

code of ENVIRONMENTAL PRACTICE

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The APPEA Code of Environmental Practice provides an outline of environmental objectives which represent guidance on key aspects of good environmental practice in the petroleum industry.

However, APPEA does not accept any responsibility or liability for any person's use of, or reliance on, this Code of Environmental Practice, or for any consequences of such use or reliance.

The Code of Environmental Practice has been developed with input provided by members of APPEA. The Code of Environmental Practice has not been reviewed or approved by Government bodies or regulators, and does not have legal force or effect. Therefore, compliance with the Code of Environmental Practice will not necessarily mean compliance with legal obligations. Each person accessing the Code of Environmental Practice must acquaint themselves with its own legal obligations, and must, on a case-by-case basis, form its own judgement as to the conduct required in order to satisfy those legal obligations. The conduct required will depend on the individual circumstances. It can not be assumed that compliance with the Code of Environmental Practice will in any way be sufficient.

Legal obligations and standards change over time as does knowledge on the environment. While APPEA intends to review and update the Code of Environmental Practice from time to time, APPEA's capacity to do so is limited. Accordingly, APPEA does not represent that the Code of Environmental Practice is up-to-date.

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PREAMBLE

In Australia, exploration and production operations are conducted within a wide range of environments. These operations require effective management in order to be sustainable.

The Australian Petroleum Production and Exploration Association (APPEA) and its member companies are committed to sound resource and environmental management practices as an integral part of industry operations.

Recognising the need to avoid or minimise and manage impacts to the environment, this code of environmental practice includes four basic recommendations to APPEA members undertaking activities:

- Assess the risks to, and impacts on, the environment as an integral part of the planning process
- Reduce the impact of operations on the environment, public health and safety to as low as reasonably practicable and to an acceptable level by using the best available technology and management practices
- Consult with stakeholders regarding industry activities
- Develop and maintain a corporate culture of environmental awareness and commitment that supports the necessary management practices and technology, and their continuous improvement.

The standard of performance achieved by reducing impacts to 'as low as reasonably practical and to an acceptable level' is a dynamic measure that will continue to evolve in line with improved risk identification and assessment methods, technological advances, changed circumstances, performance monitoring, government requirements, community expectations and other relevant information. As such, by reducing impacts to as low as reasonably practical, APPEA members will in effect be striving for continuous improvement.

Member companies, however, must determine the specific needs of their own operations, including relevant regulatory requirements, and develop a suitable management culture, environmental management systems and the technology necessary to avoid, mitigate and manage potential environmental impacts.

Consultation and communication with stakeholders is an important part of this process. Stakeholder engagement as part of the planning process is the start of an ongoing consultation program.

Companies should be capable of demonstrating their commitment to protecting the environment and to maintaining public health and safety during all phases of operation. Companies achieve these outcomes on behalf of their shareholders, employees, and on behalf of present and future generations of Australians.

Aim of the Code of Environmental Practice

The United Nations Agenda 21 (United Nations 1992) outlined the role of business and industry in sustainable development and stated that environmental responsibility for business means:

“[the] responsible and ethical management of products and processes from the point of view of health, safety and environmental aspects [impacts]. Towards this end, business and industry should increase self-regulation, guided by appropriate codes, charters and initiatives integrated into all elements of business planning and decision-making and fostering openness and dialogue with employees and the public.” (30.26)

Against this background, APPEA supports the development and application of an industry-wide code of environmental practice and indeed first published its own code in 1977.

This edition of the Code of Environmental Practice reflects the trend away from prescriptive legislation to objective-based legislation. Developing objectives enables stakeholders to make explicit the outcomes desired, while providing operators flexibility in choosing the appropriate procedures to meet those objectives. Furthermore, this approach provides the opportunity for adequate planning and communication with stakeholders.

This Code of Environmental Practice gives guidance on objectives to be achieved when managing environmental impacts associated with petroleum exploration and production. APPEA recognises that these objectives must be reviewed against the actual operations being carried out, the specific environment in which the operations are being conducted, changes in stakeholder perceptions and expectations, advances in technology and legal requirements.

