

PART B
GUIDELINES

**GUIDELINES FOR PREPARATION OF
A PUBLIC ENVIRONMENTAL REPORT**

**MATILDA MINERALS LTD
AIRCRAFT LANDING AREA
ANDRANANGOO CREEK WEST, MELVILLE ISLAND**

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These guidelines have been developed to assist Matilda Minerals Ltd in preparing a Public Environmental Report (PER) for the proposed Aircraft Landing Area (ALA) Project at Andranangoo Creek West in accordance with Clause 8 of the Administrative Procedures of the *Environmental Assessment Act* of the Northern Territory. Administrative Procedures of the *Environmental Assessment Act* of the Northern Territory state that the Minister will specify the following in the guidelines:

- Matters relating to the environment which the proponent shall deal with;
- Number of copies of the report to be provided to Minister/other agencies; and
- Newspapers in which and on occasions when the proponent will publish a notice.

The PER should contain sufficient information to enable understanding and assessment of the scope and environmental implications of the proposal. The PER should clearly identify the main environmental impacts associated with the development and should contain a management strategy that demonstrates how these impacts will be minimised.

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

The PER should include the following sections, but need not be limited to these sections or inferred structure. Previous work undertaken as part of the EIS can be included where applicable in this new context.

Previous work undertaken as part of the Environmental Impact Statement for the Matilda Mineral's Mineral Sand Mining Project can be included where applicable in this new context.

1 EXECUTIVE SUMMARY

The Executive Summary should include a brief outline of the project and each chapter of the PER, 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 PER as a whole.

2 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 Darwin, and existing airstrips located on Melville Island;
- An overall layout of the proposed Aircraft Landing Area including, airstrip alignment, other infrastructure, waterways, access and existing features of interest;

- Comprehensive maps showing topography and 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;
- Infrastructure requirements and specifications (permanent and temporary) and ancillary activities (e.g. storage areas, waste dump areas etc);
- Employment and business opportunities (direct and indirect), including sources of workforce, skill levels required and opportunities for Aboriginal people and businesses; and
- Methods for storage, handling, containment and emergency management of chemicals and other hazardous substances (including fuel and explosives).

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

Site Preparation

- Outline the construction timing, methods, equipment and materials (types, sources and quantities);
- Outline the proposed ALA surface, how and where the surfacing material is expected to be sourced; and
- Describe site 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.

Waste Management

- Identify total amount of waste to be produced from earthwork activities; and
- Outline proposed waste locations.

Water Management

- Describe the diversion of surface waters.

Transport

If different to that described in the Environmental Impact Statement (EIS) for the Sand Mining Proposal, the project description should consider, as a minimum, the following:

- Description of transport systems, and methods to convey all site traffic (including materials, workers and product) to and from the site (both during construction and operation) including:
 - type, size and number of vehicles required during all phases of the proposal;
 - the estimated volumes, tonnage, composition, origin and destination of traffic generated by the proposal;
 - estimated times of travel; and
 - additional road infrastructure works required including site access and signage.
- Description of any proposed haul roads, including length, location, land requirements, tenure and acquisition requirements;
- Consultation undertaken with relevant regulatory agencies; and

- Necessary approvals required.

Rehabilitation and Decommissioning

Calculation of an appropriate bond should be undertaken for full rehabilitation and decommissioning of the ALA area against abandonment, inability to develop business activity and maintenance of the airstrip for a period of five (5) years.

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

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

- Identification of post ALA land use and rehabilitation objectives;
- Rehabilitation commitments and timetables including stabilisation and rehabilitation plans for ALA area; and
- proposed rehabilitation measures, such as:
 - Runoff and erosion control measures of rehabilitated areas;
 - Final topographic and drainage morphology;
 - Collection and selection strategy for native species, eg: native grasses and other vegetation and
 - Profile reconstruction and viability for the growth of native species.

Describe in detail all liabilities proposed to be passed on the Traditional Owners and/or the Tiwi Land Council in terms of required ALA management, maintenance and costs.

