Guidelines for Preparation of an Environmental Impact Statement

NOLAN'S PROJECT - MINE

by

- Arafura Resources Ltd -

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1. INTRODUCTION

Arafura Resources Ltd (Arafura) proposes a conventional open-cut mine at Nolan's Bore, 135 km north of Alice Springs. The resource is expected to include 18.6 million tonnes at 3.1% rare earths, 14% phosphate and 0.02% uranium oxide, and is projected to be mined at a rate of 1,000,000 (1M) tonnes per annum. The mine is expected to have a life of 20 years.

This proposal has four main components:

1. Development of a new mining operation and onsite beneficiation plant;
2. Development of workers' accommodation;
3. Transport of ore; and
4. Transfer of processing residues from the railhead back to mine site and storage at mine site.

A separate Notice of Intent / referral and assessment process will apply to the offsite processing of the ore, and transport at the processing plant.

The Northern Territory (NT) Minister for Natural Resources, Environment and Heritage (NT Minister) has determined that this proposal requires formal assessment, under the NT *Environmental Assessment* (EA) *Act 1982*, at the level of an Environmental Impact Statement (EIS). Issues of concern contributing to this decision include:

- Managing Community Perceptions, with regard to mining of a radioactive ore, transportation of radioactive ore to a processing facility (potentially in Darwin), and long-term, on-site, safe management of radioactive tailings;
- Management of mine waste water;
- Supply, management and protection from contamination of water resources;
- Waste rock and tailings management, and rehabilitation.

The proposal was referred by Arafura to the Australian Department of Environment, Water, Heritage and the Arts (DEWHA) for assessment under the *Environment Protection and Biodiversity Conservation* (EPBC) *Act.* The project has been determined to be a Controlled Action. The controlling provisions for the proposed action are: sections 21 and 22 (Nuclear Actions). The project will be assessed under a Bilateral Agreement between the Australian Government and the NT Government, which triggers a modified NT assessment process, to concurrently satisfy requirements of the EPBC Act and EA Act.

These guidelines have been developed to assist Arafura in preparing an EIS for the proposed Nolan's Mine Project, in accordance with Clause 8 of the

Northern Territory (NT) *Environmental Assessment Administrative Procedures 1984* (EAAP). The Guidelines are valid for a period of two years from the date of issue.

Note:

The Guidelines were issued to Arafura in December 2008, and were valid for a period of two years. In August 2010 Arafura applied for an extension to the period allowed for submission of the EIS. A two year extension has been granted in December 2010 by the NT Minister to the period in which the EIS is to be prepared and submitted by Arafura, for the Nolans Project – Mine. Updates in legislation and policy provided to Arafura are available at www.nt.gov.au/nreta/environment/assessment/register.

1.1 General Content

Information about the action and its relevant impacts, as outlined in this document, are to be provided in the EIS. This information should be sufficient to allow:

- The Australian Minister for the Environment, Heritage and the Arts (Australian Minister) to make an informed decision on whether or not to approve, under Part 9 of the EPBC Act, the taking of the action for the purposes of each controlling provision; and
- The NT Minister to make informed recommendations to the responsible (consent) Minister in accordance with the EA Act.

The EIS should be a stand-alone document. It should contain sufficient information to avoid the need to search out previous or additional, unattached reports.

The EIS should enable interested stakeholders, the NT Minister and the Australian Minister to understand the environmental consequences of the proposed development. Information provided in the EIS should be objective, clear, and succinct and, where appropriate, be supported by maps, plans, diagrams or other descriptive detail. The body of the EIS is to be written in a clear and concise style that is easily understood by the general reader. Technical jargon should be avoided wherever possible. Cross-referencing should be used to avoid unnecessary duplication of text.

Detailed technical information, studies or investigations necessary to support the main text should be included as appendices to the EIS.

If it is necessary to make use of material that is considered to be of a confidential nature, the proponent should consult with the Northern Territory Department of Natural Resources, Environment, the Arts and Sport (NRETAS) and DEWHA on the preferred presentation of that material (ref. Clause 10 of the EAAP).

The level of analysis and detail in the EIS should reflect the level of significance of the expected and potential impacts on the environment, as

determined through adequate technical studies. Any and all unknown variables or assumptions made in the assessment must be clearly stated and discussed. The extent to which the limitation, if any, of available information may influence the conclusions of the environmental assessment should also be discussed.

The EIS should include the following sections, but need not be limited to these sections or inferred structure.

1.2 Executive Summary

The Executive Summary should include a brief outline of the project and each chapter of the EIS, allowing the reader to obtain a clear understanding of the nature and scope of the proposed project, the environmental risks associated with it and proposals for management of those risks to avoid or minimise impacts on the environment.

The Executive Summary should be written as a stand-alone document, able to be reproduced on request by interested parties who may not wish to read or purchase the EIS as a whole.

1.3 Description of the Proposed Development

This section should describe the development proposal to allow a detailed understanding of infrastructure design and engineering and all stages of construction, operation and management of the project and include relevant plans, photos and maps. Aspects to be covered include:

- An explanation of the objectives, benefits and justification for the project. The purpose of this is to place the proposal in the local and regional context;
- A description of the project's location indicating distance from Alice Springs, and the project in relation to the Stuart Highway and the Alice Springs to Darwin Railway. Indicate the location also in relation to smaller communities, pastoral leases and watercourses;
- An overall layout of the proposed mine site including pits, tailings storage facilities, waste rock dumps, power generation, other infrastructure, waterways, access and features of interest. Layout maps should be produced for significant stages of development of the mine site, including a map of the proposed rehabilitated landform;
- A detailed description of the proposed creek diversion;
- Comprehensive maps showing topography, water courses / catchments, vegetation communities, with an overlay of all project components and land tenure;
- Project schedule;
- Land requirements, land tenure, acquisition requirements (permits, rezoning and Native Title), and the tenures under which the project would be held including details of relevant legislative processes required to grant proposed tenure;

- Legislation, standards and guidelines applicable to the Project, and where they would apply;
- Infrastructure requirements and specifications (permanent and temporary) and ancillary activities (e.g. storage areas, waste rock dump areas etc);
- Identification of stakeholders in the region and description of their interests in the surrounding land and resources;
- Employment, business and training opportunities (direct and indirect), including sources of workforce, skill levels required and opportunities for local people and businesses; and
- Methods for storage, handling, containment and emergency management of chemicals and other hazardous substances (including fuel and explosives).

Construction should be consistent with NT Health and Families: *Requirements for Mining, Construction and Bush Camps* (Environmental Health Information Bulletin No. 6) (Appendix A).

For the development and operation of the mine the proposal description should consider, as a minimum, the following:

1.3.1 SITE PREPARATION

- Outline the construction timing, methods, equipment and materials (types, sources and quantities);
- Describe water requirements, usage, source, storage, treatment and disposal. Information is to be provided on how much water is required and how this water is to be sourced; and
- Describe on-site and off-site borrow material requirements, extraction methods and uses, with a location map.

1.3.2 MINE

- Current ore reserves and mine life;
- Outline design of pits and their dimensions (including maps, plans and geological cross-sections);
- Describe mining methods, scale of operations and timetable for ore extraction operations and identify the associated risks;
- Detail drilling and blasting requirements (including frequency) and identify the associated risks; and
- Outline possible future extensions to the mine operation, and discuss the probability of mining satellite ore bodies.

1.3.3 WASTE ROCK MANAGEMENT

- Identify total amount of waste rock to be produced;
- Characterise waste rock in terms of hazardous materials (acid generation potential; radioactivity, etc.) from drill core samples and in-

situ assessments as appropriate (eg. kinetic tests and field trials); include sample selection methodology;
- On the basis of comprehensive waste rock characterisation, describe how waste rock volumes would be managed, particularly of hazardous or potentially acidic components;
- Outline proposed waste dump locations, dimensions, water catchments, underlying geology/hydrology, surface treatment, final landform (discuss alternatives) and decommissioning. Identify associated risks and risk treatments.

1.3.4 ORE BENEFICIATION AND TAILINGS MANAGEMENT

While it is noted that the main processing of ore is to occur at a separate site, the initial beneficiation of the ore is to occur on-site, and the tailings produced from the beneficiation are to be stored on-site.

- Describe in detail the beneficiation process, and how tailings from the beneficiation are to be managed and stored.
- Indicate all input and output products (solids, gases and liquids) and pathways for each item in the beneficiation process. Detail the composition, characteristics / chemical properties associated with all inputs and outputs associated with the beneficiation process;
- Describe proposed handling and storage of the tailings produced from beneficiation; and
- Detail any proposed stockpiling of ore on site and its associated management.

1.3.5 RECEIPT AND STORAGE OF WASTE FROM (OFF-SITE) ORE PROCESSING

Tailings produced from the offsite processing of ore (i.e. processing waste) are proposed to be transported back to the mine-site for long term storage. The processing waste will contain radioactive material (eg thorium).

- Outline composition, characteristics and chemical properties of the processing wastes;
- Outline the proposed handling and method of safe long-term storage of processing wastes; and
- Provide detail with regard to management of radioactive processing wastes;

1.3.6 REHABILITATION AND DECOMMISSIONING

The rehabilitation program should be integrated into the mine plan and considered as part of the mining operation, rather than as a separate phase at the end of the mine life.