However, APPEA believes that this Code of Environmental Practice will form an effective and time-saving starting point for the development of specific objectives for a given project, program, operation or environment. Objectives developed with the guidance of this Code of Environmental Practice, based on a formal risk assessment process and in consultation with stakeholders, would reflect good industry practice.

This Code of Environmental Practice is one of an integrated series of documents that provide an industry framework adding support to member companies' management systems. As outlined in the following section, other key documents that comprise APPEA's integrated series include:

- APPEA Principles of Conduct
- APPEA Environmental Policy
- MCMPR Principles for Engagement with Communities and Stakeholders
- Company Environmental Management Plans.

These documents are central to achieving three of APPEA's key objectives:

- Self-regulation
- Industry operation to the highest standards
- Continued access to areas for exploration and production.

PRINCIPLES, POLICY AND INDUSTRY FRAMEWORK

Overview

This section outlines the existing APPEA principles and policies that provide support for this Code of Environmental Practice. The relationship between the Code of Environmental Practice and other documents produced by industry to fulfil or support statutory obligations is also explained. The relationship between these documents is graphically represented in Figure 1.

APPEA Principles of Conduct

The APPEA Principles of Conduct (APPEA 2003) provide the basis for achieving APPEA's mission of a legislative, administrative, economic and social framework which efficiently and effectively facilitates safe, environmentally responsible, socially responsible and profitable oil and gas exploration, development and production.

The APPEA Principles of Conduct (APPEA 2003) are based on the following nine principles:

- Ethical and responsible business practices;
- Sustainable development considerations integrated into company decision making;
- Foster economic growth and business development, generate government revenue, provide commercial returns to the industry and contribute to the wealth generated by Australia's natural resource base;
- Health, safety, environmental and community risk management strategies that are based on sound science and effective communication;
- Continuously seek opportunities to improve health, safety and environmental performance in addressing risks posed by our operations to employees, contractors, the public and the environment;
- Contribute to the conservation of biodiversity and protection of the environment through responsible management of our operations and their impacts;
- Foster economic and social development of the communities in which we operate;
- Respect the rights and dignity of our workforce, and deal fairly with our workforce, suppliers and the communities in which we operate; and
- Open and effective engagement with the communities in which we operate.

These Principles set the tone and provide guidance for this Code of Environmental Practice.

MCMPR Principles for Engagement with Communities and Stakeholders

The Ministerial Council on Minerals and Petroleum Resources (MCMPR) released the document entitled *Principles for Engagement with Communities and Stakeholders* in 2005. APPEA provided input into the development of these principles, which set out the framework for effective liaison between the resources sector, the community and stakeholders. It has five broad principles based on:

- Communication;
- Transparency;
- Collaboration;
- Inclusiveness; and
- Integrity.

The document sets the context for activities conducted by APPEA member companies and has been used as input to this Code of Environmental Practice.

APPEA Environmental Policy

The Australian Petroleum Production & Exploration Association (APPEA) will promote this environment policy amongst its members and encourage, and where appropriate, support member companies to:

- Comply, at a minimum, with applicable laws, regulations, standards and guidelines for the protection of the environment and in their absence, adopt the best practicable means to prevent or minimise adverse environmental impacts.
 - Work and consult with appropriate government agencies drafting policies laws, regulations or procedures to protect the environment.
 - Ensure that adequate waste management practices are carried out based on the prevention, minimisation, recycling, treatment and disposal of wastes.
 - Provide adequate training to enable employees and contractors to adopt environmentally responsible work practices and to be aware of their stewardship responsibilities.
 - Promote research to conserve resources, minimise wastes, improve understanding of risks and impacts and to cost effectively minimise these, to improve environmental protection.
 - Develop emergency plans and procedures so that incidents can be responded to in a timely and effective manner.
 - Develop and maintain management systems to identify, control and monitor risks and compliance with government regulations and industry guidelines.
 - Monitor environmental effects and assess environmental performance at all stages of exploration, development, production and rehabilitation.
 - Communicate openly with government, non-government bodies and the public in a timely manner on environmental issues which relate to the industry's operations.
- In promoting such an environmental policy among its members, APPEA will:
- Lead the industry in achieving with government, sound environmental legislation.
 - Provide a range of forums to address environmental issues.
 - Collate and disseminate information on environmental performance and best practice among member companies.
 - Recognise excellent environmental performance.

