
Department of Environment, Parks and Water Security
GPO Box 3675
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Dear Ms Fitzpatrick

Re: PNX Metals Limited, Fountain Head Gold Project - Supplement to the Draft Environmental Impact Statement (Supplement)

The Department of Environment, Parks and Water Security (DEPWS) has assessed the additional information submitted for the above Supplement and provides the following comments:

Flora and Fauna Division

The Flora and Fauna Division recommends that the Northern Territory Environment Protection Authority (NT EPA) request further information relating to the risks to biodiversity, aquatic health and significant and sensitive vegetation.

Section of Supplement to Draft EIS	Theme or issue	Comment
5.1.6 5.2.13	Terrestrial Ecosystems	Comments provided by the Flora and Fauna Division on the Environmental Impact Statement (EIS) noted that "the baseline characterisation and identification of sensitive habitats and fauna species is deemed inadequate and requires greater sampling effort across environmental gradients, including the types of stream habitats, and across the degree of exposure to impacts from previous mining". The Supplement states that "No sensitive species, ecosystems or habitat features were recorded in the study area (ERIAS, 2021b)". This response is not supported and appears to be inconsistent with aerial imagery, vegetation mapping and information provided in the EIS. In particular, there is riparian vegetation and wetland habitats located adjacent and downstream of the proposal. In the Northern Territory, these features are identified as significant and sensitive in the Land Clearing Guidelines and are known to support important biodiversity values. The Flora and Fauna Division recommends that the NT EPA seek further information addressing the comments on the EIS. This information is necessary to establish the baseline condition of these

		habitats and assess the level of risk to their associated values (and not limited to beneficial uses).
5.2.7 5.2.17	Hydrological Processes	Comments provided on the EIS requested that the proponent "Demonstrate that any potential impacts to groundwater, surface water, and the downstream environmental values (including GDE's) and cultural and heritage values, is in accordance with the environment decision making hierarchy to avoid, minimise and mitigate". The Supplement correctly identifies the potential for Groundwater Dependent Ecosystems (GDE's) to occur adjacent to and immediately downstream of the proposal. It is unclear however, why further information on these features has not been provided in the Supplement. Furthermore, it is unclear why the Water Management Plan appears to focus on Monsoon Vine Forest when other vegetation types and landscape features are also characterised as GDE's. As there are potential GDE's mapped adjacent to and downstream of the proposal, the Flora and Fauna Division recommends that the proponent establish the baseline condition/values of these features and assess whether there is potential for groundwater drawdown/mounding to have impacts.
5.2.13	Inland Water Environmental Quality	The Flora and Fauna Division has previously provided recommendations on the biological monitoring program for receiving waters downstream. Those recommendations do not appear to have been adopted with the proponent opting to abandon the program citing a predicted "negligible to low" impact to these habitats. The Supplement notes that active discharges from the mine site are not planned, however overflows/leakages will still occur on an annual basis into receiving waters. These unplanned releases contain contaminants that have the potential to impact on aquatic health downstream of the proposal. As such, the Division considers that it is appropriate that the proponent adopt the Division's recommendations and update the biological monitoring program and establish a baseline condition for waterways that may be subject to overflows/leakages. The biological monitoring program should be implemented for the life of the mine and until the site has been suitably rehabilitated.

Water Resources Division

Section of Supplement to Draft EIS	Theme or issue	Comment
3.4 – Evaporation Pond and Pit Water Quality	Scenario 2: Assumes diversion of 80% of the Fountain Head upper catchment water through the Fountain Head pit at the end of mining	Scenario 2 for the pit lake at mine closure identified in the EIS Supplement includes diversion of 80% of flows from the upper catchment of Fountain Head Lake. The 'upper catchment' and associated waterways have not been clearly defined in the Supplement. Material change to the shape, volume, speed or direction of flow, or alteration to the stability of bed and banks of a