3 ALTERNATIVES

Alternative proposals, which may still allow the objectives of the project to be met, should be discussed in detail, providing 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 potential impacts of the alternatives should be described.

Alternatives to be discussed should include:

- Not proceeding with the project.
- Alternative transport options.

In light of the information contained in the EIS for the Mineral Sand Proposal, that existing and planned transport options were viable, the PER should provide justification for the proposed ALA against the transport options described in the EIS.

The current Matilda mine authority provides for an existing helicopter landing area. Comprehensive detail should be provided exploring all potential suppliers of emergency rescue helicopter services to the Mine.

- As a minimum, the examined suppliers should include services from Tindal defence Airbase, *Jayro* helicopters (Darwin), Gove based services, helicopters currently utilised by other mines, and any other available helicopter services.
- Description should be provided of all relevant factors affecting the option of leasing or share leasing a helicopter to be based on or within reach of the Matilda Minerals lease.
- Description should be presented of the current negotiations with the intent of providing an emergency helicopter service based in Darwin, between the NT Government (Dept of the Chief Minister, Minister for Health, Pearl Air, Aspen Air, Stuart Collis – Drake International and Ian Batten –Dept of Defence).
- Description should be provided of relevant factors affecting or limiting availability of each service.
- Risk analysis should be made of each above contingency option in terms of the Matilda Minerals' assumed duty-of-care to protect mine workers against the case of a need for emergency evacuation, from both Andranangoo Ck West and Lethbridge Bay West.

4 EXISTING ENVIRONMENT, POTENTIAL IMPACTS OF THE PROJECT AND MANAGEMENT

Studies to describe the existing environment should be of a scope and standard sufficient to serve as a benchmark against which the impacts of the project may be assessed over an extended period. Control areas not impacted by the project should be included in studies and long term monitoring locations established.

This section should also include an assessment of the level of significance of the impact, be it global, regional or local (e.g. global and national implications of greenhouse gases and the localised impact of service roads or artificial water bodies).

Cumulative impacts should also be discussed. The reliability and validity of forecasts and predictions, confidence limits and margins of error should be indicated as appropriate.

Description of those areas potentially impacted by the project should, as a minimum, include:

4.1 Landform

Baseline

- Provide maps and an interpretation of the regional geology and geomorphology of the site and peripheral areas;
- Discuss the soil types and land units of the site and peripheral areas; and
- Detail the existing level of soil erosion and other disturbances.

Impacts

Describe how the project will or has the potential to impact on each element with particular consideration given to the following:

- Discuss limiting properties of landform considering erosion, rehabilitation etc. This information may be provided through the development of a landform evolution model for the life of the project and beyond; and
- Detail impacts of the airstrip to landform.

Management

Detail the safeguards, management and monitoring strategies that will be used to minimise impacts of construction and operation phases, including:

- Measures to avoid or minimise impacts; and
- A description of proposed techniques to manage any concentrated flows of surface waters to minimise erosion potential.

4.2 Hydrology/Hydrogeology

Baseline

- Describe the site and regional surface water systems including:
 - rivers;
 - creeks;
 - tidal inlets and
 - streamlines.
- List meteorological conditions including:
 - precipitation data such as maximum, minimum and average.
- For any surface water systems occurring at the site and adjacent to , discuss:
 - their significance;
 - flows (including flood contours) and discharge rates;
 - water quality; and
 - characterisation of surface water sources.

Impacts

Describe impacts on surface water from activities and associated infrastructure requirements, including impacts on:

- water quality;
- changes to/diversion of surface waters; and
- aquatic flora and fauna.

Management

Detail the safeguards, management and monitoring strategies that will be used to minimise impacts of construction and operation phases, including:

- Management of high rainfall events.
- Protection of beds and banks of watercourses including where run-off could enter tidal creeks or inlets;
- Protection of surface water from potential contamination; and

Include a map of water management system showing all structures and routes.