Company environmental management plans

Environmental Management Plans (or Environment Plans) are required under various State and Commonwealth Petroleum Acts. Prior to undertaking activities, companies must submit these plans to the regulatory bodies for approval. These plans typically include the objectives, standards and criteria that govern activities and detail the procedures that may be followed during the course of any activity to ensure achievement of the objectives.

Underpinning company environment management plans is a formal risk assessment process based on sufficient specific information to ensure effective risk assessment.

Environmental Management Plans for all activities should clearly identify the environmental objectives and then outline procedures and practices to assist operations personnel in ensuring the achievement of these objectives. It is advisable that procedures remain flexible and allow personnel to exercise initiative to adapt to the situation-at-hand.

The APPEA Code of Environmental Practice provides guidance for the development of such plans. In particular, it is the intent of this Code to provide direction on environmental objectives, with the aim of promoting consistently high standards for petroleum operations across the industry.

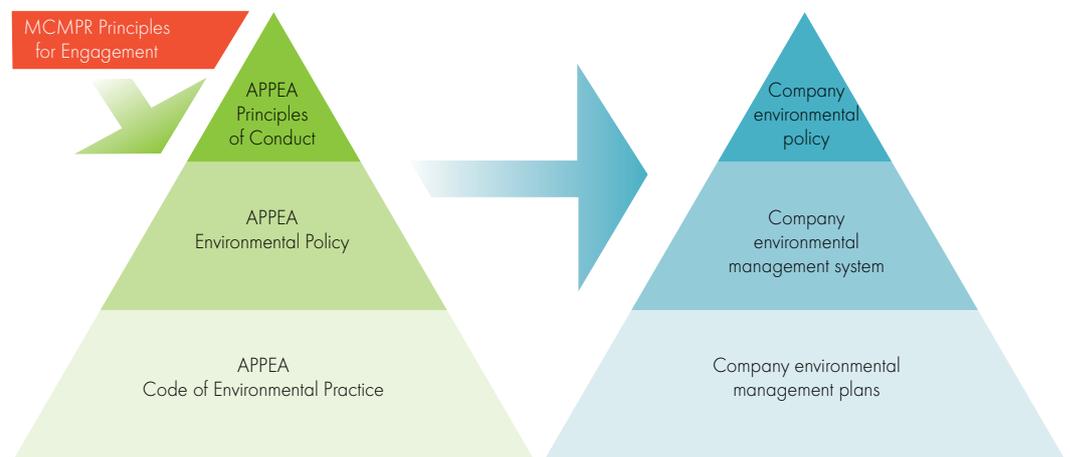


Figure 1: Relationship between documents

OVERVIEW OF LEGISLATIVE FRAMEWORK IN AUSTRALIA

Australia is a federation of states known in a formal sense as the Commonwealth of Australia. Hence, the Federal Government also is referred to as the Commonwealth Government. Each Australian state has a government and a third tier of local government also exists.

Petroleum activities will require consideration of both Commonwealth and State laws and local by-laws, although the extent of involvement of each tier of Government will vary depending on location and activity.

From an environmental point of view, petroleum activities always involve at least two major departments at both Commonwealth and State level: the resource department and the environment department. Invariably, permission to proceed with an activity will require approval from both these departments in the State and/or Commonwealth jurisdictions.

The States have primary sovereignty regarding resource matters onshore within State borders and in coastal waters out to a distance of 3 nautical miles from a base line (low water mark, but across some bays and around some islands).

