



HASTINGS
Technology Metals Limited

APPENDIX 10



HASTINGS
Technology Metals Limited

Office of the Chief Health Officer
Public Health Division
Department of Health
PO Box 8172
Perth Business Centre WA 6849

07/12/17

Dear Professor Tarun Weeramanthri,

Re. Public health considerations

Hastings Technology Metals Limited (Hastings) has referred the Yangibana Rare Earths Project (the Project) to the Environmental Protection Authority (EPA) and received a Public Environmental Review level of assessment. The EPA prepared a Draft Environmental Scoping Document and you provided comment (dated 5th May 2017). While the comments have not been specifically addressed in the approved Environmental Scoping Document, the EPA recommended that Hastings consider the comments and respond directly to the Department of Health (DoH).

Dr Lara Jefferson (Environmental Manager, Hastings) and Mr Stefan Wolmarans (Project Manager, Wave) met with Mr Vic Andrich on the 21st of August, 2017. Mr Andrich systematically discussed each of the public health concerns in your correspondence to the EPA. Hastings agreed to provide a formal response outlining how we have considered each of the public health concerns for the Project. The attached documentation provides a written summary of public health considerations for the Project and also includes relevant management plans for review:

- Public Health Considerations
- Drinking Water Quality Management Plan (draft)
- Mosquito Management Plan

Should you have any questions regarding the documentation, please contact Dr Lara Jefferson (lara.jefferson@hastingstechmetals.com; 0477 340 613).

Sincerely,

Viv Roberts
DIRECTOR, MINING OPERATIONS

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HASTINGS
Technology Metals Limited

Yangibana Rare Earths Project

Public Health Considerations

	Document Status			
Rev	Author	Reviewer	Approved	Date
A	Lara Jefferson	Stefan Wolmarans		24/08/17
0			Viv Roberts	28/11/17

1 INTRODUCTION

Hastings Technology Metals Limited (Hastings) proposes to develop the Yangibana Rare Earths Project (the Project), located approximately 270 km east-northeast of Carnarvon, in the Upper Gascoyne region of Western Australia (WA). The Project will involve mining above and below the ground water table, on-site processing of ore, water abstraction, and transport via road to port for export.

Dr Lara Jefferson and Mr Stefan Wolmarans (representing Hastings Technology Metals Limited [Hastings]) met with Mr Vic Andrich (Department of Health [DoH]) on the 21st August 2017 to recognise relevant public health issues of the Yangibana Rare Earths Project (the Project). A letter (dated 5th May 2017) from the DoH addressed to Mr Anthony Sutton (EPA) in response to the Draft Environmental Scoping Document for the Yangibana Rare Earths Project (Project), which is currently being assessed under Part IV of the Environmental Protection Act 1986 (WA).

The letter highlighted a number of human health concerns. The comments and information in the letter were used as the basis for the discussion. The following information provides a written summary of public health considerations to be addressed by Hastings.

Hastings has since submitted a Section 41 (*Environmental Protection Act 1986*) application for consideration by the EPA for minor or preliminary work i.e. construction of the access road, accommodation village and associated infrastructure. Approval of the Section 41 application by the EPA will allow Hastings to construct the access road and accommodation village prior to approval of the broader Project.

2 PUBLIC HEALTH CONSIDERATIONS

2.1 LOCATION OF SITE AND TRANSPORT OPTIONS

The Project is located 10 km north of the Lyons River, approximately 150 km northeast of Gascoyne Junction and approximately 150 km southeast of the mining hub of Paraburdoo.

There are no other mining developments in the local Shire of Upper Gascoyne. While potential mineral deposits are known to occur in the region, the only mining operations underway are salt production at Useless Loop in the Shire of Shark Bay and at Lake MacLeod near Cape Cuvier, north of Carnarvon.

Mount Augustus National Park is approximately 80 km south east of the Proposal and the north eastern corner of the Kennedy Range National Park is approximately 100 km south west of the Proposal.