4.3 Ecology

Impacts

Describe how the project will or has the potential to impact on each element identified above with particular consideration given to the following:

- Impacts on species or communities or habitats of local or regional or national significance. Detail this with reference to the inputs and outputs from the aircraft landing area;
- Rate the risk and seriousness of each impact;
- Identify noxious weeds that may result from the project activity; and
- Impacts on any groundwater dependent ecosystems affected by construction of the ALA (i.e. cut and fill activities).

Management

Detail the safeguards, management and monitoring strategies that will be used to minimise impacts of construction and operation phases, including:

- Minimisation of disturbance;
- Weed management, specifically to ensure machinery hygiene when entering the site and monitoring and treatment of emergent weed species once clearing is completed;
- Actions taken to meet the management principals criteria outlined under the Land Clearing Guidelines;
- General undertakings for fire management; and
- Detail proposed feral animal control.

4.4 Air Quality and Noise

Impacts

Describe how the project will or has the potential to impact, on the following:

- Potential air emissions including dust.

Management

Detail the safeguards, management and monitoring strategies that will be used to minimise impacts of construction and operation phases, including:

- Dust suppression and monitoring; and
- Noise mitigation.

4.5 Cultural Environment

This section of the PER should include:

- 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;
- 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;
- Status of any negotiations with native title claimants/NLC or other requirements under the *Native Title Act*; and
- Information collected to support the EIS, relevant to the current proposal.

Impacts

This section should describe the anticipated or potential impacts the project will have on each cultural value indicated in the previous section. Consideration is to be given to the impact of the proposal on local Aboriginal employment levels and the influx of additional workers into local centres. Describe how these potential impacts are to be mitigated or managed.

4.6 Traffic and Transport

Baseline

- Describe existing and already approved transport infrastructure currently being utilised by the mine both on the mining lease and on Melville Island generally (roads, airports, helipads, workshops, fuel storage sheds, etc);
- Use local and island-scale maps to indicate transport routes, distances and location of such infrastructure; and
- Describe existing transport arrangements for the mine to transport all mineral sands, goods, services and mine workers. Indicate travel times and haulage capacities. Indicate potential capacity of vehicles to transport multiple load types (for example of haul trucks to carry food supplies and / or staff).

Impacts

Describe how travel arrangements described in the EIS prepared to support the Mineral Sand Mining Proposal are now not appropriate and the likely impacts or alterations expected by the ALA proposal. Describe how the proposal has the potential to impact on transport infrastructure and arrangements during phases of construction, operation and closure of the mine at Andranangoo Ck West and Lethbridge Bay West locations.

Describe how existing transport arrangements would be altered by the ALA proposal once mining ceases at Andranangoo Creek West and commences at Lethbridge Bay West.

Management

Describe proposed safeguards, management and monitoring strategies that will be implemented to minimise potential transport impacts during construction and operation including, but not limited to:

- Methods for complying with any relevant road vehicle axle limits;
- Methods for securing loads;
- Measures to prevent sediment transport off-site via transport vehicles;

- Measures to reduce any road traffic noise impacts;
- Consultation with local communities affected by transport impacts;
- Traffic management; and
- Management of driver fatigue.

4.7 Waste Management

- Identify and describe all sources of site waste (i.e.: construction waste, fuels, oil, packaging) and proposed disposal methods.

Management

Detail the safeguards and management that will be used to minimise impacts during development and operation of the mine, including:

- Details of any pollutants that could possibly be released into the environment and measures to prevent or minimise this release of pollutants;
- Management of listed waste as per the *Waste Management and Pollution Control Act*; and
- Management of hazardous materials such as chemicals, fuels, oils and explosives.

4.8 Greenhouse Gas Emissions

The Northern Territory Government's objective for managing greenhouse gas emissions from new and expanding operations is to reduce emissions to a level that is as low as practicable. An assessment of greenhouse gas emissions for the project should be undertaken.

The assessment should outline, as a minimum, the following:

- Energy requirements for the project;
- Fuel sources for the project;
- Estimated greenhouse gas emissions, including emissions associated with land clearing; and
- A comparison with the national levels of greenhouse gas emissions.

