DRAFT GUIDELINES FOR THE PREPARATION OF AN ENVIRONMENTAL IMPACT STATEMENT

BATCHELOR MAGNESIUM METAL PROJECT

INTRODUCTION

These Guidelines have been developed to assist Mt Grace Resources NL in preparing a draft Environmental Impact Statement (EIS) for the Batchelor Magnesium Metal Project in accordance with Clause 8 of the Administrative Procedures of the *Environmental Assessment Act (1982) of the Northern Territory*.

The purpose of the Environmental Impact Statement (EIS) is to provide the Government with concise and comprehensive information regarding the design, construction and operation of the proposed mining operation and haulage of the ore. It should contain sufficient information to enable understanding and assessment of the scope and environmental implication of the proposal. The EIS should clearly identify the main environmental impacts associated with the development, and should contain a management strategy to minimise these impacts.

Information should be presented in a concise format, using maps, overlays, tables and diagrams to clarify the text where appropriate.

The draft EIS aims to provide:

- a source of information from which individuals and groups may gain an understanding of the proposal, the need for the proposal, the alternatives, the environment that it would affect, the impacts that may occur and the measures taken to minimise those impacts;

- a basis for public consultation and informed comment on the proposal; and

- a framework against which decision-makers can consider the environmental aspects of the proposal, set conditions for approval to ensure environmentally sound development and recommend an environmental management and monitoring program.

The object of these Guidelines is to identify those matters that should be addressed in the draft EIS. The Guidelines are based on the initial outline of the proposal in the Notice of Intent. Not all matters indicated in the Guidelines may be relevant to all aspects of the proposal. Only those matters that are relevant to the proposal should be addressed. The Guidelines should, however, not be interpreted as excluding from consideration any matters which are currently unforeseen, which may arise during ongoing scientific studies or which may arise from any changes in the nature of the proposal during the preparation of the draft EIS, the public consultation process and the preparation of the Supplement to the draft EIS (response to submissions).
The draft EIS should be a self-contained and comprehensive document written in a clear,

concise style that is easily understood by the general reader. Cross-referencing should be used to avoid unnecessary duplication of text. Text should be supported where appropriate by maps, plans, diagrams or other descriptive material. Detailed technical information and baseline surveys should be included as appendices or working papers.

The justification of the project in the manner proposed should be consistent with the principles of ecologically sustainable development. Assessment of the environmental impacts of the proposal and alternatives should consider the life-cycle impacts, from cradle-to-grave, including sourcing of materials, operational impacts and decommissioning. For the purpose of these Guidelines, the "principles of ecologically sustainable development" are as follows:

- the precautionary principle - namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;

- inter- and intra-generational equity - namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations;

- conservation of biological diversity and ecological integrity and improved valuation and pricing of environmental resources.

EXECUTIVE SUMMARY

The Executive Summary should include a brief outline of the project and each chapter of the draft EIS, allowing the reader to obtain a clear understanding of the proposed project, its environmental implications and management objectives. 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 draft EIS as a whole.

The summary should include:

- the title of the project;

- name and contact details of the proponent, and a discussion of previous projects undertaken by the proponent and their commitment to effective environmental management;

- a concise statement of the aims and objectives of the project;

- the legal framework, decision-making authorities and involved agencies;

- a discussion of the background to and need for the project, including the consequences of not proceeding with the project;

- a discussion of the alternative options considered and reasons for the selection of the proposed development option;

- a brief description of the project and the existing environment, utilising visual aids where appropriate; and

- an outline of the principal environmental impacts predicted and proposed, environmental management strategies (including waste minimisation and management) and commitments to minimise the significance of these impacts.

GENERAL DESCRIPTION AND SUMMARY OF ENVIRONMENTAL ISSUES

Brief introduction of the proponent and the proposal.

- Name and address of proponent, including contact officers

- Outline of proposal

- Tenement status for project area

- Summarise scope, purpose and structure of the EIS

DESCRIPTION OF PROPOSED DEVELOPMENT

This section should describe the project in sufficient detail to allow an understanding of all stages of the proposal, and assist in determining impacts from the proposal.