Offshore petroleum laws are, in a practical sense, common across all jurisdictions (except for royalty or its equivalent provisions) for Commonwealth and State waters. In Commonwealth waters, the authority to regulate activities and coordinate assessment and approvals is delegated to State resource agencies under the Commonwealth petroleum legislation. State resource agencies fulfil these responsibilities in consultation with Commonwealth and other State agencies.

Commonwealth environment legislation applies to both Commonwealth and State waters and lands. As such, in areas of State lands and coastal waters, both State and Commonwealth legislation may apply. At a State level, environment legislation differs between the jurisdictions, although the processes and outcomes are, in a practical sense, very similar.

APPEA maintains a list of applicable legislation (www.appea.com.au) as an aide memoir for companies carrying out petroleum activities. It is, however, of paramount importance that companies ensure that they have carried out a thorough process of identifying all legislation (Acts, regulations, policies, guidelines etc) that will affect the specific activities they wish to carry out and the specific areas within which they wish to operate.

Environmental legislation requires the following general steps:

- An assessment of the impact the activities will have on the environment of the area (i.e. develop the information and assess the risk);
- In most cases, the development of acceptable objectives that must be achieved in managing the environmental impact; and
- A demonstration that the company has the financial, technical and management competencies to ensure the outcomes will be achieved.

ENVIRONMENTAL OBJECTIVES – GENERAL

Overview

Environmental legislation applicable to petroleum activities requires environmental objectives to be developed that reflect the environmental outcome following successful management of activities and (where appropriate) remediation of impacts.

The following environmental objectives reflect those previously developed by companies in consultation with stakeholders for specific projects in specific areas. The objectives in this Code of Environmental Practice are intended to provide an efficient starting point for member companies when developing their site- or activity-specific environmental management objectives, plans, guidelines and procedures.

Environmental issues included in the following sections are based on industry understanding. Risk assessment may be used for specific projects, but has not been used here to link potential hazards with environmental issues because of the breadth of the subject matter.

The potential environmental impacts from the upstream oil and gas industry are well documented elsewhere and have been summarised in this Code of Environmental Practice below (see also Swan JM, Neff JM and Young PC (Eds) 1994; E&P Forum and UNEP 1997; IADC 2006). However, there is always potential for a specific combination of site and activity to raise other potential impacts.

The remainder of this Section (Section 4) addresses environmental impacts that are common to all activities.

Planning and design

Activity

Planning and design (in a general sense) is intrinsic to all stages of exploration and production activities. The degree to which planning will be needed will depend on the scale and nature of the proposed activity and its location. However, the importance of planning cannot be underestimated in achieving acceptable environmental performance and effective stakeholder engagement. Planning is central to the initial application for an exploration permit and then through the various exploration, production and decommissioning stages.

Design (again in a broad use of the term) is equally important, as many potential environmental issues can be best mitigated at the design stage of activities. Appropriate design also is important to stakeholder acceptance of a project or activity.

Environmental issues

- It is necessary to identify all environmental issues that are required to be addressed for the activities to proceed.
- This should be followed by the development of measures to obtain any information that is lacking and of measures to mitigate the environmental impacts.
- There should be proper demonstrable accountability for all decisions taken.

Objectives	Example potential performance criteria
<p>Activities are planned to avoid environmental impacts, or, where this is not possible, to minimise impacts to as low as reasonably practical and to a level that is acceptable.</p>	<ul style="list-style-type: none"> ■ Be able to demonstrate that the planning and design processes were fit-for-purpose and included: <ul style="list-style-type: none"> ● a structured assessment of the risks to the environment ● studies to close any gaps in knowledge ● the incorporation of new knowledge into the planning and design of the activity ● a structured process to identify all stakeholders and potential issues ● initial engagement with stakeholders and regulatory bodies early in planning phase ● structured consultation with stakeholders throughout the planning and design phases ● a structured process to identify all legislative requirements. ■ Accountability was documented for all decisions taken with the potential to cause significant impact to the environment.
<p>Activities are planned to avoid areas that are environmentally or culturally significant, or, where this is not possible, to minimise the impact to as low as reasonably practical and to a level that is acceptable.</p>	<ul style="list-style-type: none"> ■ Be able to demonstrate that environmentally or culturally significant areas were avoided by documenting a robust site selection criteria and process, including: <ul style="list-style-type: none"> ● a structured assessment of the significance of areas ● consideration of viable alternatives and their associated environmental impacts ● studies to close any gaps in knowledge ● the incorporation of new knowledge into the choice of areas to be avoided ● a structured process to identify all stakeholders and potential issues ● structured consultation with stakeholders throughout the planning and design phase. ■ The processes and procedures adopted to ensure that objectives are met were documented. ■ Accountability was documented for all decisions taken about areas to be avoided.