Details should also be provided on the projects commitment to:

- Greenhouse gas emissions inventory and benchmarking;
- Measures to minimise greenhouse gas emissions;
- Minimising emissions over the life of the project; and
- Benefits of this project to abatement of greenhouse gas emissions on a national or global scale.

Refer to the "Greenhouse Gas Emissions Guidelines" (Attachment A) for further information on requirements for addressing greenhouse issues in the PER.

4.9 Biting Insects

Biting insects and actions undertaken to prevent the development of mosquito and other biting insects breeding habitats need to be considered in the PER, the Environmental Management Plan and Decommissioning Plan.

The Airstrip and surrounding areas must be designed in a manner that prevents mosquito breeding. Relevant sections from the "Guidelines for Preventing Mosquito Breeding Sites associated with Mining Sites" have been included in Appendix B.

4.10 Socio-Economic

Impacts

The section should present a balanced broad summary of the project's impact on the regional and Northern Territory economies in terms of direct effects on employment, income and production.

It should outline the overall economic benefits of the proposed project, the likely contribution of the project to the development of industry, regional economic development and Indigenous economic development in the Northern Territory, employment and skills development outcomes and linkages with other Territory business and sectors, including suppliers and other service providers.

It should specify:

- Estimated value of construction, highlighting the proportion to be spent in the Northern Territory;
- Estimate the value of annual expenditure on regional goods and services;
- Opportunities for local industry and Indigenous workforce participation in the construction and operation of the facility;
- A breakdown of skills/trades required, including specific opportunities for skills development that may be of benefit to the local community, past the lifetime of the ALA;
- Identification of opportunities for facilities and infrastructure development that may be of benefit to the local community, past the lifetime of the ALA;
- Identification of negative impacts or potential synergies with existing land uses; and
- A description of anticipated socio-economic impacts upon local residents, communities and towns.

Management

- Detail how potential local business and employment opportunities and opportunities for synergistic facilities and infrastructure development will be identified;
- Specify the mechanisms that will be utilised to inform local business community and workers of business and employment opportunities; and
- Detail the socio-economic indications that will be monitored on an ongoing basis.

5 HAZARDS AND RISKS TO HUMANS AND FACILITIES

The PER should include a preliminary hazard analysis and assessment of the risks to people, the environment and any nearby facilities from potential accidents associated

with the construction, operation and maintenance of the various components of the proposal, storage and transport of materials to and from the complex.

The preliminary hazard analysis and risk assessment should outline and take into account emergency plans that detail strategies, response procedures and staff responsibilities in the event of an emergency or accident. Issues such as floods, bush fires, lightning strikes and aircraft accidents should be considered. Contingency plans for dealing with spillage of any hazardous materials should be detailed. The risks in relation to aircraft accident rescue should also be discussed.

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

5.1 Risk Scoring

		CONSEQUENCE (C)		
		<u>Low</u> <i>Little to no impact</i>	<u>Medium</u> <i>Medium term -ve impact</i>	<u>High</u> <i>Irreversible or long term -ve impact</i>
LIKELIHOOD (L)	<u>High</u> <i>>75% Chance event will occur in life of plan</i>	4	7	9
	<u>Medium</u> <i>25% <> 75% Chance event will occur in life of plan</i>	2	5	8
	<u>Low</u> <i><25% Chance event will occur in life of plan</i>	1	3	6

Critical Risk	Information required immediately	
High Risk	Information required prior to acceptance	
Moderate Risk	Information required in next submission	
Low Risk	General Information for consideration	

6 PROJECT ENVIRONMENTAL MANAGEMENT

A draft Environmental Management Plan (EMP) should be provided. 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 be prepared at the conclusion of the

assessment, taking into consideration comments on the PER and incorporating the Assessment Report recommendations.

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 PER, including performance indicators, with cross-references to the text of the report; and
- Provide for the periodic review of the management plan itself.

Reference should be made to relevant legislation and standards, 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.

7 PUBLIC INVOLVEMENT AND CONSULTATION

Detail all consultation undertaken with local landowners, Traditional Owners, the Tiwi Land Council, the Northern Territory and Australian Governments should be detailed and any outcomes referenced, especially in relation to the long term management of the ALA including proposed future use, maintenance and financing arrangements. Details of any ongoing consultation should also be provided.