- Location, including land requirements and reason for infrastructure layout

- Timetable for operations including land clearing, construction, mining, haulage and processing

- Construction material, sources, transportation, storage and uses

- Temporary construction requirements, including erosion control measures

- Mining development and operations
  - outline design of pit and its dimensions (including maps, plans and geological cross-sections)
  - describe on-site and off-site borrow material requirements, extraction and uses
  - indicate extent of area to be cleared of vegetation (or substantially thinned) and erosion control measures
  - describe mining methods, scale of operations and timetable for ore extraction and open cut operations
  - detail drilling and blasting requirements (including frequency)
  - outline possible future extensions to the mine operation, above ground and below ground level, and discuss the probability of mining satellite ore bodies
  - identify availability and suitability of material for topsoil, borrow pit requirements and proposed uses

- Processes and products
  - describe source of ore, average grade of ore, and quantities of ore to be processed
  - outline ore sampling methodology (statistically sound)
  - outline ore mineralogy
  - describe ore processing operations, including inputs and outputs

- Waste rock
  - characterise waste rock in terms of AGP (acid generation potential) from drill core samples or in-situ assessments
  - outline sampling criteria and test methods, identify possible chemical constituents in drainage, and specify test methods (provide all test information)
  - identify classes of waste rock for handling purposes
  - outline proposed waste dump locations (discuss alternatives), dimensions, water catchments, contingency drainage interception arrangements, surface treatment and final landform
  - describe in detail the methods for waste rock disposal and dump construction; including selection methodology and characterisation to direct different waste rock types for disposal, and cross sections for the design of the waste rock dumps
  - describe means of interception and management of potential acid mine drainage

- Tailings
  - characterise the tailings, including mineralogy, base metal content, neutralising capacity, sulfide content and net acid production potential
  - describe proposed tailings storage facility location and catchment details
  - describe tailings disposal and impoundment principles, surface configurations, wall designs and construction, estimated flood heights, erosion protection, spillway design and location, subdrainage and collection sumps
  - Outline geotechnical details of dam (specifically seepage potential and expected chemistry of leachate)

- Slag
  - characterise the slag, including mineralogy, base metal content, neutralising capacity, sulfide content and net acid production potential
  - describe proposed slag storage facility location and catchment details
  - describe slag disposal and impoundment principles, surface configurations, wall designs and construction, estimated flood heights, erosion protection, spillway design and location, subdrainage and collection sumps
  - Outline geotechnical details of dam (specifically seepage potential and expected chemistry of leachate)

- Water
  - outline domestic, industrial and process water requirements, sources, annual extraction volumes, delivery rates and methods of extraction and treatment (including chemistry/quality)
  - outline pit de-watering and waste rock water strategies, including expected quality and quantities before and after decommissioning
    - specify contingency plans for 1:100 year rainfall events and wet season releases, predicted water quality on release
    - specify intended design AEP (annual exceedence probability) for discharge to the environment, including wet season water releases and expected water quality,

operational hydrological/hydraulic design criteria of each major water system component including transfer, losses and on-site disposal
    - provide details on alteration to drainage lines
    - provisions of the *Water Act* will apply to alterations to drainage lines and discharge
    - quantitative terms should be used wherever possible
  - provide details of water storage requirements, including any alternative storage, ie dams, include geotechnical and construction details (freeboard estimates/allowances), seepage potential, provision for overflow, silt traps
  - outline external water sources (if required), principles and methods for extraction, storage and use

- Emissions to Air
  - Describe expected quantity and quality of emissions to air from the rotary kiln and the Heggie furnace
  - Discuss results of plume modelling for stack emissions

- Infrastructure
  - outline administration, staff amenity and workshop buildings
  - describe explosive storage and transport
  - describe hazardous substances (types, storage, use, transport and disposal)
  - describe fuel, oil and lubricants (types, storage, transport and disposal)
  - discuss options for power supply, infrastructure, servicing easements and outline preferred option
  - describe sewage and refuse disposal; disposal of any solid waste should not compromise the long term integrity and management of waste rock dumps or tailings storage areas
  - outline road access corridor and any other access corridors, including construction and any upgrade requirements, design of stream crossings and erosion control measures
  - outline communication requirements
  - outline security arrangements

- Workforce
  - provide estimates of numbers and shift requirements during construction, operation, and rehabilitation
  - outline recruitment and training policy
  - describe health, safety and emergency procedures
  - describe accommodation, amenity, office and transportation requirements for staff
  - outline professional staffing details

DESCRIPTION OF THE EXISTING ENVIRONMENT

This section should describe those elements of the existing environment that may affect the proposal, or will be potentially affected by the proposal. The results from this section should follow-through into impact assessment, monitoring and rehabilitation where relevant.