The project description should consider, as a minimum, the following:

- Progressive and final rehabilitation plans for pits, tailings storage facilities, waste rock dumps, ROM pad, roads and infrastructure sites.
- Identification and analysis of risks of a post mining land use and rehabilitation objectives;

- Rehabilitation commitments and timetables (for both temporary and permanent facilities) including waste management, pollution control and stabilisation and rehabilitation plans for mined areas;
- Description of post closure passive and active tailings management;
- Designs to isolate radioactive tailings from the surrounding environment should aim to be stable over geological time-scales; and

Provide a detailed description and analysis of risks for the following:

- Design of rehabilitated landforms, including methods to reconstruct the landscape using the materials available.
- Design of the diverted creek lines, including re-creation of any riparian habitats, and the designed levels of protection of the constructed creek-lines against extreme rainfall events.
- Rehabilitation methodology to include:
    - Proposed staging / timing
    - Soil profile reconstruction
    - Selection and collection of local native species e.g. native grasses and other vegetation
    - Runoff and erosion control measures
    - Water supply
    - Protection from fauna, including cattle and feral animals
    - Weed control
    - Fire management
    - Contingency management against rehabilitation failure
- Final post-rehabilitation topographic and drainage morphology.
- Maintenance of water quality.

1.3.7 EXPLORATION AND FUTURE DEVELOPMENT

- Outline briefly the known potential for additional future mining beyond the scope of this proposal (by Arafura or any third party) within the region; and
- Outline the risks of impacts from any continuing exploration activities within the mining lease – in particular, potential risks to groundwater and surface water.
- Discuss any potential for cumulative impacts from the proposal.

1.4 Alternatives

Alternative proposals, which may still allow the objectives of the project to be met, should be discussed, detailing reasons for the selection and rejection of particular options. The selection criteria should be discussed, and the advantages and disadvantages of preferred options and alternatives detailed. The short, medium and long-term potential beneficial and adverse impacts of each of the options should be considered and associated risks should be detailed and analysed. The potential impacts of the alternatives should be

described. Considerations need to be described objectively, neutrally and in some detail.

Alternatives to be discussed should include:

- Not proceeding with the project
- Alternative locations of infrastructure;
- Alternative sources of raw materials for the project, including water supply;
- Alternative transport corridors and options for transport of ore to the processing plant;
- Alternative extraction and processing technologies;
- Alternative of leaving all radioactive materials on site (or no uranium product).
- Alternative environmental management technologies considered, such as treatment and disposal of by-products and waste products;
- Alternative decommissioning options – analysis should include reference to industry 'best practice' guidelines, including exploration of the option of backfilling the pit with waste rock;
- Alternative configurations to reduce the project's carbon footprint;
- Alternative workforce accommodation; and
- Alternatives to the proposed creek diversion.

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2. PRINCIPAL IDENTIFIED RISKS AND POTENTIAL IMPACTS OF THE PROJECT

This section details risk analysis and/ or information requirements with respect to specific risks / impacts identified for the project by the Northern Territory Government.

Processes for risk management are formalised in Australian Standards (eg. AS/NZS 4360:2004; HB 436:2004; HB 158:2006) which provide generic guidance for application and more detailed guidelines for specific risks, including environmental risks. In addition, organisations such as the US Environmental Protection Agency have published guidelines for ecological risk assessment (e.g. US EPA 1998).

The EIS should demonstrate that the proponent has identified all risks associated with the issues raised, undertaken comprehensive assessment of those risks (including quantification where practicable) and identified effective controls for significant risks. Residual risks should also be identified. All aspects of the risk assessment should be accompanied by statements about levels of uncertainty. Steps to reduce uncertainty or precautions taken to compensate for uncertainty should also be identified and their effect demonstrated.

Information provided should permit the reader to understand the likelihood of the risk, its potential severity, and any uncertainty about the effectiveness of controls. If levels of uncertainty do not permit robust quantification of risk, then this should be clearly acknowledged. Explicit strategies should be formulated to address any such deficiencies.

Arafura will be expected to demonstrate the implementation of industry best practice measures in design of the facility, project planning, environmental risk assessment, and in all future aspects of the life of the project.

The assessment process aims to provide a mechanism for the Proponent and the Government to gain a clear understanding of the potential extent of such impacts, and to examine the likely effectiveness of preventative measures proposed. This understanding creates an opportunity to reduce impacts by adoption of more effective up-front engineering and/or management mechanisms, if shown to be needed.

Arafura is expected to work with close regard to community expectations and concerns and to respect that the community may perceive the level of risk for this proposal differently to the proponent. In the interest of achieving a balanced risk assessment, it is expected that the proponent will place a high priority on communicating with the local community potentially affected by the Nolans Project.

2.1 Major Risks Identified

The major risks below have been identified through analysis by the Northern Territory Government of the Notice of Intent for Nolan's Mine Project. It is possible that further major risks will be identified in the Environmental Impact Assessment process. The major identified risks are:

1. Contamination (by seepage) of groundwater resources underlying the waste water and waste rock storage facilities, and the pits;
2. Impacts on recharge to the Ti Tree groundwater basin, including potential impacts due to contamination of surface water.
3. Long term capacity for waste storage facilities to prevent leakage of hazardous wastes;
4. Radiation hazards for workers, the public and the environment;
5. Transport related risks of road and rail transport of ore between the mine site and the processing facility, and in returning waste material to the mine site; and
6. Public concern over environmental, health and social impacts of the project.

The Environmental Impact Statement must demonstrate the following environmental outcomes:

2.2 The long term protection of water quality in local and downstream groundwater resources.

The proponent shall prevent unacceptable degradation of water quality in groundwater aquifers from direct and indirect mining influences.

Risk analysis is required of the potential for the project to impact on the water supplies of surrounding settlements dependent on local groundwater aquifers (quality and quantity).

The Mine site is also proposed to be located on an anabranch of the Woodforde River, the largest tributary in Ti Tree Basin. The Woodforde River provides a significant flood recharge mechanism for the Ti Tree Basin. Ti Tree's public water supply is located within the Basin's Western Zone.

The proponent shall assess the risk of the proposed operation to significantly impact on groundwater quality and then demonstrate how measures, design solutions and engineered structures are utilised to mitigate this to a low level or eliminate the risk.

The proponent shall:

- Outline in risk management terms, the risks to the local groundwater resources. This includes but is not limited to current and future bore water users; surface water users; and interrelated surface water ecosystems, vegetation and fauna etc.;
- Demonstrate that seepage from waste water storage facilities of the Nolan's Mine Project will not cause a loss of water quality in local groundwater resources;
- Outline risks of the mine impacting on recharge of groundwater resources in the Ti Tree basin, including potential for impacts due to contamination of surface water.
- Demonstrate that waste rock dumps will minimise / mitigate the release of radioactive, acidic and/or metalliferous drainage, to ensure no significant impact on the surrounding environment, for the life of mine and beyond;
- Demonstrate that any pits, or sub-surface waste storage facilities will minimise / mitigate the release of radioactive, acidic and/or metalliferous drainage, to ensure no significant impact on the surrounding environment, for the life of mine and life of the processing-waste storage facility;
- For any proposed treatments the discharge water, tailings etc., demonstrate the magnitude of risk reduction to the receiving environment, and the estimated residual risk level following proposed treatment.

2.2.1 INFORMATION REQUIREMENTS

2.2.1.1 General Context

- Describe (and map where appropriate) the hydrology and hydro-geological environment of the site to the extent of potential reach of any environmental impacts from the Project.
- Provide and interpret local extreme event data for rainfall / drought (return intervals, event durations and intensities). Consider the latest Bureau of Meteorology analysis of modelling of potential changes in future local weather characteristics as a result of Climate Change.
- Analyse potential connections to the main Ti Tree Basin aquifer systems.
- Describe any known geotechnical or geological features within the proposed mine footprint (eg pit area, waste rock dumps, tailings dams or water retention structures) that may have implications with respect to the preferred migration of ground or surface water. If any have been recognised detail how design of the site is anticipated to mitigate or eliminate these risks.

2.2.1.2 Water Management

- Describe water management systems and design criteria of infrastructure in terms of return intervals (ARI), durations and intensities.

- Characterise all water sources (both surface and groundwater);
- Estimate the demand for potable and raw water for the operational period and discuss this in relation to the resource capacity and current use.
- Provide a site water balance (all inputs and outputs) for the expected mine life, including rehabilitation.
- Include a map of the water management system showing all structures and routes. Details of surface water sampling points and groundwater investigation bores should also be included. A high priority on water management should be reflected in the comprehensiveness of management and monitoring strategies.

2.2.1.3 Groundwater

- Describe with detailed maps the geology and aquifers underlying the waste water and rock storage facilities, pits and the surrounding areas, to the outer extent of the underlying and connected aquifers. Contour maps should include overlays of all proposed infrastructure.
- Describe groundwater connectivity and surface connections, confined and unconfined aquifers, groundwater recharge zones, and expressions of groundwater aquifers potentially affected by the waste water / rock storage facilities (eg. bores; springs, soaks, water courses). Include analysis of potential groundwater connections to *Ti Tree* aquifer systems. Consider impacts upon the Ti-Tree Water Allocation Plan.
- The proponent must use preliminary groundwater modelling to demonstrate the likely impact of pit dewatering on local aquifers. Groundwater model refinement should continue with increasing data through the life of the mine.
    - Analysis of impacts on groundwater should be projected forward through the life-of-mine and life of the processing-waste storage facility (i.e. period for which safe storage is required), to be consistent with current best practice principles of sustainable development and life of mine planning.
    - Ongoing modelling should support analysis of the viability of a flooded pit as a post closure option.
    - The proponent is to investigate, model and document the likely risks (quality and quantity) of the project on surrounding settlements dependent on local groundwater aquifers and ensure that those risks are adequately managed and monitored over the life of the project. Where settlement water supplies are likely to be impacted, detail management, mitigation or alternative source proposals.