		waterway will trigger a requirement for a permit to interfere with a waterway under section 41 of the *Water Act 1992*.
Fountain Head Gold Project Mine Closure plan	Impact to Sothern Flow Path at mine closure	The 'Southern Flow Path' (Strahler stream order 2) intersects the site. The Fountain Head Gold Project Mine Closure Plan identifies that at mine closure the integrated waste landform will intersect the Southern Flow path and a flood diversion channel will be implemented. Material change to the shape, volume, speed or direction of flow, or alteration to the stability of bed and banks of a waterway will trigger a requirement for a permit to interfere with a waterway under section 41 of the *Water Act 1992*. Prior to commencement of construction works which may alter the flow regime of the Southern Flow Path or of the Upper Catchment, project specific advice should be sought from the Water Resources Division. Further information on permit requirements for interference with a waterway is available in the DEPWS factsheet Mining and Petroleum Activities: Interfering with a waterway.
Appendix 4 - Groundwater Monitoring Plan	Proponent's response to previous issues raised regarding groundwater monitoring triggers	The proponent has adequately addressed issues previously raised by the Groundwater Assessment Unit, and has produced a groundwater monitoring plan that details how they intend to track how closely the proposed dewatering aligns with their modelled predictions. The proponent has also set thresholds to trigger reassessment if monitoring indicates a deviation from the original monitoring. Lastly, the proponent has identified the need for a network of new monitoring bores that are deep enough to measure the predicted drawdown over the life of the project.
Appendix 7 - Commitments register	Inconsistencies between submission documents	It is noted that many of the commitments regarding groundwater monitoring described in Appendix 4 (Groundwater Monitoring Plan) and Appendix 5 (Water Management Plan) do not appear in Appendix 7 (Commitments Register). The proponent should ensure that these two documents are consistent and include all commitments regarding groundwater and not only those related to septic systems.
Supplement to EIS, Chapter 5 'Response to Submissions'	Groundwater modelling	Previous comments provided on the draft EIS included the following points: • Revise, expand and improve the local monitoring (groundwater and surface water) network for better modelling outcomes (predictions) and to reduce model uncertainty/assumptions. • Review and refine the model input data such as estimates of hydraulic conductivity (kH and kV). • Monitor and collect an appropriate baseline dataset to evaluate the surface water and groundwater interactions with a focus on developing post closure monitoring of the groundwater system. • Refine the conceptual model and improve the numerical model.

		• Address the limitations and uncertainties in the models in the EIS, and propose approaches to model refinement to improve predictions for surface/groundwater interactions. The proponent has not yet demonstrated that these points have been adequately addressed. The proponent performed additional modelling to predict mounding over the life of the project and post-closure. However, it has not yet been demonstrated that the original MODFLOW model itself has been improved using additional field data or improved conceptualisation of the groundwater system. The groundwater model provided in the draft EIS submission has been reviewed by the Groundwater Assessment Unit and deemed to only have characteristics of a Class 1 model based on the criteria in the Australian Groundwater Modelling Guidelines (Barnett et al. 2012). Such models are described as only being able to 'Provide first-pass estimates of extraction volumes and rates required for mine dewatering'. The proponent's groundwater modelling description in the 'Site Water and Solute Balance Modelling' included with the original draft EIS states 'at the current study Stage, the results of the groundwater model are considered preliminary because of a lack of relevant hydraulic property data that can be used for model refinement and model calibration', which supports the categorisation of the model only having features of a Class 1 model. The Australian Groundwater Modelling Guidelines (Barnett et al. 2012) recommends at least a Class 2 model for adequate impact and water balance modelling for dewatering projects. Some specific points are provided here regarding the deficiencies in the proponent's current MODFLOW groundwater model: • Existing groundwater monitoring is inadequate for the calibration of the numerical model to a Class 2 standard. The only groundwater monitoring data used for model calibration are '13 groundwater level observations from July 2019 and three observations with earlier unknown dates'. Furthermore, only a selection of these bores appear to be surveyed using differential GPS. • The model calibration is primarily reliant on the modelled pit water level, groundwater inflow and infiltration from the Evaporation Pond. This needs to be drastically improved to achieve a Class 2 categorisation. • The model has been developed using very limited field-derived aquifer parameters, and none from this specific site. • Calibrated model parameters all appear to be low.

		• Specific yields and hydraulic conductivities of the same or similar formations of the Pine Creek Orogen (Mount Bonnie Formation and Burrell Creek Formation) have typically found to have a range of 0.01-0.04 and 0.04-1.2m/day (assuming an aquifer thickness of 100m - likely an overestimate), respectively, depending on weathering/fracturing. • The annual recharge estimate of 33mm/year represents just over 2% of annual rainfall (approximately 1,400mm/year at Brocks Creek). Other aquifers in the top end of NT (influenced by monsoonal periods), are typically found to be recharged at rates of 10-20% of annual rainfall. Further, BoM's AWRA-L model estimates potential diffuse recharge at this location to be approximately 80-110mm/year, and modelled diffuse recharge provided to DEPWS by CSIRO estimates it to be 300-330mm/year. These represent 6-24% of annual recharge, and are much more reasonable given previous site-specific estimates for this climate region and aquifer type. The above points could have significant implications for the potential pit inflows and required dewatering volumes (and subsequent disposal) over the project life. As such, Groundwater Assessment disagree that this model represents a conservative estimate of the water balance. At this stage, the proponent should instead be trying to demonstrate that their model is a Class 2. The following recommendations are made for the proponent to consider as priorities for improving the groundwater model's performance for predicting potential impacts to the surrounding environment and dewatering requirements: • Surveying of all monitoring bores using differential GPS methods. • Expansion of monitoring bore network, as described by Appendix 4 (Groundwater Monitoring Plan) • Site-specific aquifer testing to determine field-validated hydraulic conductivity and storage parameters. • Time-series groundwater levels at most (if not all) existing monitoring bores over at least one wet season and dry season cycle (to better constrain recharge estimates). The list above is not exhaustive, and represents suggestions for the bare minimum improvement to the existing model. The proponent should seek the advice of a suitably qualified expert to determine the most efficient means of improving the existing model to the required level.
NA – general comment	Unregistered bores	The proponent has listed numerous groundwater monitoring bores in this submission and other submissions for different mines in this area that are not yet registered with the Department. All known bores are required to be registered.