Biophysical environment

- Climate
  - rainfall (annual rainfall, monthly variability and average recurrence intervals for events), evaporation, temperatures (annual, monthly averages - minimum, maximum and mean), and wind characteristics

- Geology, regional and local setting

- Land systems, land units and description of soils
  - including maps at appropriate scales for project requirements
  - soil data to include; profile description and classification (including pH, EC and organic matter), types, composition, friability and erodibility

- Hydrology
  - describe surface hydrology; define drainage catchments and sub-catchments, describe flow regimes, discharge rates, including seasonal variations (orient this to identified potential contaminant pathways and water disposal plans)
  - describe surface water quality and sediment load characteristics (characterise waters to better define possible geochemical mine water constituents, and to identify key monitoring parameters)
  - describe groundwater occurrence locally (mine site) and regionally, groundwater movement mechanisms, interaction with surface processes, seasonal responses, hydrochemistry
  - characterise groundwater quality
  - identify present uses and users for surface water and groundwater, including a discussion on issues associated with the water supply to Batchelor

- Flora and fauna
  - provide baseline information/maps on flora and fauna communities of immediate area and surrounds (should include communities downstream of site which may be impacted by variations in water quality and siltation), as determined by literature search, survey and sampling programs
    - include comprehensive description of methodologies used to gather information, survey and sampling techniques
    - provide overall evaluation of flora and fauna communities of site and surrounds in relation to the Batchelor district and NT
  - list unique, rare, endangered and vulnerable native species and communities, and evaluate the significance of occurrence of such species and communities at the mine site in relation to their overall status, distribution and condition
  - describe aquatic species, both aquatic plants, fish and macro-invertebrates

- Describe feral animals and weed species at the site

- Provide baseline data on mosquito and other biting insects habitats and populations

- Describe fire regime

Socio-economic environment

- Describe land tenure and land uses, in and adjacent to the project area
  - traditional Aboriginal ownership and management
  - Parks and Reserves (including Boards), pastoral properties, mining activities, communities, and townships
  - provide a brief description of the township of Batchelor
  - outline alterations or degradation to the natural environment which may have occurred

- Identify any nominated proposed and/or declared heritage places and objects under the *Heritage Conservation Act*
  - If any of the places are within the project area, describe these places, their location in relation to infrastructure, and the impact of the project on these places/objects.

- Identify non-Aboriginal heritage significance under the *Heritage Conservation Act*
  - survey area to include the mine area as well as associated infrastructure
  - provide details of survey methodology and sampling technique
  - provide site descriptions, diagrams and maps
  - provide an assessment of significance in a regional context

- Identify places and objects of Aboriginal heritage significance as defined under the *Heritage Conservation Act*
  - survey area to include the mine area as well as associated infrastructure
  - provide details of survey methodology and sampling technique
  - provide site descriptions, diagrams and maps
  - provide an assessment of significance in a regional context

- Identify Aboriginal anthropology and significance under the *Northern Territory Aboriginal Sacred Sites Act* including
  - results of an inspection of the Register of Sacred Sites maintained by the Aboriginal Areas Protection Authority (AAPA)
  - details of applications lodged with the AAPA for Authority Certificates within the meaning of the *Northern Territory Aboriginal Sacred Sites Act*
  - copies of the Certificates issued by the AAPA as a result of the applications
  - details of conditions (if any) listed on the Certificates

- Outline native title issues

POTENTIAL AND ACTUAL ENVIRONMENTAL IMPACTS, PROPOSED SAFEGUARDS AND MANAGEMENT

Impacts may be direct, indirect, significant, short or long term. Some will be temporary and some will be irreversible. All potential impacts associated with the construction, operation and decommissioning of the mine, both on site and off site, should be identified and characterised in relation to the above. Include information on magnitude, risk and significance of the impact. The section should also detail the environmental management practices and safeguards proposed to prevent, minimise or ameliorate these impacts.

This section could take the form of a table which lists and describes impacts (in point form) against all environmental protective commitments, safeguards, and the methods of

management proposed to achieve environmental protection. Commitments and safeguards should be cross-referenced to the text.

If this section is not in the form of a table, then a detailed table of safeguards and commitments, cross referenced with the text, should be included as an appendix.

