Submission on proponent initiated EIS referral information and draft terms of reference

Castile Resources Pty Ltd – Rover 1

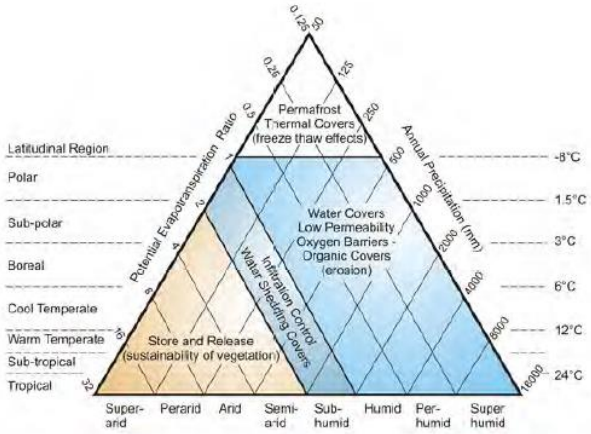
This submission is made under regulation 53 of the Environment Protection Regulations 2020

NT EPA reference number: EP2023/030

Government authority: Department of Industry, Tourism and Trade

Summary: Mining Operations comments provided is based on assessment of the key project components and activities, assessed against the Proponent Terms of Reference document and has focussed on the key risks of the project.

Section of referral or terms of reference	Theme / issue	Comment
2.2.5 ToR Site selection and design; ToR (Table 1 – Design)	Justification for proposed location of key infrastructure such as TSF and WRD	Section 2.2.5 of the Draft ToR requires the Operator to appropriately justify the proposed layout with respect to avoidance of potential impacts. Although the Operator cites the use of standard industry guidelines such as ANCOLD and GARD for the project, Mining Operations notes that no justification has been provided for the proposed location of key landforms that are to remain at closure such as TSF and WRD. Guidance documents such as ANCOLD and GARD explicitly require justification for the proposed locations for siting of such landforms with consideration of factors such as localised faults that may be major hydraulic pathways to groundwater and groundwater recharge zones. Given the site is located within the Tennant Creek Water Control District, the volume and quality of seepage from these landforms into the underlying groundwater poses a major risk that remains. Therefore, it is essential that any proposed locations for the WRD and TSF be demonstrated to consider the regional importance of the groundwater resource and appropriate justification provided on the final locations of these landforms.
ToR – Table 1 – Design	WRD design rationale	The proposal indicates waste rock to be disturbed has been classified as: • NAF • NAF – HS (High Sulfur) • PAF – LC (Low Capacity) • PAF During the early stages of project development, waste rock will be brought to the surface until sufficient capacity becomes available in the underground voids for the preferential disposal of PAF waste rock streams. Any PAF classified waste rock that is to be managed in a surface WRD will be managed within a dedicated PAF cell constructed within the WRD and blended with NAF that has high Acid Neutralising Capacity (ANC). This is consistent with the

Section of referral or terms of reference	Theme / issue	Comment
		GARD guidelines, given the various types of waste rock to be disturbed and the Operator is commended for this approach. However, a key element of the WRD structure that has not been appropriately discussed is the final cover system that is to be applied. The Operator has proposed the use of a Store-and-Release cover system, without discussion of why such a design is appropriate. Chapter 6 (Figure 6-9) GARD guidelines, reproduced below, provides advice on appropriateness for cover systems. Further, International Network for Acid Prevention (INAP) has developed specific guidance on cover systems[1]. Any WRD landforms that is to remain on the surface at closure require careful design, especially given the sensitive water control district of this proposal.  An options analysis of the various cover systems is recommended to demonstrate the chosen design will meet appropriate design and environmental objectives, given the properties of the waste rock and the climatic setting,.
ToR – Table 1 – Design, Ore processing and Tailings	TSF design rationale	The proposal indicates a Tailings Storage Facility (TSF) will be developed in accordance with ANCOLD guidance, amongst other leading practice guidelines. Two options have been provided (underground disposal as paste fill or management in and an above ground TSF), but a preferred option has not been identified. Accordingly, Mining Operations is unable to provide advice on the appropriateness of the tailings management for the following reasons: • Appendix C – Geochemical Characterisation of Waste Rock describes the resource as an IOCG deposit, hosted in magnetite and hematite ironstones at depths of between 300 and 600m. Geological descriptions of the stratigraphy of the local area indicate fresh (i.e. unweathered rocks) below 120m.

[1] INAP (2017) Global Cover System Design – Technical Guidance Document.

