



**FINAL GUIDELINES FOR PREPARATION OF
A PUBLIC ENVIRONMENTAL REPORT (PER)**

INJIN BEACH WHARF FACILITIES

ENI AUSTRALIA B.V.

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TABLE OF CONTENTS

1	INTRODUCTION TO THE GUIDELINES	1
2	EXECUTIVE SUMMARY	1
3	REGIONAL SETTING.....	1
4	THE PROPOSAL.....	3
5	ALTERNATIVES.....	4
6	POTENTIAL IMPACTS	4
6.1	PRELIMINARY	4
6.2	LANDFORM.....	5
6.3	HYDROLOGY AND WATER QUALITY	5
6.4	ECOLOGY.....	5
6.5	SOCIO-ECONOMIC.....	7
6.6	ABORIGINAL, HISTORIC AND CULTURAL HERITAGE VALUES	7
6.7	VISUAL AMENITY	7
6.8	BITING INSECTS	7
6.9	GREENHOUSE GAS EMISSIONS INVENTORY AND BENCHMARKING	8
7	PROJECT ENVIRONMENTAL MANAGEMENT	8
8	PUBLIC INVOLVEMENT AND CONSULTATION.....	10
9	GLOSSARY	10
10	APPENDICES	10
11	ADMINISTRATION DETAILS.....	10

1 INTRODUCTION TO THE GUIDELINES

These Guidelines have been developed to assist Eni Australia B.V. in preparing a Public Environmental Report (PER) for the proposal to construct wharf facilities at Injin Beach, Port Keats (Wadeye), in accordance with Clause 8 of the Environmental Assessment Administrative Procedures of the *Environmental Assessment Act* (1982) of the Northern Territory. These Guidelines have been prepared by the Environment Protection Agency Program (EPA) within the Department of Natural Resources, Environment and the Arts.

The 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;
- Timeframe for submitting the report;
- Number of copies of the report to be provided to the Minister and other agencies; and
- Newspapers in which the proponent will publish a notice.

This proposal has been deemed by the Australian Government to be a controlled action under the *Environment Protection and Biodiversity Conservation Act* (EPBC Act) as it is likely to have a significant impact on listed threatened species (sections 18 & 18A) and listed migratory species (sections 20 & 20A).

These guidelines address the environmental issues to be considered in the PER. If guidance on the structure of the document is required, the proponent should contact the nominated project officer.

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 management strategies that demonstrate how these impacts will be avoided or 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.

2 EXECUTIVE SUMMARY

The Executive Summary should include a brief summation of the project and each chapter of the PER to allow 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.

3 REGIONAL SETTING

The PER is to include a description of the surrounding environment to place the proposal in its local and regional context. 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 proposal may be assessed.

The purpose of this information is to provide an understanding of the proposal and its potential for impact on the environment. Where information provided for the Blacktip Gas

Project Environmental Impact Statement and other studies are relevant and sufficient for the purposes of this assessment, this information can be used.

At a minimum, the PER is to include:-

- A detailed description of landscape features and environments likely to be impacted by the proposal, including but not limited to:
 - All water bodies including creeks and wetlands;
 - Sand dune systems;
 - Beach form and bathymetry;
 - Coastal geological and topographical environment; and
 - Bathymetry of the offshore / onshore environment.
- Detailed description of biological communities, both marine and terrestrial, that could be affected by the proposal. Survey work undertaken must include a thorough examination of the immediate and surrounding sea and land areas of the proposed wharf area. Rare, threatened or endangered species should be identified against relevant Northern Territory legislation and the *EPBC Act*. In addition, baseline information regarding the population/s of listed threatened species known to occur in the proposal area should be outlined. This should include information such as the species' population size, overall distribution, habitat requirements and the quality and area of habitat that is likely to be impacted. Species with Indigenous conservation values should also be described. Flora and fauna species listed as "data deficient" under Northern Territory or Australian Government legislation should be included in description.
- Meteorological information – particularly in reference to storm surges and cyclonic events that have the potential to impact on the infrastructure and adjacent disturbed areas.
- Description of coastal processes, local and regional tides, current patterns and typical wave magnitudes at the location of the proposed wharf infrastructure.
- Description of limiting properties of soil types and land units (including marine muds) at the proposed sites of disturbance.
- Identification of key stakeholders, land and marine area uses and features in the vicinity of, and potentially impacted by, the proposed wharf facility and road works including:
 - An outline of land titles (e.g. freehold, leasehold, pastoral, crown land, native title, mining tenure, etc) and rights over land or marine areas to be used for road construction, wharf construction, dredging, borrow pits or any other activities, such as Native Title under the *Native Title Act 1993*, Aboriginal land claims under the *Aboriginal Land Rights (Northern Territory) Act 1976* and any other appropriate legislation. List the permissions/approvals required/granted from identified land owners.
 - Archaeological information – results of an archaeological survey of Injin Beach and areas proposed to be impacted upon by this development, particularly focussing on those areas that will be subject to clearing for the access road and the dune areas where any infrastructure is likely to be located.