Appropriate safeguards and management practices should be developed using the following categories:

- Project and infrastructure layout

- Design and processes options

- Management and contingency plans, including an indication of the risk of occurrence of events, intended response and time frame (this is particularly important in respect to water discharge or spillage)

* Note: Monitoring is not a safeguard and should be detailed separately

Potential and actual impacts should address:

- Landforms, land clearing, soil stability, erosion potential and topsoil management

- Water quality
  - including surface and groundwater hydrology
  - runoff, erosion, downstream effects
  - impact on existing drainage systems
    - include means to separate natural catchments from those affected by site development during construction, operation and decommissioning
  - components of mine water described/explained in terms of; flow rates, flow frequency/duration, annual volumes, methods of collection and storage, quality and proposed re-use, treatment and storage (including the use of wetland systems for storage and treatment)
    - components include; pit de-watering, waste rock runoff, waste rock seepage, plant site spillages, plant site stormwater, and operational runoff
  - chemistry of water
    - toxicity to flora and fauna, bio-accumulation and any impacts on food chains

- Processes and products, waste rock, tailings, and slag

- Hazardous substances, explosives, fuel, oil and lubricants

- Biological impacts
  - flora and fauna communities (including unique, rare, endangered and vulnerable species or communities)
  - feral animals and weed species

- Health impacts
  - potable water and food sources
  - mosquitoes and other biting insects

  - sewage and refuse disposal
  - air quality and atmospheric emissions
  - noise and vibration (blasting)

- Fire management

- Impact on heritage places, including archaeological sites

- Special areas management
  - heritage and archaeological sites
  - sacred sites
  - local community, land tenure, adjacent land use
  - road access corridor
  - site stability and revegetation

SCHEDULE OF MONITORING, MEASUREMENTS, SAMPLE ANALYSES AND REPORTING

Environmental monitoring should be compatible with baseline studies, however they should be identified separately.

Environmental monitoring should be directed to and address each key environmental issue and management activity with the following objectives;

- Detect short and long term trends
- Recognise environmental changes and enable analysis of their causes
- Measure impacts
- Check the accuracy of predicted impacts
- Develop improved practices and procedures for environmental protection

A table providing details of the original and on-going baseline studies and monitoring programmes is recommended.

The programme should specify:

- Sites
- Type of sample or measurement
- Sampling/measurement frequency
- Constituents and parameters, and detection limits
- Responsibilities for monitoring and response mechanisms
- Reporting mechanism and frequency

REHABILITATION AND DECOMMISSIONING

The text should outline a time scale for decommissioning and for determination of compliance with, and release from, requirements of the appropriate authorities.

- Specific information requirements include;
- Integration of the rehabilitation program with mine design and operation
- Design of rehabilitated landforms
- Erosion control procedures
- Describe progressive and/or final rehabilitation plan for the pit and surrounds
- Natural and constructed drainage system design to ensure runoff discharge does not erode or add to downstream siltation
- Actions to prevent the development of mosquito and other biting insect breeding habitats
- On-going water management requirements linking storage, quantity and quality (including maintenance of wetlands or other systems)
- Describe progressive and final rehabilitation plans for waste rock dumps; specifically collection and selection strategy for native species, eg native grasses and other vegetation to be used for runoff and erosion control, final topographic and drainage morphology, maintenance of water quality, prevention of leaching and revegetation procedures
- Establishment of vegetation to include seeding, flora selection, fertiliser use (if needed), and rehabilitation trials
- Continued water monitoring and discharge requirements following decommissioning
- Responsibilities of the proponent

REFERENCES

APPENDICES

ADMINISTRATIVE REQUIREMENTS

- Prior to the report being distributed for comment, a preliminary draft of the Environmental Impact Statement should be lodged with the Department of Lands, Planning and Environment for review and comment.

- Once the draft EIS is ready for comment, 40 copies of the draft EIS should be submitted to the Department of Lands, Planning and Environment for distribution to NT Government advisory bodies.

- The EIS should be placed on public review at the Batchelor Public Library, Department of Lands Planning and Environment offices in Darwin, Department of Mines and Energy offices in Darwin and the NT Library (Parliament House, Darwin).

- If possible the EIS should be on CD Rom disc so that the EIS can be placed on the Department's Internet site. The CD Rom copies should be in ABODE® *.pdf format for placement on the Internet

- The Department of Lands, Planning and Environment action officer for this project is Richard McAllister - telephone (08) 8924 4123, facsimile (08) 8924 4053.