2.2.1.4 Surface-Water Recharge of the Ti-Tree Groundwater Basin

- Identify and quantify relevant connections and risks from the Nolans mine to surface waters potentially recharging the Ti Tree groundwater basin,

particularly Ti Tree's public water supply in the Basin's Western Zone. Consider potential for contamination of surface waters by the mine; and surface expressions of groundwater aquifers potentially impacted by mining and waste storage operations;

- Detail environmental controls available / proposed over the life of the mine, including monitoring, to ensure the protection of Ti Tree's water supply from any potential contaminants or drawdown;
- Detail site stormwater management with particular reference to predicted rainfall events associated with climate change.

2.2.1.5 Waste Characteristics

- All mining waste materials from beneficiation and offsite processing, are to be fully characterised, presenting the full range of likely constituents and qualities of environmental significance.
    - Identify all hazardous substances and identify appropriate management strategies;
    - Analyse physical/geotechnical characteristics of mining waste streams to determine infiltration capacity etc.. Include likely ranges of mineralogy / base metal content, neutralising capacity, and radioactivity;
    - Determine the potential for leaching of the different waste types, in the context of designing appropriate strategies for containment and rehabilitation; and
    - Detail the nature, toxicity and management of any reagents to be used during on-site processing (beneficiation).

2.2.1.6 Processing-Waste Facility Design and Construction

- Describe processing waste disposal and impoundment principles. Include surface configurations, wall designs and construction, designs against extreme rainfall events (ARI, intensity), floods (heights, ARI), erosion; details of spillways, sub-drainage and collection sumps;
- The proponent must use groundwater modelling to support the proposed design of the processing-waste containment facility, to the extent required to prove to the regulator that seepage from the facility will not adversely impact on downstream beneficial uses of groundwater for the life of the waste containment facility;
- The proponent must provide details of the leak detection system proposed to be installed to provide early warning of physical failure of the containment; and
- Provide design depths of all liner layers, and profile of the underlying geological strata;

- Demonstrate the availability of suitable clays or appropriate low permeability material and their expected life span, to construct any proposed liner systems for the facilities;
- Predict and demonstrate the permeability of all waste storage facility layers and calculate likely oxygen diffusion and water percolation rates through the layers;
- Establish vertical and horizontal permeability data through the geological strata underlying the processing-waste storage facilities, to support contaminant transport modelling;
- Demonstrate how construction quality control will be achieved;
- Describe final rehabilitation and revegetation plans for the completed waste storage facilities. Include criteria for success of rehabilitation actions; and
- Describe ongoing monitoring, and (contingency) management plans for the waste storage facilities after mining ceases. Articulate post-closure contaminant mitigation strategies and targets.

2.2.1.7 Tailings from Ore beneficiation

- Describe risks associated with the beneficiation process;
- Describe risks associated with the proposed handling and storage of the tailings produced from beneficiation; and
- Detail mitigation measures available / proposed to mitigate and remove risks identified in association with the beneficiation process, and the handling and long term storage of beneficiation tailings.

2.2.1.8 Waste storage facility seepage

- Seepage quality is to be comprehensively predicted and modelled, with impact analysis presented of qualities significant to environmental and/or human health, over time;
- Compare predicted seepage quality with existing groundwater quality; and
- Detail mitigation measures available / proposed to manage seepage, with focus on the post-mine-closure period.

2.3 Long term prevention of hazardous or radioactive discharges from mining activities, including from waste storage facilities

The proponent will ensure that the mining operations including waste storage facilities do not become a source of hazardous or radioactive seepage, stormwater runoff or dust, to mine workers, surrounding areas, biota or water resources as a result of concentration and/or partitioning of radioactive elements in the Storage Facilities.

The proponent shall assess the risk of the proposed operation to significantly impact on mine workers, surrounding areas, biota or water resources as a result of concentration and partitioning of radioactive elements in any aspect of the mining operations. Demonstration should then be made that measures, design solutions and engineered structures are utilised to mitigate this to a low level or eliminate the risk.

2.3.1 CONTEXT

- Uranium, Thorium and various radioactive rare earths are present within the mined material, and thorium will be concentrated in processing wastes stored on the mine site.
- Radioactive material is known to exist on this project to an extent that the *Radiation (Safety Control) Act* is triggered.
- The *Notice of Intent* for the Project (section 11) provided an outline of the contents of a Radiation Waste Management Plan.
- Radiation protection is to be optimised. It is an object of the *Radiation Protection Act 2004* to ensure the health and safety of people, to protect them from the harmful effects of radiation and protect the environment from the harmful effects of radiation. Currently, the latter is achieved by ensuring the former. The *Radiation Protection Act 2004* will commence soon but these objects are appropriate for the *Radiation (Safety Control) Act.*
- The project needs to limit the radiation dose according to the *National Standard for Limiting Occupational Exposure to Ionizing Radiation (1995)* and to interpret radiation dose limitation in relation to recommendations published by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) in 2002. The National Standard is a current condition of radiation licence.
- Project operations should comply with the *Code of Practice for Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing (2005)*, which is a condition of radiation licence.

2.3.2 INFORMATION REQUIREMENTS

- Provide detailed baseline radiometric data for the mine-site and a specific baseline description of the natural, radiation environment into which the radioactive waste is to be discharged or disposed, so that this radiation baseline is available for future decommissioning, for estimating radiation dose following closure. Include gamma, long lived alpha activity, radon and bush tucker surveys;
- In the context of identifying safe handling practices, identify all ore components, their characteristics, radio-activity, toxicity and other potential hazards or risks to safe handling;
- In the context of identifying safe handling practices and secure storage, identify all processing waste components, their characteristics, radio-

activity, toxicity, and other potential hazards or risks to safe storage in the short to very long-term;

- Provide a detailed Radiation Management Plan which includes a systematic risk review process to assess the effectiveness of proposed measures in meeting objectives of the plan;
- The Radiation Management Plan is to include a radiation-monitoring program that includes radiation monitoring for a critical group. The radiation dose to the critical group is often estimated from modelling that requires a discharge-source term. Therefore, the estimated dose to the critical group may set a discharge limit on radioactive material. A critical group is to be identified and defined, as per section 2.7 of the *Code of Practice* (2005) mentioned in 2.3.1 above;
- Detail post closure passive and active tailings management. Demonstrate that isolation of radioactive tailings from the surrounding environment in secure contained storage is likely to stay secure virtually indefinitely (> 10,000 years). Identify and evaluate risks against the facility remaining secure over the very long term;
- Detail the proposed monitoring regime for the radioactive waste storage facility, both in the operational and post closure phases;
- Provide a detailed Radioactive Waste Management Plan, consistent with, but not limited in scope by section 2.8.2 of the *Code of Practice* (2005) mentioned in 2.3.1 above;
- Examine all potential for radioactive elements to concentrate and partition in the waste storage facility and waste storage facility seepage;
- Provide a response plan for accidental or uncontrolled release;
- Provide a decommissioning and rehabilitation plan for all facilities that will hold radioactive wastes; and
- Detail the radiological exposure potential from the waste storage facility and waste storage facility seepage. Include potential impacts to mine workers, members of the public and the surrounding ecosystems in the operational and post-operational mine phases. In detailing the sources, include:
    - Radon gas and its decay products;
    - Radioactive particles in dust;
    - Gamma radiation; and
    - Exposure potential from ore and ore processing including tailings disposal, ore stockpiles and waste dumps.

2.4 Transport of ore and waste

Ore and processing wastes will be transported between the mine site and the processing plant. Although transport methods and the main processing location are yet to be determined, modes of transport are likely to include road trains, and the Adelaide to Darwin railway.

The proponent shall assess the risks from transport related activities, including dust generation, accidental release of hazardous materials, human error, equipment failure, train derailment / collision or traffic accidents. The proponent is to demonstrate how risk management will mitigate or eliminate all identified risks.

2.4.1 CONTEXT

- There are risks associated with the transport of ore and processing wastes that cannot be managed through engineering alone.
- Many of the roads that are to be used are shared with the community, or pass through private land, or near rural communities.
- NT Government carried out a review of the 'Transport of Dangerous and Hazardous Goods'

2.4.2 INFORMATION REQUIREMENTS

List all legislation, standards, commitments and agreements applicable to traffic and transport associated with the Project, particularly the transport of radioactive ores and contaminants.

From a risk perspective, examine aspects of transport and handling of ore and processing waste including, but not limited to:

- Details of any new roads and rail facilities;
- Details of the Northern Territory's capacity to respond to a collision or derailment;
- Details of Arafura's capacity to respond-to / assist NT Police, Fire and Emergency Services;
- Any ore stockpiling / storage at Storage of ores at the mine site or railheads;
- Details of how high risk aspects will be managed (such as road intersections, river crossings, driver fatigue); and
- Details of containerisation of ore and waste, and how risks of spillage will be managed.

2.5 Public interest in environmental, social and health impact

Environmental, social and health impact assessment (ESHIA) is required to help citizens, communities and community leaders understand and quantify social and health implications of a project. This allows the community to

collectively and constructively plan for and address the consequences of a proposed development (refer also to section 3.3).