4 THE PROPOSAL

The PER must provide detail of the proposed barge facility and road works and all associated activities, including any associated ancillary activities. Relevant plans, maps, GPS coordinates (including datum) and photographs should be included and, where possible, the information should be provided as GIS coverage. Where information provided for the Blacktip Gas Project Environmental Impact Statement is relevant to this proposal, this information should be included.

As a minimum, the PER should include the following:

- Future plans for the use of the wharf facilities and access road, if not decommissioned at completion of construction of the gas plant, or any expressions of interest from third parties for future use of the infrastructure. If the wharf is to be decommissioned at completion of the gas plant, provide a decommissioning rehabilitation timetable which includes rehabilitation details for the access road and all areas disturbed by the wharf structure;
- The proposed road works, including all associated ancillary activities such as laydown and storage areas, borrow pits, gravel sources, depth of excavations, access roads, detours, construction camps, etc;
- The proposed wharf construction details, including details of materials used for construction, sources and quantities of the materials and the potential for contaminants;
- Details of dredging for the wharf channel, including exact location and quantities to be dredged and location where dredge spoil will be disposed;
- Details of all equipment and materials used and construction methods;
- Details of waste generation and/or by-products and their storage and disposal, including hazardous and non-hazardous waste, wastewater and sewage;
- A description of all chemical and mechanical activities to be conducted on the construction sites and ancillary work areas. Identify all chemicals, including fuels, and the proposed methods for transportation, storage, use and emergency management of these substances. Detail hazardous materials to be stored and/or used on site. Provide the Material Safety Data Sheets and environmental toxicity data and biodegradability for raw materials and final products;
- An assessment of statutory obligations under all relevant Northern Territory legislation including the *Planning Act* and *Pastoral Land Act* for permits to clear native vegetation (include appropriate timelines to allow for application assessment and approvals), and the *Marine Act* for approval to construct the wharf facility;
- An outline of employment and business opportunities (directly and indirectly, including the Traditional Owners of the area and other local indigenous people) at the different stages of the project (construction and operation), likely sources of the workforce and level of skill required;
- Accommodation requirements and arrangements for both construction and maintenance activities;
- Transport methods and routes for delivering construction and maintenance materials and other necessary goods and consumables. Identify constraints with the existing transport infrastructure (e.g. Wet season access, periods of road closure and load limits) and details of any new infrastructure or upgrades that will be required for the

works including locations of new roads or tracks, lay down storage areas, turning circles, approach diversion lanes, etc.

- Construction work hours and hours of operation of the wharf facilities;
- Use and extent of other infrastructure required for the works including but not limited to gas, telecommunications and power;
- Details of water supply, source, treatment and usage for construction activities and workforce;
- Proposed rehabilitation of all works construction areas including storage and laydown areas; and
- An itemised description of the general operational activities expected on the wharf including the total number of barge landings that will occur during the project life.

5 ALTERNATIVES

Discuss alternative proposals, which may still allow the objectives of the project to be met, detailing reasons for the selection and rejection of particular options. Discuss the selection criteria and detail the advantages and disadvantages of preferred options and alternatives. Consider the short, medium and long-term potential beneficial and adverse impacts of each of the options.

Alternatives to be discussed should include:

- Not proceeding with the proposal – alternative options for transportation, with specific reference to the original proposed transportation option;
- Alternative locations for the wharf facilities – change in location from Yelcherr to Injin Beach;
- Alternative barge landing designs; and
- Alternative gravel extraction sources and construction techniques.