The nearest Aboriginal community is the Burringurrah community, which is located approximately 60 km from the Project area, and doesn't occur along the transport routes utilised by the Project.

Access to the mine site is via public roads. Hastings is currently communicating with the Shire of Upper Gascoyne regarding road improvements and on-going road maintenance activities. A 15 km gravel access road will be prepared from the public road to the accommodation village. Travel to and from the site by the work force will be a combination of fly in/fly out and drive in/drive out. The accommodation village is approximately 10 km from mining and processing activities.

2.2 WATER QUALITY ISSUES

Water will be sourced from groundwater bores and treated by a water treatment plant prior to consumption. A *Drinking Water Quality Management Plan* (draft) for the Project has been appended to this document for review and comment by the DoH. The *Drinking Water Quality Management Plan* has been prepared to comply with the *Australian Drinking Water Guidelines* and takes account of DoH guidelines:

- *Systems compliance and routine reporting requirements for mine sites and exploration camps*
- *Small community model assessable sampling grid*
- *Materials and substances in contact with drinking water*

2.3 WASTE WATER

A waste water treatment plant forms part of the supporting infrastructure for the accommodation village, and is a component of the Section 41 application, currently being assessed by the EPA. The Section 41 application states:

“A Department of Health approved waste water treatment plant (WWTP) will be used to service the accommodation facilities. The WWTP comprises the following treatment phases:

- *Anaerobic treatment phase: Settlement in primary or holding tank.*
- *Aerobic treatment phase: Primary biological treatment.*
- *Clarification phase: Humus removal in secondary settling tank.*
- *Disinfection phase: Chlorine contact tank with Pill type or Liquid Chlorine Dosing.*
- *Effluent polishing phase: Media filtration, phosphate removal, UV disinfection, and membrane filtration.*

The treated effluent will be of sufficient quality to provide sub-surface irrigation for landscaping around the accommodation village, if required. Alternatively, treated wastewater will be disposed in a fenced irrigation field (approx. 1 ha in area) in accordance with AS/NZ 1547:2012.”

The section 41 application also recognised approval requirement of the DoH in other approvals requirements, specifically:

“Waste water treatment plant installation and approval to dispose of treated waste water on gardens required under the Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974 (WA)”

Hastings also notes the (draft) Guidelines when considering the use of treated waste water on gardens at the accommodation facilities, namely:

Guidelines for the use of recycled water in Western Australia (DoH, April 2009)

2.4 PEST CONTROL

Pest control is considered within the Environmental Review Document. The approach that Hastings has taken is to deter or prevent entry of pests on site:

Weeds: Weed hygiene procedure that ensures all vehicles and machinery entering the site was cleaned at their source location. Inspections of all vehicles and machinery will be undertaken and

forms completed to record the inspection. Weeds exist on site, and Hastings will need to ensure these do not spread as a result of land disturbance and human activity.

Weed management is addressed in the *Flora and Vegetation Management Plan*, which will be appended to the Environmental Review Document (to be released for public comment; PER).

Fauna: Feral fauna (i.e. goats, dogs, cats, rodents, insects) will be deterred through management of waste (i.e. fencing landfill and regularly covering landfill with a layer of soil), management of water sources (i.e. maintenance of pipelines and dripping taps to reduce availability of water) and education/awareness training (i.e. ensure workforce do not feed fauna). Feral fauna management will be addressed in three documents:

1. *Fauna Management Plan:*

- feral fauna: Training and awareness of workforce i.e. will not feed feral animals, trapping program,
- non-native fauna: consideration of pastoral activities, training and awareness, speed limits in vicinity of cattle grazing, land access requirements during mustering activities (in consultation with the pastoralist), and
- native fauna: training and awareness, snake handling, speed limits, incident reporting, egress from trenches and inspection of trenches and lined ponds during construction.

2. *Land Management Plan:*

- management of putrescible waste to deter feral fauna.

3. *Water Management Plan:*

- inspection and monitoring program of pipelines and facilities where water is used (e.g. waste water treatment plant), and
- fencing of evaporation pond.