An ESHIA is required to comprehensively detail how a proposed action will alter the life of communities and regions.

2.5.1 CONTEXT

- There is strong public concern of the health impacts related to the exposure of humans to radioactive material.
- There is strong public interest in the mining of uranium, and the fate of the ore.
- There is strong public interest in the storage of radioactive waste, including the life of the storage facility and the possibility of damage to the facility enabling contamination of the surrounding land and water resources.
- There is public concern that radioactive wastes could create “legacy” issues after the mining company has finished with the site.
- Legacy issues may include (but not be limited to) the long term storage of waste material, potential public doses of radiation and security of the site beyond mine closure and rehabilitation.
- Barriers to full understanding and participation of the public include language barriers, which should be taken into account in the preparation of relevant documents.

2.5.2 INFORMATION REQUIREMENTS

The EIS should include a risk assessment of the potential impacts on people, the environment and nearby facilities, associated with the construction, operation and maintenance of the various components of the proposal, and the storage and transport of materials to and from the complex. The aim of this section is to demonstrate that:

- The proponent is fully aware of the risks to human health and safety associated with all aspects of the development;
- The prevention and mitigation of risks to human health and safety are properly addressed in the design specifications for the facility;
- The risks can and will be managed effectively during the construction, commissioning, operation and decommissioning of the development; and
- Long term management (after mine closure), safety and security of the site are achievable and will meet the public dose limits of the National Directory of Radiation Protection.

Sufficient analysis should be provided to indicate whether risks are likely to be acceptable. Assumptions used in the analyses should be explained. Relevant standards, codes and best practice that minimise risks should be discussed.

The risk assessment should as a minimum, address:

- Perceptions of risk to the surrounding community and non-human biota regarding the project;
- A detailed examination and rating of possible exposure pathways. To include water and wind borne contaminant dispersal and an assessment of potential impacts on Indigenous cultural practise and lifestyle pathways, including bush tucker.
- The effect of climate change predictions and unusual / extreme weather conditions on vulnerable components of the complex, including extreme rainfall, flooding and drought;
- Emergency evacuation procedures and requirements, including nearby residents or the public;
- Potential impacts from an incident on health and safety;
- Consequences of possible incidents;
- Responsibilities and liability in the event of an incident or accident;
- Design, construction, operational, and decommissioning requirements of the project to satisfy relevant codes, standards and legislation;
- Potential accidents associated with the construction, operation, maintenance and decommissioning of the various components of the proposal, including storage and transport of materials to and from the complex; and
- Risk treatments should include contingency plans for dealing with spillage of hazardous materials.

The hazard and risk analysis will identify the critical areas that need to be addressed in management plans, monitoring programs, contingency and emergency plans.

3. OTHER POTENTIAL IMPACTS OF THE PROJECT AND MANAGEMENT

3.1 Other Potential Impacts

This section should evaluate the risks associated with relevant environmental factors and/or aspects that could be impacted by the project or with the potential to impact on the project. Baseline information for each factor/aspect must be of a sufficient scope and standard to allow assessment of potential impacts (positive and negative) and to enable the establishment of auditable management targets where applicable. Potential impacts and proposed measures to mitigate negative impacts must be described and environmental monitoring programs detailed. The proponent must fulfil all NT and Federal Government legislative requirements and should implement leading practice environmental management techniques in constructing, operating and decommissioning the project.

The following environmental factors and aspects should be addressed:

1. **Ground and surface water management;**
2. **Ore stockpile / Run-of-Mine management;**
3. **On-site processing the ore;**
4. **Waste rock and (beneficiation) tailings management;**
5. **Socio-economics;**
6. **Erosion and sediment control;**
7. **Ecology and Biodiversity;**
8. **Weed Management;**
9. **Bushfire prevention, control and fighting equipment;**
10. **Waste management;**
11. **Transport;**
12. **Air quality, dust and noise;**
13. **Cultural environment (Aboriginal and non-Aboriginal);**
14. **Greenhouse emissions; and**
15. **Biting Insects.**

Specific requirements and information:

- Species of Significant Conversation Value (NT and Commonwealth) –
    - Baseline surveys should include both dry and wet season surveys of flora and fauna.
    - Identify rare, threatened and endangered species against NT and Commonwealth legislation, and species with indigenous conservation values.

  - Describe and analyse risks of how the project will or has the potential to impact on each element identified above including cumulative impacts.
  - Mitigation measures and offsets should be discussed.

- Archaeological advice required for the site – Heritage Branch of NRETAS can be contacted to discuss scope of works for any survey work that may be necessary and for advice on appropriate heritage management.
- Cultural (non sacred-site) Heritage:
  - Results of an search of the NT Heritage Register regarding nominated, proposed and declaration heritage places under the NT Heritage Conservation Act;
  - An indication of the archaeological survey work undertaken to date and any outstanding work still required;
  - An indication of permits sought/obtained under s29 & 39 of the NT *Heritage Conservation Act*; and
  - An indication of procedures to be adopted should any additional archaeological sites be located during the course of construction and/or operations.
- Aboriginal Areas Protection Authority –
  - Results of the inspection of the Register of Sacred Sites maintained by the Aboriginal Areas Protection Authority;
  - Details of the application lodged with the Aboriginal Areas Protection Authority for an Authority Certificate within the meaning of Part 3, Division 1 of the NT *Aboriginal Sacred Sites Act*;
  - A copy of the Certificate issued by the Authority as a result of that application containing conditions, if any, relating to the protection of sacred sites on, or in the vicinity of, the project area; and
  - Status of any negotiations with native title claimants/CLC or other requirements under the *Native Title Act*.
- Workers accommodation considerations – Including *'Requirements for mining, construction and bush camps'* - Appendix A;
- Greenhouse gas emissions – Refer to the *NT Environmental Assessment Guidelines: Greenhouse Gas Emissions and Climate Change* – see Appendix B;
- Biting Insects - Refer to the attached Guideline "*Guidelines for Preventing Mosquito Breeding Sites associated with Mining Sites*" - Appendix C.
- Bushfires – *Bushfires NT* should be consulted to obtain guidelines with regard to firebreaks, Permits to Burn and advice to neighbours.

3.2 Project Environmental Management

A draft Environmental Management Plan (EMP) should be provided in a form suitable for inclusion in a Mining Management Plan (MMP) as required under the *Mining Management Act (NT)*. The draft EMP should be strategic, describing a framework for environmental management. Where possible specific management policies, practices and procedures should be included in the draft EMP. A final EMP would normally be prepared after conclusion of the environmental assessment process, taking into consideration comments on the EIS and incorporating the Assessment Report recommendations. The final EMP would then be included as part of an MMP submitted for approval under the NT *Mining Act* (NT) to the Minister for Primary Industry, Fisheries and Resources.

The draft EMP should:

- Define the management structure of both the construction and operational phases and the relationship to the environmental management of the site;
- Describe the proposed measures to minimise adverse impacts and the effectiveness of these safeguards (e.g. provide performance indicators by which all anticipated and potential impacts can be measured);
- Describe how employees and visitors will be made aware of environmental responsibilities and safeguards (including induction process);
- Describe monitoring to allow early detection of adverse impacts;
- Describe remedial action for any impacts that were not originally predicted;
- Detail how monitoring will be able to determine the differences between predicted and actual impacts;
- Include a summary table listing undertakings and commitments made in the EIS, including performance indicators, with cross-references to the text of the report; and
- Provide for the periodic review of the management plan itself.
- The proponent should detail its corporate capacity to deliver on key environmental commitments with reference to such criteria as staff skill set, financial provision and relevant industry experience.

Reference should be made to relevant legislation, standards, and guidelines and proposed arrangements for necessary approvals and permits should be noted. The agencies responsible for implementing and overseeing the management plan should be identified. Proposed reporting procedures on the implementation of the management plan, independent auditing or self auditing and reporting of accidents and incidents should also be described.

3.3 Public Involvement and Consultation

The Environmental, social and health impact assessment (from section 2.5) also provides an opportunity for local communities to identify potentials to develop synergistic relationships with the mine.

The ESHIA by the proponent must include:

- A Community Engagement Strategy (CES) and Stakeholder Identification and Analysis (SIA) which will encompass:
  - A CES which details the activities conducted to gain effective consultation of those identified in the SIA above;
  - That effective consultation means that those stakeholders, including landowners, traditional owners and settlements be exposed to a process of describing in detail the proposed mine development, including a description of the pre-, during, and post-operations (legacy) and likely risks to surrounding lands and waters to enable informed consideration;
  - Where language barriers exist, the proponent shall take all necessary steps to ensure that landowners are able to be addressed in a language enabling understanding. A minimum presentation of the ESHIA/Risk Assessment would be in English and Anmatyerr and/or Walpiri languages. Where appropriate a local community member should be employed to provide translation.
- Risk and opportunity assessment - focusing not only on potential liabilities but also on identifying opportunities to contribute constructively to the long term development of communities and regions. The 'Risk and Opportunities' discussion with stakeholders and communities of the proposed mine development shall include the provision of opportunities by the proponent for local economic, social and environmental participation in the development, including consideration of employment and skills development of local Indigenous and non- Indigenous populations.