Section of referral or terms of reference	Theme / issue	Comment
		This suggests fresh ironstones hosting the ore will be disturbed. As such there are similarities with other known and worked ironstone deposits in the Tennant Creek Area such as Warrego and Peko, where tailings produced from processing or magnetite-ironstone-hosted ores shows strong PAF character. The geochemical characterisation has been limited to potential waste rock that is to be disturbed. A big data gap remains on the potential AMD character of the tailings. Given the issues observed at Warrego and Peko, understanding of the geochemical properties of the tailings waste to be produced is essential to inform appropriate design for the TSF. • ANCOLD guidelines provides advice on advantages and disadvantages of the dry-stacking method. Based on this, a key issue for use of dry-stacking is the potential for AMD production, if tailings are assessed to be PAF, as the moisture will be reduced that will increase the propensity for oxidation. A second key issue, as highlighted by the guidelines is the management of tailings dust, given the tailings will be dried. Please refer to this document for the full description. • An alternative option proposed for the management of tailings is in the underground voids, which will be flooded once mining is completed. Aqueous submergence of high-PAF materials is consistent with GARD (refer to Figure 6-9). However, a major data gap remains on the predicted water quality, once the underground voids filled with water, based on the potential volumes of waste to be disposed, the geochemical properties of the tailings and the timeframe that tailings will be exposed to conditions conducive to oxidation before it is submerged. • A single basal liner is proposed for the design of the TSF. Similar to our feedback on the WRD design, justification for the has not been provided for the proposed location of the TSF in consideration of factors such as localised faults that may be major hydraulic pathways to groundwater and groundwater recharge zones. This is an essential requirement under ANCOLD guidelines.
ToR – Table 1 – waste rock	Geochemical characterisation	Appendix C provides an assessment of the waste rock that has been undertaken the following categories of waste rock developed: • NAF • NAF – HS (High Sulfur) • PAF – LC (Low Capacity) • PAF Table 9, Appendix C provides the criteria for the waste categories. Based on the proposed criteria, up to 25 % of NAF materials may fall in the PAF-LC category or vice-versa

Section of referral or terms of reference	Theme / issue	Comment
		(i.e. 25 % of PAF-LC materials may fall within the NAF category). Despite this, the report indicates that operationally, this should not be an issue as mixing/blending will of these materials will result in adequate neutralisation of any potential acid produced. While this is correct, that overall acid production will be minimised by the excess of acid neutralising minerals, metals/salts (i.e. NMD and/or SMD or SD) may likely be liberated until the produced acid is neutralised. Fortunately, due to the dolomitic/carbonate nature of the materials, this neutralisation is expected to be rapid. The volume of NMD/SMD or SD produced will require assessment to determine whether the project water quality will still be achieved. Table 8 of the report provides an indication of the types of metals that maybe released and it will be important to include such analytes in any water quality monitoring program.
ToR – Table 1 – waste rock	Geochemical characterisation	The geochemical assessment indicate that there is no correlation between PAF and lithological types. This suggests field based indicators will not be useful in rapid PAF discrimination. Of key importance are the materials belonging to the NAF-HS category. Despite the high sulfur, these materials are classified as NAF due to the high reported ANC. Deionised water testing, to simulate effects from rainwater on these materials, indicate liberation of appreciable amounts of Mo, Ni and Zn metals and elevated sulfate, Ca and/or Mg. This suggests that such materials may exhibit Neutral Metalliferous Drainage and/or Saline Drainage. Further, out of the 27 samples subjected to deionised water tests, only 4 were associated with NAF-HS category, and interestingly, all 4 samples were identified to be ironstone. The referral indicates that NAF will be preferentially used in construction of landforms and related infrastructure. It is highly recommended that NAF-HS be excluded from use in construction, especially rehabilitation. Given the small number of testing on these samples, further assessment will be required. Lastly, there appears to be somewhat confusion in the nomenclature used on the NAF-HS. The remaining three category of wastes (NAF, PAF-LC and PAF) are broadly indicative of the material geochemical behaviour. However, the use of the term “high-sulfur” has no relevance in terms of its geochemical behaviour. It is recommended the terminology of this material type be changed to be consistent with other three category types.
ToR – Table 1 – waste water management	Water inventory management	Inadequate information has been provided on how water will be managed. Table 2-3 of the referral document indicates “*a series of ponds will be required to manage raw and mine waters. The sizing of water management infrastructure and length of pipelines required, is currently unknown and will be confirmed*

Section of referral or terms of reference	Theme / issue	Comment
		following collection of baseline data and development of water balance". Given this uncertainty, the number of ponds/dams required to manage the dewatering activity is unknown, nor is it understood how surplus water, if present, will be managed. Given the lack of natural waterways, that would impede application for waste discharge licence, management of water inventory, particularly if excess water will be generated, will a key aspect of the project.
2.2.7 ToR – Rehabilitation and Closure	Mine Closure	Given the advice provided on waste rock and tailings, the closure aspects of these landforms will require further scrutiny. The referral makes generic statements on adoption of best-practice on mine closure, however this has not been demonstrated.

Please be advised the following petroleum Exploration Permit (EP) Applications are located within NT Portion 3556:

Title	Title Holder/s	Contact Details
(EP) 199	Wiso Oil Pty Ltd (100%) Blue Energy (Manager)	
(EP)160 (EP)129	Merlin Energy Pty Ltd (100%) Central Petroleum Limited (Manager)	
(EP)262	Territory Gas Aust Pty Ltd (100%) Australian Mining & Exploration Titles Services Pty Ltd (AMETS) (Manager)	

Castile Resources Pty Ltd hold the below mineral titles which are identified in their Rover 1 Project.

EL27039

EL27372

EL25511

EL27292

EL24541

ELR29957

ELR29958