		The proponent should undertake a bore audit, determine which bores are not currently registered, then send all available information (i.e. coordinates, drilling details, lithology, yield, water quality and construction) of unregistered bores to water.regulation@nt.gov.au and request Registered Numbers (RNs) be assigned to them.

Environment Division

The Environment Division has identified potential issues relating to the discharge of contaminates from the mine site to a waterway. The information provided within the Supplement stated:

> 'The approach to management of water and wastewater has not changed since the submission of the draft EIS and a licence to discharge water under the *Water Act 1992* will not be required as water is not proposed to be discharged off lease to waterways, such as rivers and streams. All wastewater is still planned to either be recycled or retained on site within water storage areas such as the evaporation pond. Site water quality monitoring results will be screened against the revised ANZECC/ARMCANZ (200) values (ANZG, 2018) to understand potential risks and inform water management strategies (as per the Water Management Plan (WMP)). Runoff from sediment dams around bunded hardstand areas and the IWL will be diverted to the Fountain head Lake Catchment or the evaporation pond catchment, whereby it will be diluted prior to release offsite'.

Fountain Head Lake is considered to be a waterway and sits within a natural drainage line which during the wet season becomes an ephemeral stream. The proponent is required to hold a Waste Discharge Licence if waste or polluted water is not confined within the mining site on which the activity is being carried out. The unauthorised discharge (active or passive) of polluted water (diluted or non-diluted) to a waterway is considered an offence under the *Water Act 1992* and the *Waste Management and Pollution Control Act 1998*. The proponent should further address its obligations under the *Water Act 1992*.

Rangelands Division

Weed Management Branch

The previous recommendations and comments in relation to weed management for the Draft EIS have been addressed in the Supplement and further commitments by the proponent have been made in the report. Should these commitments by the proponent be carried out then the Weed Management Branch has no further comment.

Parks and Wildlife Division

The Supplement to the draft EIS identified: (1) management of long term surface flows is currently under evaluation; (2) the feasibility for diverting water to the Fountain Head pit post-closure needs to be assessed; and (3) the potential impacts to the environment from diverting natural catchment runoff and the downstream discharge need to be further considered.

Section of Supplement to Draft EIS	Theme or issue	Comment
Water Management Plan (WMP) Table 5.1 & section 3.3.5.3	Information gaps Management of long term surface flows requires further feasibility and assessment. Modelling is theoretical only, and does not consider the feasibility or a practical design for diverting water from the Fountain Head Lake catchment to the pit. The feasibility of doing this needs to be explored, and the potential impacts to the environment from diverting natural catchment runoff and the downstream discharge need to be further considered. Scenario 2 (identified as the preferred option) assumes diversion of 80% of the natural catchment water through the Fountain Head pit at the end of mining (2025).	• Previous comments by the Parks and Wildlife Division in 2020 identified that this proposal is located in the upper reaches of the Adelaide River catchment, a number of parks and reserves are located downstream and proposed activities will have an impact on land located downstream if water discharges from the project. • The downstream parks and reserves include the Adelaide River Foreshore Conservation Area, Window on the Wetlands Visitor Centre, Harrison Dam Conservation Area, Djukbinj National Park and Melacca Swamp Conservation Area. These parks and reserves contain a number of natural, cultural and recreational values. • The Division supports the use of proactive management techniques to deal with potential impacts, particularly managing chemical spillage, waste rock and ore leaching, surface water runoff, as well as managing weeds through regular monitoring and control.
Appendix 18 Mine Closure Plan 6.6.2 & 8.1	Issues: (1) The feasibility for diverting water to the Fountain Head pit post-closure needs to be assessed and the potential impacts to the environment from diverting natural catchment runoff and the downstream discharge need to be further considered. (2) No structures will be retained on site to divert surface flows, the site-wide concept is to return drainage to the natural flows.	• Provide details on how the proponent will achieve diverting 80% of natural water runoff at the end of mining whilst implementing the "site-wide concept" to return drainage to natural flows at the end of mining. • Update the Mine Closure Implementation Schedule to include timing for site-wide drainage reinstatement works.

Should you have any further queries regarding these comments, please contact Rebecca de Vries by email Rebecca.deVries@nt.gov.au or phone (08) 8999 4454.