Given the role of the EIS to inform the public, it is essential that the proponent demonstrate how public concerns were identified and influenced design and delivery of the project. Public involvement and the role of government organisations should be clearly identified. The outcomes of surveys, public meetings and liaison with interested groups should be discussed, and any resulting changes made to the proposal clearly identified. Details of any ongoing liaison should also be discussed including any negotiations with native title claimants.

Negotiations and discussions with local and community government, the Territory Government and the Commonwealth Government should be detailed, and any outcomes referenced. Details of any ongoing negotiations and discussion should also be presented.

4. INFORMATION SOURCES, REFERENCE LIST, BIBLIOGRAPHY

The EIS should contain a comprehensive reference list or bibliography. Any source of information such as studies, research, maps and personal communications used in the preparation of the EIS should be clearly identified, cited in the text and referenced in the bibliography.

5. APPENDICES, GLOSSARY

Information and data related to the EIS, but unsuitable for inclusion in the main body of the statement, should be included as appendices. This may include detailed analyses, monitoring studies, baseline surveys, and raw data.

A glossary should be provided, defining the meaning of technical terms, abbreviations and colloquialisms. (Note: throughout the EIS, technical terms and jargon should be minimised).

6. ADMINISTRATION

A draft of the EIS is to be lodged with the Environment, Heritage and the Arts (EHA) Division of NRETAS, and DEWHA, for internal review, prior to public exhibition of the EIS.

Lodgement of the EIS document for public exhibition should be outside the period December to February, unless agreed to in consultation with EHA Division and DEWHA.

Once the EIS is complete, 25 copies of the EIS should be submitted to the EHA Division for distribution to NT Government advisory bodies.

The EIS is to be publicly advertised for review and comment in the *NT News*, the *Centralian Advocate* and *The Australian*. The EIS is to be made available for public comment for 8 weeks.

The EIS should be placed on public review at:
Darwin Region

- Environment, Heritage and the Arts Division (NRETAS), 2nd Floor, Darwin Plaza, 41 Smith Street Mall, Darwin;
- Minerals and Energy Information Centre, Department of Regional Development, Primary Industry, Fisheries and Resources, 3rd Floor, Paspalis Centrepoint, 48 Smith Street Mall, Darwin; (2 copies, so 1 can be forwarded to the Alice Springs branch)
- Northern Territory Library (NTL), Parliament House, Darwin;
- The Environment Centre (Unit 3, 98 Woods St, Darwin;);

Alice Springs and surrounds

- Alice Springs Town Council Library, corner of Todd St. and Gregory Terrace;
- NRETAS Alice Springs branch (front desk), Level 1 Alice Plaza, corner of Parsons St. and Todd Mall, Alice Springs;
- Arid Lands Environment Centre, Shop 17, John Cumming Todd Plaza, Todd Street Mall, Alice Springs;
- Central Land Council, 31-33 Stuart Highway, Alice Springs.
- Aileron Roadhouse; Stuart Hwy, 135km N of Alice Springs. Ph (08) 8956 9703.
- The *Anmatjere Knowledge Centre & Library*, in the community council building on the western side of the Stuart Highway in Ti Tree, 200 km N of Alice Springs.

Canberra

- Australian Government Department of Environment, Water, Heritage and the Arts Library, John Gorton Building, Parkes, Canberra.

The EIS should be provided on CD/DVD in ADOBE *.pdf format for placement on the NRETAS internet site. Chapters and Appendices should be separate files. Where possible, individual file sizes should be kept below 2Mb. The .pdf files should be provided to EHA Division at least 4 days before newspaper publication. Additionally, two Microsoft Word copies should be provided to facilitate production of the Assessment Report and Recommendations.

APPENDIX A:
Requirements for Mining, Construction & Bush Camps

ENVIRONMENTAL HEALTH
INFORMATION BULLETIN No. 6

This information bulletin has been developed to provide information to proponents of Mining, Construction & Bush Camps with regard to the Department of Health and Families (DHF) environmental health requirements. Issues covered include food business registration, boarding house registration, on-site wastewater disposal, wastewater stabilisation ponds, potable water supply, solid waste disposal, fuel storage, public health nuisances, and environmental management plans.

REGISTRATION AS A FOOD BUSINESS

Larger camps that are not self-catering generally incorporate a commercial food preparation area (kitchen). The *Food Act 2004* defines a food business as 'any business or activity that handles food intended for sale or selling regardless whether the business if of a commercial, charitable or community nature or whether it involves handling or selling on one occasion only'. Consequently the camp's commercial food preparation area is considered to be a food business and therefore requires registration with DHF in accordance with the *Food Act 2004*.

Registration can be carried out on-line and does not attract a fee. The Registration period is for 12 months with renewals due on 1 July.

To register, go to the DHF website link or contact the relevant Environmental Health Office:

http://www.transact.nt.gov.au/ths/healthmanager/HealthNotifications.nsf

The *Food Act 2004* also requires all food businesses to meet the minimum standards prescribed by the *Food Safety Standards*:

3.1.1 Interpretation and Application

3.2.2 Food Safety Practices and General Requirements

3.2.3 Food Premises and Equipment

These nationally endorsed standards have been designed to be descriptive, rather than prescriptive and provide the food industry with an increased flexibility in meeting the desired outcome of providing safe food to consumers. Accordingly, Environmental Health Officers (EHO) are also now required to adopt a more flexible approach when assessing how businesses are able meet the criteria contained within these Standards.

Australian Standard AS 4674 *"Design, Construction and Fit-out of Food Premises"* has been developed to assist the food industry in meeting the outcomes of the Standards. It is not prescribed by law that a premises must meet the requirements contained within, however a premises that meets AS4674 is deemed to comply with the *Food Act* and *Food Safety Standards*.

A food premises that does not meet the requirements of AS 4674 may still able to meet the requirements of the relevant legislation. However, further evidence may be required to be provided to the EHO to ensure that they can be assured that the business will comply through other means. In some instances, a design issue may be able to be addressed through the development and implementation of appropriate workplace policies or procedures. This may, in turn, sometimes result in a delay of the approval process, and require the submission of more information than the typical application.

Approval Process

The approval process of a food business is dependent on its location, however it generally involves at least one inspection. Camps are by nature located in remote areas where Building Control in terms of the *Building Act* is not applicable. Building Control essentially means that a Building Certifier must certify all building structures to ensure compliance with the Building Code of Australia. Proponents are referred to Appendix 1 to determine if their project is located within a Building Control Area.

Inside a Building Control Area

Under the provisions of the *Building Act*, DHF is a Reporting Authority and as such, Building Certifiers are required to seek the Department's comments on all building applications involving, amongst other things, new or existing food businesses. The Building Certifier must submit detailed plans to the relevant Environmental Health Office prior to the construction of works. Following assessment and approval, the premises must be registered as a Food Business with the relevant Environmental Health Office prior to operating.

Outside a Building Control Area
Since Building Certification does not apply then DHF becomes the first point of contact for approval of a food business. The proponent must submit detailed plans and specification to the relevant Environmental Health Office prior to the construction of works. Following assessment and approval, the premises must be registered as a Food Business with the relevant Environmental Health Office prior to operating.

REGISTRATION AS A BOARDING HOUSE

The accommodation section of the Camp will require registration as a boarding house in accordance with the *Public Health Act and Public Health (Shops, Eating-Houses, Boarding Houses, Hostels and Hotels) Regulations.*

The Registration period is for 12 months with renewals due on the 31 December. Annual Fees are applicable and are based on the number of bedrooms:

3-10	Bedrooms	$100 p.a.
11-20	Bedrooms	$125 p.a.
21-40	Bedrooms	$150 p.a.
> 40	Bedrooms	$250 p.a.

A Boarding House application form can be downloaded online or by contacting the relevant Environmental Health Office:

http://www.nt.gov.au/health/healthdev/environ_health/environ_health.shtml >application forms

Following a review of Northern Territory public health legislation, DHF has developed *Public Health Guidelines for Commercial Accommodation 2005*. These Guidelines will eventually replace the current provisions relating to boarding houses in the *Public Health (Shops, Eating-Houses, Boarding Houses, Hostels and Hotels) Regulations* offering a less prescriptive approach and a clear set of minimum standards.

Room sizes in the Camp must comply with the provisions of *Public Health (Shops, Eating-Houses, Boarding Houses, Hostels and Hotels) Regulations* or the yet to be endorsed Guidelines. However, if the latter is chosen, it will be necessary for the proponent to make application in writing to the Chief Health Officer seeking approval to utilise the Guidelines.

Approval Process

The approval process of a boarding house is dependent on its location in a similar manner to food businesses, and also generally involves at least one inspection. Camps are by nature located in remote areas where Building Control in terms of the *Building Act* is not applicable. Building Control essentially means that a Building Certifier must certify all building structures to ensure compliance with the Building Code of Australia. Proponents are referred to Appendix 1 to determine if their project is located within a Building Control Area.

Inside a Building Control Area

Under the provisions of the *Building Act*, DHF is a Reporting Authority and as such, Building Certifiers are required to seek the Department's comments on all building applications involving, amongst other things, new or existing boarding houses. The Building Certifier must submit detailed plans to the relevant Environmental Health Office prior to the construction of works. Following assessment and approval, the premises must be registered as a Boarding House with the relevant Environmental Health Office prior to operating.

Outside a Building Control Area
Since Building Certification does not apply then DHF becomes the first point of contact for approval of a boarding house. The proponent must submit detailed plans and specification to the relevant Environmental Health Office prior to the construction of works. Following assessment and approval, the premises must be registered as a Boarding House with the relevant Environmental Health Office prior to operating.