If the services of a contractor for the control of a pest species are required, then Hastings commits to ensuring the contractor holds a current Pest Management Technician Licence; and is employed by a Registered Pest Management Business in accordance with the Health (Pesticides) Regulations 2011 (WA). Hastings also notes that if employees were to apply pesticides/herbicides as part of a pest management program, then employees will need to be provided with sufficient knowledge, skills and training and personal protective equipment to safely apply pesticides/herbicides. Material safety data sheets will be maintained and available to employees in a folder where the pesticides/herbicides will be stored.

2.5 MOSQUITOES

Hastings sought the advice of Mr Andrew Jardeine (Mosquito Branch, DoH) on 24 August, 2017 to determine the level of risk to human health of mosquito outbreaks at the Project area. Mr Jardeine said the risk of mosquito borne viruses in the area is considered relatively low during most of the year. However, heavy rainfall events, and the presence of people at the Project, would result in short periods of high risk. Mr Jardeine suggested a Mosquito Management Plan should be in place to address mitigation strategies during high risk periods and has provided guidance materials to aid in the development of a Mosquito Management Plan.

Please refer to the attached *Mosquito Management Plan* for your review and comment.

2.6 DISASTER PREPAREDNESS AND EMERGENCY MANAGEMENT

The commitment to develop an *Emergency Response Plan* is made in a number of documents:

- the formal environmental impact assessment under the *Environmental Protection Act 1986* (WA), namely the Environmental Review Document (under development),
- the Radiation Waste Management Plan and Radiation Management Plan (in draft, for approval by the Radiological Council) under the *Radiation Safety Act 1975* (WA), and
- the Project Management Plan (in draft) for approval by the Safety Division of the Department of Mines, Industry Regulation and Safety (DMIRS) under the *Mines Safety and Inspection Act 1994* (WA).

Hastings will address potential public health impacts (population residing in accommodation facilities) of applicable incidents such as cyclones, bushfires, or flood events. Hastings will communicate with the local government, Shires of Upper Gascoyne and Carnarvon, regarding common infrastructure requirements and communications protocols in the development of management strategies should such an incident occur.

Hastings will refer to the *Critical Infrastructure Emergency Risk Management and Assurance Handbook* (Emergency Management Australia, 2004) in the development of the Emergency Response Plan. The *Emergency Response Plan* will include, but not limited to, consideration of:

- An evacuation plan
- Surge arrangements for mass casualty incidents
- Support for family members of injured employees
- Planning for extreme heat events
- Limited health infrastructure in the region
- Limited health specialists and general personnel in the region
- Distance
- Communications redundancy
- Disaster equipment
- Development of an Emergency Response Team and staff training
- Business continuity
- Communications with other agencies in the event the Emergency Response Plan is activated:
 - Department of Health
 - Department of Fire and Emergency Services
 - WA Police
 - St John Ambulance
 - Royal Flying Doctor Service

2.7 ASBESTIFORM MINERALS

There are no asbestiform minerals associated with the ore body or waste rock to be mined at the Project area as determined in the *Waste Characterisation Study* (Trajectory and Graeme Campbell and Associates 2017).

2.8 AIR QUALITY

An *Air Quality Assessment* (Pacific Environment 2016) has been conducted. The key pollutant sources during operations are:

- Mining operations
 - Blasting
 - Drilling
 - Material loading by excavators
 - Material unloading from haul trucks
 - Wheel generated dust from haul roads
 - Bulldozers on ore and waste rock
 - Conveyors
 - Wind erosion from stockpiles and open areas
 - Material loading into crusher by front end loader
- Processing plant operations (Acid bake kiln)
- On site power generation

Pollutants from the above emission sources include:

- Particles, as PM10, PM2.5, TSP and dust deposition
- Oxides of nitrogen (NOx) as nitrogen dioxide (NO2)
- Radon and Thoron

The acid bake kiln (in the processing plant) will produce the following impurities:

- Sulfur trioxide
- Sulfur dioxide
- Hydrogen sulphate
- Carbon dioxide

Impurities from the acid bake kiln will be removed via a combination of scrubbers and a precipitator (note, the final design will be based on outcomes of the pilot plant), and instrumentation will monitor the efficiency of the equipment.