6 POTENTIAL IMPACTS

6.1 Preliminary

Clearly identify, qualify and quantify the potential environmental impacts and include an assessment of the level of significance of the impacts. This is to be based upon the baseline information gathered (refer section 4) as well as any necessary predictive modelling (such as hydrodynamic modelling), relevant studies, etc. and is to take into account the following factors:

- The nature and intensity of impacts (magnitude, duration, frequency and extent);
- The degree of mitigation and management possible;
- The degree of public interest;
- The reliability and validity of forecasts and predictions;
- The resilience of the biophysical and social receiving environment to cope with the change;

- Cumulative impacts, including the extent to which the environment is already affected by existing developments as well as ongoing impacts such as continued erosion and changes in coastal processes; and
- The reliability and validity of forecasts and predictions, confidence limits and margins of error should be indicated as appropriate.

6.2 Landform

Detail the type, extent and implications of possible impacts to morphological, topographical, geological or landform features/sites from dredging, wharf construction, road construction and gravel/ fill extraction. Specific issues include:

- Destabilisation of the dune and beach systems;
- Impacts to the profile level of Injin Beach;
- Disturbance of acid sulfate soils;
- Erosion and sedimentation – waterways, dune systems, beach environment, proposed road, proposed gravel pits;
- Beach morphological processes (including impacts to natural sediment distribution along this part of the coast); and
- Disturbance of marine muds.

6.3 Hydrology and water quality

- Describe the expected effect of local currents on the entrance channel and berth pocket. Based on this, provide an estimate of regularity of dredging required for operation of the barge.
- Describe how works undertaken for the road, the wharf and dredging may impact on the surface and ground water features. Include a description of any potential effects on local groundwater tables and any associated disturbance to wetland and aquatic flora and fauna.
- Discuss the potential for contamination of ground water, surface water, intertidal and marine environment.
- Discuss the contingency arrangements for meeting MARPOL Annex V provisions during wharf operations.

6.4 Ecology

- Discuss the potential for the proposal to impact on threatened species, ecological communities and ecosystems (terrestrial and marine) and habitats from all activities associated with the proposal, e.g. vegetation clearing, dredging, filling, gravel extraction, marine traffic, etc.
- Describe significant vegetation listed under NT and Commonwealth legislation, including:
 - Rare, threatened, endangered and regionally restricted species, vegetation types or habitats;

- Communities that are particularly good examples of their type;
 - Vegetation types which are outside their normal distribution or have other biogeographical significance;
 - Ecologically outstanding areas which have importance beyond the immediate site, eg. Wetlands riparian forests, etc; and
 - Vegetation which is the habitat of rare and threatened fauna or has outstanding diversity that may be impacted by the proposal.
- Include an indication of the value of existing terrestrial vegetation communities and wetland communities on site to fauna, e.g. as habitat, food source, breeding and dispersal. Any survey methodologies for the project area should be included in the Appendices to the PER;
 - Discuss the vegetation types proposed to be cleared, including their significance and area. Discuss whether habitat in the area of the work site is considered important habitat for a listed species / matters of National Environmental Significance, e.g. sea grass beds and terrestrial vegetation;
 - Discuss the significance of populations of EPBC listed species found in the area, particularly populations of listed turtle species;
 - An assessment should be made of the nature and extent of the likely short term and long term ecological impacts of the project including whether impacts are likely to be unknown, unpredictable or irreversible;
 - An analysis shall be conducted of the consequences of a breach of the coastal sand dunes and the potential for salt water intrusion of the freshwater wetland system behind these dunes;
 - Identify pest species (including marine) and noxious weeds that are likely to or could occur as a result of both construction activity and operation of the wharf facility and access road. Include a discussion of the potential existing pest species that may be spread as a result of the project;
 - The impacts from marine traffic, wharf activity, and road operation on marine and terrestrial fauna (including but not limited to turtles, dugongs and migratory birds) must be considered;
 - Discuss the impacts on the Purple-mouthed periwinkle (*Littoraria ianthostoma*), the only marine invertebrate recorded as endemic to the Northern Territory, which is found in mangrove areas;
 - If construction works are to be carried out at night and/or if the wharf facility is to operate at night, discuss the impacts of lighting on fauna, e.g. nesting turtles and migratory birds;
 - All analyses of impacts need to be substantiated using scientifically sound studies and techniques. All surveys must include baseline sampling that takes into account seasonality. See Northern Territory Government, Natural Resources, Environment and the Arts, Biodiversity Conservation Division's *Guidelines for the Terrestrial Biodiversity Component of Environmental Impact Assessment* for a guide to biodiversity assessment procedures;
 - Monitoring program descriptions, outlining: the aim, design, timeline, baseline data collection, evaluation and review should be incorporated into the PER; and

- The sections of the PER document referring to species listed under the EPBC Act should be clearly defined to aid review.