Yours sincerely

Maria Wauchope
A/Executive Director, Rangelands

22 December 2021

NORTHERN TERRITORY GOVERNMENT

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16 December 2021

Ms Kylie Fitzpatrick
Manager Environmental Assessment
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Via email: eia.ntepa@nt.gov.au

Dear Ms Fitzpatrick

Re: Invite to comment - PNX Metals Limited – Fountain Head Gold Project

Thank you for the opportunity to comment on the supplement to the draft Terms of Reference (ToR) for PNX Metals Fountain Head Gold Project.

The Mining Operations Branch of the Department of Industry, Tourism and Trade has reviewed the documents and has provided comments on the draft ToR at Attachment A.

If you require any further information please contact Mairi Walsh, Manager Resource Regulatory Reform at StrategyPolicyCoordination.DITT@nt.gov.au or on 8999 7020.

Yours sincerely

BRETT EASTON
Director, Resource Policy and Reform

Attachment A - Submission on the Supplement to the Draft Environmental Impact Statement

PNX Metals Limited – Fountain Head Gold Project

Government authority: Department of Industry Tourism and Trade

Summary: The Mining Operations Branch has reviewed the Fountain Head Supplement to the Draft EIS and, with the exception of the below comments, considers the Supplement to the draft EIS adequately addresses potential environmental impacts and risks, and details appropriate management measures.

Section of Supplement to Draft EIS	Theme or issue	Comment
Section 2.4 PAF Stockpile And Appendix 8	Potential for acid metalliferous drainage (AMD)	Section 2.4 explains that PAF waste will now be stored within Fountain Head Pit, encapsulated in 3 separate pods. Pods 2 and 3 are below the depth of the future pit lake water table; however, part of Pod 1 is above the pit lake water table. Pod 1 will contain the highest amount of PAF material at 470,300 LCM. DITT officers are concerned that Pod 1 will not be sufficiently submerged at closure to prevent oxidisation. In addition, all three pods will be exposed until the pit is flooded at closure. Adequate details for management of this risk have not been provided.
Section 3.4 Evaporation Pond and Pit Water Quality	Potential long term impacts	Two scenarios are described for management of the pit post mining, both of which have potential risks. Scenario 1 leads to high loads of arsenic in pit water, but no overtopping. Scenario 2 leads to lower arsenic concentrations, but the pit overtops regularly. Scenario 2 is PNX's preferred option. Whichever scenario is adopted, PNX has not demonstrated an understanding of the potential long term impacts to the surrounding environment and/or described appropriate management and mitigation of those impacts.

Submission on the Supplement to the Draft Environmental Impact Statement

PNX Metals Limited – Fountain Head Gold Project

Government authority: Department of Industry, Tourism and Trade – Tourism Division

Section of Supplement to Draft EIS	Theme or issue	Comment
Section 5.2 15.2	Dust and Transport Impact	• It is noted that "The proposed traffic generated by the operation of the site will result in an increased traffic of 145% (32 trips) along Fountain Head Road and 0.3% (4 trips) along Stuart Highway". This will lead to increased traffic near the Adelaide to Darwin Level Crossing along Ban Ban Spring Road. Given the history, it is advised that the proponent carry out further assessments to understand the need of traffic management near the level crossing. Especially, inclusion of temporary road signage layout and traffic management plan near the railway crossing. • The proponent has stated "The Ghan will be consulted in relation to blasting activity". Tourism NT recommends this to be done prior to commencement of the project and to notify any potential impacts of the blasting to the passenger trains operating.

From: PFES, Secretariat <Secretariat.PFES@pfes.nt.gov.au>
Sent: Tuesday, 14 December 2021 11:05 AM
To: Fitzpatrick, Kylie <Kylie.Fitzpatrick@nt.gov.au>
Cc: PFES, Secretariat <Secretariat.PFES@pfes.nt.gov.au>; Suradi, Emma <Emma.Suradi@pfes.nt.gov.au>
Subject: TRM: NTPFES Response: PNX Metals Limited, Fountain Head Gold Project - Supplement to the Draft Environmental Impact Statement

Good morning Kylie

In response to your below email, please refer to the following advice:

- The remote location of the operation is outside the Northern Territory Fire Rescue Services (NTFRS) Emergency Response Area, which limits our ability to respond to an emergency in a timely manner;
- With regards to road crash/response, the NTFRS crews will respond as required within existing capacity as with any other crash. If the timeliness of that response does not adequately mitigate the risk for PNX Metals Limited then self-funded measures should be implemented;
- The NTFRS is able to advise PNX Metals Limited on current capabilities in the vicinity of their operations to inform their risk assessment; and
- The NTFRS are not in a position to provide comment around environmental impacts within this request for comment.

Should you require anything further, please do not hesitate to contact this office.

Regards

Nadia

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