Modelled ground level concentrations for key pollutants of interest were compared to ambient air quality assessment criteria (Pacific Environment 2016). The assessment considered the potential impact associated with the proposal, as well as the cumulative impact (i.e. in conjunction with the existing air quality of the project area). The assessment was made generally across the model domain, as well as at key sensitive receptor locations identified as being representative of protected environmental values.

Ambient air quality criteria are provided by the Department of Environmental Regulation (DER) as part of its Environmental Risk Assessment Framework (DER 2015). There is no formal dust deposition criterion available in WA. As such reference has been made to the New South Wales (NSW) criteria (DEC, 2001) for deposited dust, which are normally applied for assessments in WA. The NSW criteria set a maximum increase of 2 g/m²/month in dust levels with a maximum total deposited dust level of 4 g/m²/month. Deposited dust was assessed as insoluble solids as defined by AS 3580.10.1-1991.

The modelling results in isolation of other emission sources in the region indicated that the predicted ground level concentrations of TSP, PM10, PM2.5, dust deposition and NO2 are not significant, by comparison to the relevant criterion at receptor locations.

The proposal emissions were also modelled in conjunction with an estimate of background emissions, to estimate the potential cumulative impact on the environment. In the absence of site specific background monitoring information, conservative background levels were adopted for

pollutants and the cumulative impact should be considered in conjunction with background levels adopted. Given the remoteness of the proposal, background levels for NO₂ were assumed negligible.

Both short term impacts (24-hour timeframe) and longer term impacts (1-year) were considered. The modelling results for the proposal indicate that the predicted ground level concentrations for:

- Cumulative 24-hour TSP can be expected to be around 34.6 µg/m³ (44% of the criteria concentration of 82 µg/m³).
- Cumulative 24-hour PM₁₀ can be expected to be around 20.3 µg/m³ (44% of the criteria concentration of 46 µg/m³).
- Cumulative annual average PM₁₀ can be expected to be around 19.2 µg/m³ (70% of the criteria concentration of 27.5 µg/m³).
- Cumulative 24-hour PM_{2.5} can be expected to be around 3.1 µg/m³ (14% of the criteria concentration of 23 µg/m³).
- Cumulative annual average PM_{2.5} can be expected to be around 2.9 µg/m³ (41% of the criteria concentration of 7 µg/m³).
- Excluding background, the maximum monthly dust deposition is predicted to be 0.014 g/m²/month, at less than 0.7% of the criteria concentration of 2 g/m²/month.
- Cumulative 1-hour NO₂ can be expected to be less than 2% of the criteria concentration of 226 µg/m³.
- Cumulative annual average NO₂ can be expected to be around 13% of the criteria concentration of 56 µg/m³.

Therefore risk of impacts to the public as a result of air quality is considered to be low. Areas in the immediate vicinity of mining and processing will include dust management, specifically due to the presence of radionuclides in the ore body. Dust suppression measures are described in:

- *Flora and Vegetation Management Plan*
- *Radiation Waste Management Plan*

Monitoring for Legionella bacteria will be conducted where evaporative air conditioners are utilised. Hastings will ensure the camp contractor will include this consideration in the *Camp Health and Safety Management Plan*.

2.9 FOOD SUPPLY/PREPARATION

Hastings has recently developed *Scope of Services and Specification – Village management* documentation for the yet-to-be-determined camp operator, which includes compliance with the *Food Act 2008* and associated code, standards and regulations. Specifications relating to the safe transportation of food are currently being added to the document. Specifically, the specification document includes a section on Food Safety and Quality Control and includes:

- Hazard analysis and critical point monitoring
- Food handling requirements
- Microbiological testing

- Food related illness procedures
- Hygiene and cleanliness
- Meal authorisation
- Food presentation
- Food choices

All food preparation and storage areas inside the mess building will be constructed to the relevant NCC and AS/NZ standards and be inspected after construction completion by the Shire health officer as part of the building approval and certification process.