SANITARY ACCOMMODATION & ABLUTION FACILITIES

Adequate numbers of ablution facilities and sanitary accommodation to be accessible for all operations in accordance with Building Code of Australia and relevant Northern Territory legislation.

ENVIRONMENTAL MANAGEMENT PLANS

The proponent shall provide the relevant Environmental Health Office with copies of Environmental Management Plans that relate to the Camp or Project Operations for initial comment.

ON-SITE WASTEWATER DISPOSAL

On-site wastewater disposal using septic tanks is likely to be the most suitable option for camps that have no major site constraints and comprise less than 20 staff. Larger camps may need to consider other options such as a treatment plant or waste stabilisation ponds. In all cases, the proponent should seek advice from a qualified hydraulic consultant about the most suitable wastewater disposal system. Reliability and low maintenance costs of remote on-site wastewater disposal systems should not be underestimated.

The design of septic tank systems is detailed in the Northern Territory *Code of Practice for the small on-site sewage and sullage treatment systems and the disposal or reuse of sewage effluent* (The Code). The Code was gazetted on the 11 November 1998 and is called up in Regulations 28-28B of the *Public Health (General Sanitation, Mosquito Prevention, Rat Exclusion and Prevention) Regulations.*

The Role of Regulatory Authorities

Local Government Authorities in the Northern Territory have no jurisdiction over on-site wastewater management, i.e. approval or monitoring of septic tank installations.

The Department of Planning and Infrastructure (DPI) administer the provisions of the *Building Act & Regulations* with respect to all septic tank installations within a Building Control Area.

DHF administers the provisions of the *Public Health Act & Regulations* with respect to the:

- type approval of septic tanks and associated products.
- conventional septic tanks located outside Building Control Areas.
- notification to install an Alternative Septic Tank System (ASTS) for a single residential dwelling.
- site-specific design approval of an ASTS.

CONVENTIONAL SEPTIC TANKS & ALTERNATIVE SEPTIC TANK SYSTEMS

Conventional Septic Tanks (e.g. septic tank reticulating to absorption trenches or evapotranspiration bed) must be installed by self-certifying plumbers and drainers within Building Control Areas or by licensed plumbers and drainers outside Building Control Areas. The administrative process is dependent on whether the installation is located within a Building Control Area (urban areas and along main highways) or outside a Building Control Area (remote areas).

Alternative Septic Tank Systems (ASTS) are septic tank systems that treat effluent to a higher quality than that offered by conventional septic tank system. For example, these include Aerated Wastewater Treatment Systems (AWTS), Composting Toilets, Hybrid Systems and Ecomax Systems. In addition to the self-certification of the installation, ASTS require either a notification to install or site specific design approval.

Septic Tank application forms can be downloaded online or by contacting the relevant Environmental Health Office:

http://www.nt.gov.au/health/healthdev/environ_health/environ_health.shtml >application forms

Connection to existing Septic Tank Systems

If the proposal can utilise existing infrastructure such as septic tank systems, then the proponent will need to demonstrate that such infrastructure has adequate hydraulic capacity. This will require the proponent to engage a qualified hydraulic consultant to provide the relevant Environmental Health Office with as-constructed drawings of the existing infrastructure.

TRADE WASTE PRE-TREATMENT DEVICES

Trade waste is defined as a *"liquid or liquid borne waste generated from any industry, business, trade, manufacturing process or similar that is approved for discharge to sewer but does not include wastewater from a toilet, shower, hand basin or similar fixture".*

It is not recommended that trade waste be discharged to septic tank system, however a Camp's commercial food premises may prepare cooked food generating liquid trade waste that comprises of food scraps, detergents, fats, oils and grease. This liquid trade waste has a substantial impact on a septic

tank system, and if not contained by pre-treatment equipment will cause system failure. For this reason, it is mandatory that all greasy liquid trade waste must be discharged to sewer via a pre-treatment device that has been approved by Power and Water Corporation's Trade Waste Section.

The requirements for trade waste pre-treatment devices are detailed in the following documents:

- Power and Water Corporation - *Guidelines for On-site Pre-treatment* which can be downloaded from the website at: http://www.powerwater.com.au/powerwater/business/trade_waste.html
- DHF Information Bulletin – *Trade Waste Pre-treatment Devices* which can be obtained from the relevant Environmental Health Office.

WASTE STABILISATION PONDS

Waste stabilisation ponds (also known as sewage ponds) are used extensively in the Northern Territory for the treatment of wastewater prior to final disposal.

There is legislation to control the reuse or disposal of treated sewage effluent. The responsibility for enforcement of such legislation is vested with DHF and the Department of Natural Resources, Environment, the Arts and Sport (NRETAS). The discharge of treated sewage effluent to land or water may therefore occur, but only in accordance with pertinent legislation, or in its absence, to any reasonable conditions imposed by the relevant government agency.

Where treated sewage effluent is proposed to be discharged to a waterway and where the discharge does not have a potential to impact on public health, DHF will liaise with the EPA as part of the approval process. Consideration will be given to the reuse/irrigation of treated sewage effluent in controlled public access areas, constructed and operated for this express purpose.

Approval Process

Any proposal to construct waste stabilisation ponds at a camp shall require the submittal of plans, design specifications and disposal methodology to the relevant Environmental Health Office & the EPA for approval, prior to construction.

Environmental Health Office will seek specific comment with regard to mosquito breeding from the Department's Medical Entomology Branch.

POTABLE WATER SUPPLY

The camp must have a potable that complies with the NH&MRC *Australian Drinking Water Guidelines*. The relevant Environment Health Office may set conditions on the provision of water testing results. Proponents should note that water analysis can be carried out by the Water Laboratories at:

Alice Springs – Department of Natural Resources, Environment, the Arts and Sport - located at the Tom Hare Building, phone (08) 8951 8233

Darwin – Department of Primary Industries and Fisheries - located at Berrimah Farm, phone (08) 8999 2346

Bore setbacks to onsite wastewater disposal shall be in accordance with the Code of Practice for Small On-Site Sewage and Sullage Treatment Systems and the Disposal or Reuse of Sewage Effluent.

SOLID WASTE DISPOSAL

The *Waste Management and Pollution Control Act 1998* requires that certain waste management activities be licensed or approved by the EPA. An NRETAS approval for a landfill (rubbish dump) is not required if the landfill is

for domestic waste generated on the premises or domestic waste from temporary construction camps.

A NRETAS licence for a landfill is required if the Camp serves a permanent population of more than 1000 persons or if the Project Operations generates hazardous waste. Further information can be obtained by contacting the NRETAS on (08) 8924 4139 or by going to their website > http://www.nt.gov.au/nreta/environment/index.html

Providing the landfill does not have to be licensed or approved by the NRETAS, then the proponent will still need to demonstrate to the relevant Environmental Health Office that the Camp's landfill meets best practice and will not cause an environmental or public health nuisance. Reference should be made to the *Guidelines for Siting, Design and Management of Solid Waste Disposal Sites in the Northern Territory 2003* which can be downloaded from the NRETAS website:

http://www.nt.gov.au/nreta/environment/waste/codes/index.html

FUEL STORAGE

Camps and their respective operations generally have a fuel storage facility. Environmental Health does not regulate fuel storage and therefore proponents should discuss this issue with the NRETAS. Reference should be made to AS 1940-2004 (and amendments) *Storage and handling of flammable and combustible liquids.*

PUBLIC HEALTH NUISANCE

The proponent shall ensure that the construction and operation of the Camp does not create a public health nuisance, in particular from dust or other particulate matter. Environmental Health has provisions to deal with public health nuisances under the *Public Health (Nuisance Prevention) Regulations.*

APPENDIX B:

GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

NT Environmental Impact Assessment Guide

a) PURPOSE

The Northern Territory Government's objective for managing greenhouse gas emissions from new and expanding operations is to minimise emissions to a level that is as low as practicable. This will help fulfil the objective of minimising greenhouse gas emissions from the NT into the future.

The Northern Territory Government's objective for considering future climate change in the assessment process is to ensure projects and developments are planned taking climate change science and projections into account, to minimise future environmental, social and economic costs and take advantage of any opportunities.

This Guide aims to assist proponents in providing the information needed by the Department of Natural Resources, Environment the Arts and Sport (NRETAS) to assess the impact of greenhouse gas emissions from proposed projects and assess other potential impacts from proposed projects under projected future climatic conditions under the *Northern Territory Environmental Assessment Act 1994*.

b) GUIDANCE

EMISSIONS ESTIMATES

Note that the Australian Government is establishing a national greenhouse gas emissions trading system, which may have implications for some proponents. More information on a national emissions trading scheme is available at http://www.climatechange.gov.au/emissionstrading/index.html

Proponents should detail the following in their environmental impact assessment documentation:

1. An estimate of the greenhouse gas emissions for the construction and operation phases:

in absolute and carbon dioxide equivalent figures (refer to the Glossary in this Guide) for each year of the project;

identified on a gas by gas basis; and

by source (including on site and upstream sources such as emissions arising from land clearing and the production and supply of energy to the site).

Emissions estimates are to be calculated using the methodology developed and periodically updated by the National Greenhouse Gas Inventory Committee or another national or internationally agreed methodology. See http://www.climatechange.gov.au/workbook/index.html for access to the National Greenhouse Accounts Factors which may assist.