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.

8 INFORMATION SOURCES, REFERENCE LIST, BIBLIOGRAPHY

The PER 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 PER should be clearly identified, cited in the text and referenced in the bibliography.

9 APPENDICES, GLOSSARY

Information and data related to the PER, 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 PER, technical terms and jargon should be minimised).

10 ADMINISTRATION

Once the PER is ready for comment, 20 copies of the PER and 15 CD-rom copies (formatted in ADOBE® pdf) should be submitted to the Environment Protection Agency (EPA) Program for distribution to NT Government advisory bodies.

The proponent is required to place the PER on public exhibition for a 28 day period. The proponent has the responsibility of advertising the public exhibition of the PER in Northern Territory (NT News) and Tiwi Island newspapers.

The PER is to be made available for public viewing at the following locations:

- Northern Territory Library, Parliament House, Cnr Bennett and Mitchell Streets, Darwin NT;
- Casuarina Public Library, Bradshaw Terrace, Casuarina, NT;
- Darwin City Library, Darwin Civic Centre, Harry Chan Ave, Darwin
- Palmerston Public Library, Civic Plaza, Cnr University Avenue and Chung Wah Terrace, Palmerston, NT;
- Charles Darwin University Library, CDU Casuarina Campus;
- Department of Planning and Infrastructure, Ground Floor, 38 Cavenagh St, Darwin; and
- Locations on the Tiwi Islands including Tiwi Land Council offices at Milikapiti, Pirlangimpi an Ngiuu.

The proponent should also provide a copy of the PER to the following organisations for comment:

- The Environment Centre of the Northern Territory;
- The Tiwi Land Council (Darwin office);
- Great Southern Plantations; and
- The Tiwi Islands Local Government (Milikapiti Community Council).

Digital (word.doc and pdf) versions of the PER should be provided to the EPA Program one week prior to commencement of the public exhibition period, so that the PER can be placed on the Agency's Internet site.

The EPA Program action officer for this project is Annie Andrews, telephone (08) 8924 4123, facsimile (08) 8924 4053, and email: annie.andrews@nt.gov.au

APPENDICES

APPENDIX A:

NT Environmental Impact Assessment Guide - Greenhouse Gas Emissions

APPENDIX B:

Guidelines for Preventing Mosquito Breeding Sites Associated with Mining Sites

- Biting Insect Assessment (Baseline Survey); and
- Guidelines

APPENDIX A:
NT ENVIRONMENTAL IMPACT ASSESSMENT GUIDE:
GREENHOUSE GAS EMISSIONS

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 Guide aims to assist proponents in providing the information needed by the Environment Protection Agency (EPA) Program to assess the impact of greenhouse gas emissions from proposed projects during assessment under the *Northern Territory Environmental Assessment Act 1994*¹.

GUIDANCE

Emissions estimates

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:
 - (a) in absolute and carbon dioxide equivalent figures (refer to the Glossary in this Guide) for each year of the project;
 - (b) identified on a gas by gas basis; and
 - (c) 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 Committee² or another national or internationally agreed methodology.

2. 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 context³.

¹ As required under Action 6.4 of the NT Strategy for Greenhouse Action 2006, available at http://www.nt.gov.au/nreta/environment/greenhouse/publications/pdf/greenhouse_action.pdf

² Up to date methodology can be obtained from the Australian Greenhouse Office. See www.greenhouse.gov.au.

³ Information on Australia's national emissions profile can be obtained from the Australian Greenhouse Office at www.greenhouse.gov.au; international emissions from the United Nations Framework Convention on Climate Change (UNFCCC) website at <http://unfccc.int/2860.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.

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.

Examples may include but are not limited to:

- establishment and maintenance of perennial vegetation;
- sequestration of carbon by geological, chemical, biological or other means;
- reducing the carbon intensity of existing activities;
- replacing fossil fuels with renewable fuels;
- trading emissions permits in a nationally approved system;
- synergistic linking of enterprises to reduce net greenhouse gas outputs; and
- development of new greenhouse gas efficient technologies.