2.10 ABORIGINAL ENVIRONMENTAL HEALTH

As described in section 1.0, the nearest Aboriginal community is approximately 60 km from the project area. Hastings works closely with the Traditional Owners (Thin-Mah Warianga, Tharrikari, Jivarli [TMWTJ]) to identify indigenous heritage values at the Project area. Hastings has voluntarily negotiated a Mining Agreement with the recent TMWTJ native title claim group (despite having all mining leases approved already).

The Mining Agreement includes, but is not limited to, consideration of job opportunities, use of Aboriginal contractors and training.

Hastings intends to maintain regular communications with the TMWTJ group through participation on the Implementation and Liaison Committee, as described in the Mining Agreement. The Mining Agreement is expected to be finalised in Q4, 2017.

2.11 ACCOMMODATION VILLAGE

Hastings is regularly liaising with the Shire of Upper Gascoyne with regards to complying with the necessary approval requirements for the accommodation village.

Relevant approvals for the accommodation village will be obtained by Hastings, or the camp contractor, include:

- Land tenure under the *Mining Act 1978 (WA)*: Application has been submitted, receipt of land tenure will occur following a Mining Agreement negotiation with Native Title holders
- Mining proposal and mine closure plan under the *Mining Act 1978 (WA)*
- Project Management Plan under the *Mine Safety and Inspection Act 1994 (WA)*
- 5C licence to abstract water under the *Rights in Water and Irrigation Act 1914 (WA)*
- Works approval and operating licence for the Waste Water Treatment Plant and landfill under Part V of the *Environmental Protection Act 1986 (WA)*
- Waste water treatment plant installation and approval to dispose of treated waste water on gardens required under the *Health Act 1911 (WA)* and Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974 (WA)
- Local government building permit under the *Building Act 2011 (WA)*
- Liquor (tavern) licence under the *Liquor Control Act 1988 (WA)*
- Tobacco licence under the *Tobacco Products Control Act 2006 (WA)*

- Registration of a food business under the *Food Act 2008* (WA)
- Communications licence under the *Radio Communications Act 1992* (WA)
- Approval to construct a public pool under the *Health Act 1911* (WA), and Aquatic Facilities Regulations 2007 (WA)

2.12 IMPACTS TO PROVISION OF LOCAL HEALTH SERVICES

Hastings will maintain medic services on site and offer assistance to pastoralists or the general public in the nearby vicinity in the event of an emergency. Where employees require urgent medical assistance, the Royal Flying Doctor Service (RFDS) will be utilised. Hastings will maintain a Code 3C purpose built airstrip that meets RFDS standards with appropriate portable lighting to allow for night time landing.

2.13 RADIATION

The target ore body occurs within monazite, which is known to contain radionuclides. During processing of the ore body, radionuclides are concentrated in two of the three tailings streams. Due to the presence of radionuclides, a Radioactive Waste Characterisation Assessment (RadPro 2016) and a Baseline Radiation Assessment (RadPro 2016) has been completed. A Radiation Impact Assessment (Jim Hondras 2017) reported that dose assessments show that exposure to:

- workers - less than 5 mSv/y
- public - less than 0.01 mSv/y

These values are well below regulatory dose exposure limits of 20 mSv/y for workers and 1 mSv/y for members of the public.

However, despite this Hastings is committed to applying the ALARA (as low as reasonably achievable) principle. In doing so, the following management plans have been developed:

- *Radiation Waste Management Plan*
- *Radiation Management Plan*

Radiation will be addressed in the Environmental Review Document as a component of the formal environmental impact assessment under Part IV of the *Environmental Protection Act 1986* (WA) and as a 'nuclear action' under the *Environment Protection and Biodiversity Act 1999* (Commonwealth).