For emissions from clearing of vegetation, emissions estimates are to be calculated using the National Carbon Accounting System, or another nationally recognised methodology. For more information see http://www.climatechange.gov.au/ncas/index.html

Details of the project lifecycle greenhouse gas emissions and the greenhouse gas efficiency of the proposed project (per unit and/or other agreed performance indicators).

Lifecycle emissions and greenhouse gas efficiency should be compared with similar technologies producing similar products.

To provide an understanding of the broader impact of the proposal, proponents are encouraged to place the estimated greenhouse gas emissions from the proposal into a national and global context. Information on Australia's national emissions profile can be obtained from the Department of Climate Change at http://www.climatechange.gov.au/inventory/2005/index.html. International emissions can be seen at the United Nations Framework Convention on Climate Change (UNFCCC) website at http://unfccc.int/ghg_emissions_data/items/3800.php

MEASURES TO MINIMISE GREENHOUSE GAS EMISSIONS

Proponents must demonstrate consideration of a wide range of options and indicate the intended measures and efficient technologies to be adopted to minimise total greenhouse gas emissions from the proposed project, including:

(a) identifying energy conservation measures, opportunities for improving energy efficiency and ways to reduce fugitive emissions where applicable;
(b) indicating where potential savings in greenhouse gas emissions can be made through the use of renewable energy sources, taking into account fossil fuels used for supplementary power generation; and
(c) their commitment to offsetting greenhouse gas emissions.

The design measures to maximise efficiency and minimise emissions should represent best practice at the time of seeking project approval.

Proponents are to advise whether they will join the Commonwealth Government's Greenhouse Challenge program. For more information on the program see http://www.climatechange.gov.au/challenge/index.html

Offsets

Emission offsets include activities that remove carbon from the atmosphere or reduce the greenhouse gas intensity (output per unit product) from current or future activities. No Australian standards for offsets currently exist, although the Australian Government has committed to the development of an Australian standard for offsets by the end of 2008. The Australian Government does currently approve Greenhouse Friendly carbon credits under the Greenhouse Friendly initiative, more information about which can be found at http://www.greenhouse.gov.au/greenhousefriendly

Measures that offset emissions within the NT are encouraged, and NRETAS staff can discuss possible options with proponents. Proposed emissions offsets projects should include an estimate of greenhouse gas emissions savings that will be achieved through implementation.

Emissions monitoring and reporting

Consistent with the principles of continuous improvement, a program is to be outlined in the proponent's Environmental Management Plan which includes ongoing monitoring, investigation, review and reporting of greenhouse gas emissions and abatement measures.

The Australian Government is developing a nationally consistent framework for greenhouse and energy reporting by industry. Projects with significant emissions may be required to report their emissions under the National Greenhouse and Energy Reporting Act 2007. Data reported through the system will underpin the National Emissions Trading Scheme. For more information see http://www.climatechange.gov.au/reporting/index.html

IMPACTS OF CLIMATE CHANGE

Climate change is projected to result in changes to sea level, land and sea temperatures, cyclone intensity, frequency of fire weather, and frequency of extreme weather events including storms, drought and flood.

Proponents should discuss how projected climate change has been taken into account in planning the proposal, and how climate change is expected to affect the proposal over its stated lifetime. Proponents should discuss how

climate change-related risks (for example, risk of failure of project infrastructure during potential extreme weather events) will be managed.

Potential impacts of climate change on the surrounding environment including water, land, biodiversity and ecosystems, coastal zones, and the social environment should also be taken into account in proposal planning.

In assessing climate change risk, proponents should be guided by recent projections published by organisations such as the CSIRO, the Bureau of Meteorology (BoM), and the Intergovernmental Panel on Climate Change. For the latest CSIRO and BoM projections for Australia, see: http://www.climatechangeinaustralia.gov.au

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GLOSSARY OF GREENHOUSE TERMS

Abatement: Limiting, abating, avoiding or sequestering greenhouse gas emissions through source reduction, fuel displacement or switching, carbon stabilising techniques or sink enhancement.

Absolute emissions: Refers to the total emissions of greenhouse gases expressed in terms of the actual mass of each individual gas emitted over a specified time period.

Best Practice: A best practice is a process, technique, or use of technology, equipment or resource that has a proven record of success in minimising energy use and greenhouse gas emissions. A commitment to use best practice is a commitment to use all available knowledge and technology to ensure that greenhouse gas emissions are minimised.

Carbon Dioxide Equivalent: A unit of greenhouse gas emissions calculated by multiplying the actual mass of emissions by the appropriate Global Warming Potential. This enables emissions of different gases to be added together and compared with carbon dioxide (see Table 1 below).

Commonwealth Government's Greenhouse Challenge program: A cooperative effort by industry and the Commonwealth Government to reduce greenhouse gas emissions through voluntary industry action. See: http://www.climatechange.gov.au/challenge/index.html

Greenhouse Gases: Table 1 lists the greenhouse gases proponents are required to report on.

Global Warming Potential (GWP): The warming potential of a gas, compared to that for carbon dioxide. GWPs are revised from time to time as

knowledge increases about the influences of different gases and processes on climate change. Refer Table 1.

Project Lifecycle Greenhouse Gas Emissions: Those greenhouse gas emissions measured cumulatively over a defined period. Typically this period is from the point of extraction of the raw materials to either the beginning of the consumer phase of a product or the final disposal or recycling stage of a product, depending on its nature. Proponents should justify their choice of the defined period.

National Greenhouse Gas Inventory Committee: A committee comprising representatives of the Commonwealth, State and Territory Governments that oversees the development of greenhouse gas inventory methods and compilation of inventories for Australia.

Sequestration: Removal of greenhouse gases from the atmosphere by vegetation or technological measures. Sequestration is not yet precisely defined for the purposes of recognised trading or offset schemes. Accordingly, NRETAS will take a common sense approach on a case by case basis in the interim. To assist proponents, NRETAS regards sequestration as a process that results in the isolation of carbon dioxide from the atmosphere for a period which is significant in terms of influencing the global warming effect.

Source: Any process or activity that releases a greenhouse gas into the atmosphere.

Table 1: Greenhouse gases and respective Global Warming Potential (GWP) factors

Greenhouse Gas	Global Warming Potential
Carbon dioxide (CO_2)	1
Methane (CH_4)	21
Nitrous oxide (N_2O)	310
Perfluorocarbons (CF_x)	6,500 – 9,200
Hydrofluorocarbons (HFCs)	140 - 11,700
Sulphur hexafluoride (SF_6)	23,900

Greenhouse gas emissions expressed in carbon dioxide equivalent (CO_2-e) are calculated by multiplying the actual mass of emissions for each greenhouse gas by its respective GWP factor. GWP factors listed are those published by the International Panel on Climate Change in its 4th Assessment Report, 2007, see

http://ipcc-wg1.ucar.edu/wg1/Report/AR4WG1_Print_Ch02.pdf

APPENDIX C:
Guidelines for preventing mosquito breeding sites associated with mining sites

COMMENTS SPECIFIC TO THE NOLANS PROJECT – MINE

There is no requirement for a baseline biting insect assessment of the proposed mine site, due to the relatively low annual rainfall in the Alice Springs region. However due to mine sites in general using and disposing of significant amounts of water, there is the requirement for a mosquito management plan to ensure no mosquito breeding sites are created. This management plan should be developed in consultation with Medical Entomology, with relevant information to be included in the EIS.

The creek diversion should have suitable erosion prevention structures installed where necessary, to prevent erosion which could lead to the downstream siltation of drainage lines. The sedimentation of drainage lines could lead to impeded drainage, and increased mosquito breeding during periods of rainfall.

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GUIDELINES FOR PREVENTING MOSQUITO BREEDING SITES ASSOCIATED WITH MINING SITES

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Department of Health and Community Services
November 2005

General Comments

All mining operations need to include a section in an Environmental Management Plan for the monitoring and control of mosquitoes. This is necessary because of the potential of mine sites to provide extensive breeding sites for mosquitoes of pest and disease significance. Mine sites also provide the potential for the introduction of mosquito species and mosquito borne diseases into the NT that are either exotic to the NT or have previously been eliminated.

The monitoring of adult mosquitoes in any new mine should include trapping of adult mosquitoes once a month at a number of sites for the initial 12 months baseline mosquito monitoring program. The baseline mosquito monitoring program provides an indication of the seasonal distribution of the mosquito species present and the relative potential impact of mosquito borne disease to mine personnel.

The monitoring and control of mosquito larvae should be an ongoing operation for the life of the mine. Mosquito larvae must be controlled with an approved mosquito larvicide (*Bacillus thuringiensis var. israelensis or methoprene*) as part of an organised monitoring and control program. Any mosquito control program should be discussed with the Medical Entomology Branch of the Department of Health and Community Services with regard to methods and insecticides.

Accommodation for personnel should be sited as far as possible from the most important biting insect breeding sites and be adequately insect screened or otherwise protected to reduce the impact of mosquitoes.

The potential for artificially created mosquito breeding sites can be minimised with the appropriate design of water holding facilities and water management procedures.

1. WATER DAMS

All water storage dams should be constructed with relatively steep sides (45° slope minimum) to discourage the establishment of semi-aquatic vegetation (eg. *Typha* and *Eleocharis* reeds) that will provide suitable habitats for mosquito breeding.

Dam margins should be as straight as possible to minimise the linear area available for the establishment of semi-aquatic vegetation.