Proposed emissions offsets projects should include an estimate of greenhouse gas emissions savings that are likely to be achieved through implementation.

Measures that offset emissions within the NT are encouraged, and EPA staff can discuss possible options with proponents.

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. It should be noted that in 2006, large energy users (those using greater than 0.5 petajoules per year) will be required by the Commonwealth Government to report publicly on their greenhouse gas emissions.

Preparedness for climate change

Proponents should demonstrate due consideration of the risk of climate change impacts to the proposal. Relevant variables may include, but are not limited to:

- increasing average temperature and evaporation rates;
- variation in rainfall and the incidence of floods;

- sea level rise;
- increased frequency and intensity of cyclones and storm surge levels; and
- altered distribution of pests and disease.

In assessing climate change risk, proponents should be guided by recent projections published by organisations such as the CSIRO and the Intergovernmental Panel on Climate Change. (For CSIRO projections, see:

<http://www.ipe.nt.gov.au/whatwedo/greenhouse/documents/pdf/ntclimatechange.pdf>).

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: www.greenhouse.gov.au/challenge.

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, the EPA Program will take a common sense approach on a case by case basis in the interim. To assist proponents, the EPA 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 Potentials (GWPs)*

Greenhouse Gas	Global Warming Potential
Carbon dioxide (CO ₂)	1
Methane (CH ₄)	21
Nitrous oxide (N ₂ O)	310
Perfluorocarbons (CF _x)	6500 - 8700
Hydrofluorocarbons (HFCs)	560 – 11 700
Sulphur hexafluoride (SF ₆)	23 900

Greenhouse gas emissions expressed in carbon dioxide equivalent (CO₂-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 at the time of publication of this Guide

APPENDIX B:

GUIDELINES FOR PREVENTING MOSQUITO BREEDING SITES ASSOCIATED WITH MINING SITES

BITING INSECT ASSESSMENT (Baseline Survey)

Biting insects need to be considered due to the potential of mine sites to create extensive breeding sites for mosquitoes of pest and disease significance, and the potential for the introduction into the NT of dengue carrying mosquito species from North Queensland and overseas. The location of the mine site to natural creek lines and large water bodies created by past mining activities could also potentially expose mine workers to mosquitoes and mosquito borne disease. It is therefore recommended that a Biting Insect Assessment be conducted at the proposed mine site, with an outline of the proposed Biting Insect Assessment provided below.

A Biting Insect Assessment generally includes a 12 month adult biting insect trapping program, with traps set once a month around the time of the full moon to locate monthly abundance of mosquito and biting midge species. Ground assessments are also conducted to locate actual and potential mosquito breeding sites within the development area, and an assessment of aerial photography is undertaken to locate potential mosquito breeding sites outside of the development area that may impact on the development area.

Mining plans are also examined to evaluate the potential for mining operations to create new mosquito breeding sites. A detailed report is then prepared based on the findings of the biting insect assessment, with recommendations provided on how to prevent new mosquito breeding sites and reducing the impact of biting insects on mine personnel. The proponent or relevant environmental consultant should contact the Medical Entomology Branch to discuss the proposed Biting Insect Assessment.

For more information contact:

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GUIDELINES FOR PREVENTING MOSQUITO BREEDING SITES ASSOCIATED WITH MINING SITES

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Department of Health and Community Services
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General Comments

All 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 disturbed sites to provide extensive breeding sites for mosquitoes of pest and disease significance.

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.

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.

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.

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.

RUBBISH AND GARBAGE DUMPS

Rubbish and garbage dumps must be operated in such a manner 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.

DECOMMISSIONING

A decommissioning plan should be in place for all operations to ensure no actual or potential mosquito breeding sites remain after cessation of 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 a site include removing infrastructure and artificial receptacles that could pond water, removing water dams and reinstating existing flowpaths where practical, rehabilitating, sediment traps, and other facilities that could pond water and breed mosquitoes.