6.5 Socio-Economic

- Describe, including timeframes, potential site specific and cumulative impacts on existing and potential land uses, development and industry that are anticipated to occur due to the proposed works. In particular, carefully consider the impacts on future Aboriginal use and business opportunities for the local indigenous community.
- Present a balanced and broad summary of the proposal's impact on the regional and territory economies in terms of direct and indirect effects on employment, income and production. Specify any disturbance to existing land use or threat to wilderness areas, which may impact on commercial activities and potentially impact adversely on employment.
- The proponent has indicated that it will own and operate the wharf for the life of the Blacktip Project and envisages that, at this stage, the wharf will not be available for public use. Justification should be given for maintaining the wharf in situ once construction of the Blacktip Gas facility is complete and the plant is commissioned. In the event that the proponent reconsiders its position with respect to public use/ownership of the wharf in the future, it is expected that the NT Government will be advised and provided with a detailed plan of the uses and mechanisms for management of such an asset.

6.6 Aboriginal, Historic and Cultural Heritage Values

- The Authority Certificate C2006/60, issued in relation to the Blacktip OGP project does not cover the area of the proposed wharf landing at Injin Beach or access to it. The Aboriginal Areas Protection Authority (AAPA) must be consulted with regard to obtaining an Authority Certificate for the proposed works.
- Include all information that has been collected to date pertaining to Aboriginal sacred site protection, and cultural and historic heritage values that could potentially be disturbed as a result of road works. Include any further survey and data requirements and any approvals and conditions that are already in place. The results of archaeological surveys should also be included.
- Describe the potential impacts on features of cultural significance. The identification of indigenous cultural heritage impacts is to take place in consultation with relevant indigenous groups and should include a discussion of the local Aboriginal people's relationships to the land including cultural values.

6.7 Visual Amenity

- Discuss the impacts to visual amenity of the proposed wharf infrastructure on the landscape and potential impacts that this may have on any future economic and recreational opportunities in the area.

6.8 Biting Insects

- Identify measures to prevent the creation of new mosquito breeding sites in quarries and borrow pits. Note that the proposed development should conform to the applicable sections of the Medical Entomology Branch guideline *Construction*

Practice Near Tidal Areas In The Northern Territory Guidelines To Prevent Mosquito Breeding.

- Workers should be supplied with the Medical Entomology Branch handout *Personal protection from mosquitoes and biting midges in the NT*, and be supplied with insect repellent when necessary.
- The Medical Entomology Branch conducted a biting insect assessment for the Blacktip Project and two reports were produced; the proponent is advised that these be reviewed and relevant information from the reports included in the PER.

6.9 Greenhouse Gas Emissions Inventory and Benchmarking

- Refer to the attached *NT Environmental Impact Assessment Guide – Greenhouse Gas Emissions* (Attachment A).

7 PROJECT ENVIRONMENTAL MANAGEMENT

Specific safeguards and controls, which would be employed to minimise or remedy environmental impacts, are to be outlined. These should include, but not be limited to, the following matters:-

- A discussion of strategies to prevent or minimise impacts on species, communities and habitats (e.g. timing of works, erosion and sediment control, minimisation of riparian vegetation disturbance, alternative gravel extraction and water abstraction arrangements, proposed rehabilitation of disturbed wetlands);
- Management measures to be employed to minimise impact on marine fauna, including but not limited to sea turtles, dugongs and migratory birds;
- A discussion of safeguards that will be taken to minimise impacts on mangroves (therefore protection of any population of *Littoraria ianthostoma* and other species that inhabit these wetlands);
- A description of the methods that will be undertaken to rehabilitate disturbed areas following construction, including revegetation strategies, surface stabilities and aquatic monitoring programs. This should include a list of any species that would be used, ongoing management of rehabilitated areas such as watering of planted species and a monitoring program to assess the rehabilitation performance.
- An outline of the safeguards that will be put in place to ensure that the integrity of the foredune is maintained;
- A description of the management strategies or design techniques that will be employed to avoid or minimise the impacts to coastal processes, including current patterns, erosion and accretion of the beach, etc.;
- A description of management strategies that will be undertaken to manage and dispose of acid sulfate soils;
- Details of all dredging activities required and standards to be applied to manage the impacts of those activities. Demonstrate compliance with National Ocean Disposal Guidelines for Dredged Material, Commonwealth of Australia, Canberra, 2002. (<http://www.ea.gov.au/coasts/pollution/dumping>);
- Soil and erosion control and management strategies;