Where possible, any closely grouped dams should be joined together to minimise the linear margin of vegetation.

The bottom of any dam should be graded as level as possible, with a slight slope to one end to form a deeper section for periods of low water. This will remove the potential for the formation of isolated pools as the water level recedes in the dry season.

Areas surrounding any dam that will be flooded during a wet season should be graded to enable water to drain freely into the dam as the water level recedes, without the formation of isolated pools that are capable of retaining water for a period greater than 5 days.

There must be no islands formed within any dam. All areas of impounded water should have a relatively deep (2 m) wet season stabilised water level to prevent the emergence of semi-aquatic vegetation.

Any drainage line directed into a dam must be fitted with a sediment trap or erosion prevention structures just upstream from the dam. This is necessary to prevent the formation of “alluvial fans” that will promote the establishment of semi-aquatic vegetation in the area of the fan where silt will be progressively deposited.

Any overflow areas from dams should have erosion protection measures to prevent the creation of plunge pools.

Local native fish should be introduced or have access into any dams where the water quality is suitable for their survival, to provide natural predators for the control of mosquito larvae.

The margins of any water dam should be inspected annually for vegetation growth such as semi-aquatic vegetation and grass. Any dense marginal vegetation should be herbicided or physically removed, to prevent the vegetation from creation suitable mosquito breeding sites.

2. WETLAND FILTERS

Wetland filters have the potential to provide prolific breeding sites for mosquito species of pest and disease significance. If no other alternative is available for the treatment and disposal of waste water, a wetland filter should incorporate the ability to annually reduce the build up of any dead vegetation. Plans for wetland filter design and siting should be forwarded to the Department of Health Families (Medical Entomology Branch) at the planning stage to ensure that their potential impact on the health of mine site personnel is minimised.

Annual maintenance could be achieved by dividing a wetland filter into separate sections. A dual system will enable water to be directed into one section of the filter while vegetation is burnt or otherwise reduced in the other section. An ability to manipulate the water level in the filter to strand or drown vegetation would be beneficial for the management of vegetation and mosquito numbers.

Stocking the wetland filter with local native fish will provide a significant measure for controlling mosquito larvae. The provision of fish however will not remove the need for annual maintenance of the wetland filter.

Where appropriate, consideration should be given to the provision of a fish ladder on any overflow facility to enable the dispersal of fish into and upstream of the filter.

Wetland filters may need to be removed after mining operations are completed to enable the future development of adjacent land.

3. WEIRS

Any spillways must be fitted with erosion prevention structures to prevent scouring and siltation of creek lines during periods of overflow.

Fish ladders should be constructed where appropriate to enable the upstream dispersal of fish following periods of dam overflow.

4. MINE WASTE DUMPS

The final surface of mine waste dumps should be contoured so that the surface area is free draining and has no surface depressions.

Any runoff from a waste dump should be directed to a silt trap to prevent any siltation of natural creek lines. Siltation in creek lines can promote the formation of isolated pools or disrupt fish ecology and may lead to the subsequent establishment of mosquito breeding sites.

Mine waste dumps should be located away from natural drainage lines, to prevent the upstream impoundment of natural surface water flows. If impractical to locate mine waste dumps away from natural drainage lines, diversion drains will be required to direct surface water flows around the waste dump.

5. SEDIMENT TRAPS

Sediment traps need to be designed so that they are free draining within a period of 5 days after flooding.

Sediment traps should be maintained by silt and vegetation removal on an annual basis.

6. BORROW PITS

Borrow pits, costeans or scrapes must be rehabilitated such that they do not hold water for a period greater than 5 days. These sites can be rectified either by filling or rendering them to be free draining.

7. DRAINAGE PATHS

Natural drainage patterns should be maintained where possible. Access roads across drainage lines may need to be fitted with culverts of sufficient size to prevent upstream flooding for periods that will enable mosquito breeding. Culverts should be installed flush with the upstream surface level. Erosion prevention structures will need to be constructed on the downstream side of any culvert, and erosion prevention structures may also be required at the headwalls of any culvert.

Any disruption to surface drainage should be removed at the end of the mining operations.

8. WASTE WATER DISPOSAL

Septic tanks must be installed to DHF guidelines and should be inspected on an annual basis by the Environmental Officer to ensure that tanks and their effluents do not breed mosquitoes.

Discharge, overflow or excess effluent from sewage treatment systems must be disposed of in a manner approved by DHF. A sprinkler disposal system is suitable under most situations. Infiltration systems are acceptable if soil conditions are favourable. The discharge of excess effluent into ephemeral creek lines is not acceptable.

Sewage ponds should be constructed with steep sides with an impervious lining and be regularly maintained to prevent vegetative growth at the margins (see "*The prevention of mosquito breeding in sewage treatment facilitie*s", available from the Medical Entomology Branch). Surface debris and algal scum should be removed on a regular basis. Monitoring of mosquito larvae should be conducted in sewage ponds on a regular basis and control treatments conducted when necessary.

Disposal of water into "Application areas" must ensure that water does not pool for a period greater than 5 days.

9. ARTIFICIAL CONTAINERS

Rainwater tanks must be adequately screened to prevent the entry of mosquitoes.

Any container capable of holding water, eg. machinery tyres, drums, disused tyres, tanks, pots, etc. should be stored under cover, be provided with drainage holes, emptied on a weekly basis, treated with an appropriate insecticide on an appropriate schedule, or disposed of in an appropriate dump site to prevent the formation of mosquito breeding sites.

No used tyres, machinery or other containers that have previously held rain water should be brought to the NT from Queensland unless the containers or machinery has been thoroughly treated with chlorine or an appropriate insecticide to remove the possibility of the introduction of drought resistant eggs of exotic Aedes mosquito species.

10. RUBBISH AND GARBAGE DUMPS

Rubbish and garbage dumps must be operated in such a matter that there is no ground surface or water filled receptacle pooling of water for a period greater than 5 days, to prevent the formation of mosquito breeding sites.

Rubbish and garbage dumps must be rehabilitated by filling and surface contouring to ensure they are free draining and have no surface depressions.

11. DECOMMISSIONING AND REHABILITATION

A decommissioning and rehabilitation plan should be in place for all mining operations to ensure no actual or potential mosquito breeding sites remain after cessation of mining operations. All disturbed areas should be rehabilitated to be free draining where practical. The proponent should consult the Medical Entomology Branch for input when preparing this document.

Aspects to consider when decommissioning and rehabilitating a mine site include removing and appropriately grading all sediment ponds, removing all bund walls created for the development, removing infrastructure and artificial receptacles that could pond water, removing water dams and reinstating existing flowpaths where practical, rehabilitating borrow pits, removing wetland filters, sediment traps, and other facilities that could pond water and breed mosquitoes.

Facilities such as open pit voids and water dams can be left as water holding pits if they are constructed with steep sides (at least 1:2 slope), and stocked with fish during the rehabilitation process.

APPENDIX D:
Weed Management

Weed Management Branch

The following information is provided in relation to NT Portion 703, the proposed location of the Nolans mine project.

A check of our records however indicates that *Calotropis procera* (commonly referred to as Rubberbush), *Opuntia spp*. (commonly referred to as Prickly Pear) and *Carthamus lanatus* (commonly referred to as Saffron Thistle) have been recorded on the existing pastoral lease.

- *Calotropis procera* is classified as Class B (growth and spread to be controlled) declared species south of the 16 degrees 30 minutes S latitude and Class C (not to be introduced into the NT) declared species under the Northern Territory *Weed Management Act 2001.*
- *Opuntia spp.* is a Class B declared species (growth and spread to be controlled) (area S of 18 degree S latitude) and Class C (not to be introduced into the NT) declared species under the Northern Territory *Weed Management Act 2001.*
- *Carthamus lanatus* is a Class B (growth and spread to be controlled) declared species under the Northern Territory *Weed Management Act 2001.*

Whilst every effort has been made to ensure that the information provided above is accurate to the best of our knowledge at the time of writing, and has been obtained from reliable sources, the above information is not a definitive list of declared plants which may be encountered on site and where uncertainty exists as to a plants declaration status under the *Weed Management Act 2001*, it should be positively identified to minimise the chances of accidentally spreading a declared or potential weed.

The schedule of declared weed classes specifies the level of control required for individual species. Information about the declared weeds list can be found at www.nt.gov.au/weeds. Weed Management Officers of this department are available to assist landholders in developing weed management plans for their property or to provide technical advice on control methods.

Parties responsible for land development including earth moving contractors should be made aware that the current declared weed species list is being reviewed and may impact on some weed species and their legislative responsibilities to be controlled in the future.

Basic weed hygiene procedures will need to be adhered to, such as ensuring all vehicles, machinery and earth moving equipment are weed free before entering the site and are cleaned prior to leaving the area.

Part 3: Section 9 of the *Weed Management Act* places a duty of care upon landholders and owners to manage weeds on their land, including taking reasonable measures to prevent the land being infested with a declared weed, and taking all reasonable measures to prevent the spread of a declared weed, or potential weed, which may exist on the land.

The Act also refers responsibility to the landholder for notifying the presence of a declared weed after first becoming aware of a declared weed which has not previously been, or known to have been, present on the land.

Should you require further information or clarification please contact Chris Brown, Regional Weeds Officer (Southern Region) on telephone 8951 9210 or email chris.brown@nt.gov.au

Community Engagement Program
Weed Management Branch
Department of Natural Resources, Environment, the Arts and Sport