- Safeguards and management strategies used to minimise the impacts of road, wharf and marine works on the hydrological features. In particular, provide details about measures that will be taken to protect ground water, surface water (including marine environment) from contamination;
- A description of waste management strategies for all wastes produced on site and a description of how minimisation, reduction, reuse and recycling of wastes can be practically initiated and managed. Outline procedures for storage, transport and disposal of waste;
- A description of on-site wastewater management for sewage. Any wastewater treatment systems used during the construction must comply with the requirements of the *Code of Practice for Small On-Site Sewage and Sullage Treatment Systems and the Disposal or Reuse of Sewage Effluent*. Solid waste disposal shall comply with the Environment Protection Agency's Guidelines for the Siting, Design & Management of Solid Waste Disposal Sites in the NT;
- An outline of the requirements and responsibilities for rehabilitation or maintenance of roads and other project infrastructure upon project completion;
- Identification of activities which pose a risk of wildfire and a description of safeguards for minimising the likelihood of wildfire and fire response plans. Develop a fire management plan for the construction period in consultation with the Bushfires Council and NT Parks and Wildlife;
- Details of the safeguards which will be employed or installed to reduce the risk of injury to persons, fauna and environmentally sensitive sites along the proposed road works;
- Environmental Management Plans (EMP) will need to be amended and/or prepared to support the proposal. The EMPs should be strategic, describing a framework for environmental management, identifying specific management policies, practices and procedures. The EMPs are to also include specific programs of monitoring or measuring the success of the project's environmental management. Contingency measures will also need to be identified. Include as part of the EMP:
 - a weed management plan to cover construction, rehabilitation and ongoing maintenance that includes best practice weed management principles. This should include strategies that will be employed to manage and minimise the introduction of feral animals and other exotic fauna species;
 - a Vegetation Clearing Plan that is consistent with existing land clearing guidelines (DIPE 2002); and
 - A Biofouling Management Plan covering all vessels operating in the area, giving consideration to currency of antifoulant, an inspection schedule for niche areas with the potential to be fouled, and potential fouling of internal seawater systems.
- With respect to construction activities, the proponent should refer to and comply with relevant parts of the Department of Health and Community Services *Information Bulletin No 6 Requirements for Mining Construction and Bush Camps*.
- The proponent is advised to contact the Department of Health and Community Services, Environmental Health for information on onsite wastewater disposal systems that may be proposed. Approval is required for these systems; and
- The proponent is advised to refer to the draft South Australian EPA "Code of Practice for Materials Handling on Wharves" for general operational activities.

8 PUBLIC INVOLVEMENT AND CONSULTATION

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.

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

9 GLOSSARY

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 APPENDICES

Information and data related to the PER but unsuitable for inclusion in the main body of the statement (e.g. because of its level of technical detail) should be included as appendices. This may include detailed analyses, monitoring studies, baseline surveys, raw data and modelling data. Where necessary, specific guidance should be provided on the most appropriate means of accessing information not appended to the PER.

11 ADMINISTRATION DETAILS

The Project Officer is Ms Wendy Hutchison from the Environment Protection Agency Program, Department of Natural Resources, Environment and the Arts. Her contact number is (08) 8924 4553, facsimile (08) 8924 4136, and e-mail: wendy.hutchison@nt.gov.au.

Approximately 20 bound copies of the PER will be required for distribution to NT advisory bodies and public viewing locations (eg. Environment Centre NT, Darwin City Council Offices and Darwin City Library).

The PER should also be made available for public review at the Thamarrurr Council Wadeye.

Copies of the PER are to be provided to:

- Environment Centre NT
- Northern Land Council
- Thamarrurr Regional Council

In addition, 8 CD ROM copies (in ADOBE*.pdf format) plus two unsecured Microsoft Word copies should be submitted (to allow placement on the Office's Internet site and to facilitate production of the Assessment Report and Recommendations).

The proponent should also consider producing at least several copies for direct sale to the public, on request.

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.

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:

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/>.

- 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