Assessment of environmental risks

Activity

The formal assessment of events that can cause harm to the environment is applicable to all operations undertaken by an organisation.

Environmental issues

It is necessary to identify risks (likelihood and consequence) to the environment and the appropriate mitigation measures so that the risks can be reduced to as low as reasonably practical, are in accordance with legislation and are acceptable.

The risk assessment process should be adapted for each activity, project or operation to ensure that it is fit-for-purpose. All risk assessments, no matter how simple or informal, should be documented.

Objectives	Example potential performance criteria
<p>Activities are assessed to ensure that risks to the environment are avoided or are as low as reasonably practical, aligned with any legislative requirements and are acceptable.</p>	<ul style="list-style-type: none"> ■ Be able to demonstrate by a documented formal risk assessment process that the environmental risks were assessed and company management accepted the resultant level of managed risks ■ Fit-for-purpose approach to risk assessment of smaller projects.

Emergency response plan

Activity

All activities require appropriate emergency response plans to be prepared, in place and practised.

Environmental issues

Potential environmental impacts may result from unplanned incidents such as leaks, spills, explosions, incursions into protected areas or bushfires. Emergency response, clean-up and rehabilitation measures are needed to minimise potential environmental impacts.

Objectives	Example potential performance criteria
To ensure that in the event of an emergency appropriately trained personnel and other resources are available to respond to and meet the objectives of the emergency response plan.	<ul style="list-style-type: none">■ Be able to demonstrate that:<ul style="list-style-type: none">● emergency response plans were prepared and practised● practice or actual responses to emergencies met pre-determined performance criteria● resources were adequate to address emergencies.

Training and induction

Activity

Training and induction are essential parts of any project or program. It is essential that all staff have the appropriate environmental knowledge and skills necessary to undertake their work. There will be a range of matters that will need to be communicated, including:

- legislative requirements and company policies
- environmental objectives and work procedures for a particular activity
- competencies needed for a particular task that may impact on the environment.

Environmental issues

Each project or program will have a unique set of environmental issues that need to be communicated to, and understood by, the personnel involved. Personnel need to be competent to carry out all work required to the necessary standard.

Objectives	Example potential performance criteria
Personnel are able to meet environmental management objectives.	<ul style="list-style-type: none">■ There were no incidents attributable to inadequate training.■ Be able to demonstrate that:<ul style="list-style-type: none">● appropriate and defined environmental training and induction was available for all relevant activities● records of environmental training were completed.

Auditing

Activity

An environmental audit program is necessary to demonstrate that management systems exist, are being implemented and are achieving the objectives. Audits can be undertaken either in-house or by external personnel, depending on the purpose of the audit.

Environmental issues

Environmental impacts may occur if the systems and procedures in place are not sufficiently robust. Regular auditing is necessary to ensure that proper systems and procedures are in place and are working effectively.

Objectives	Example potential performance criteria
To ensure that management systems and monitoring requirements are appropriate to the activity or operation, are being implemented and are achieving the environmental objectives.	<ul style="list-style-type: none"> ■ There were no incidents that have failure of audit to detect non-conformance as a contributing cause. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● management systems and audits were of an appropriate scope and were carried out at appropriate intervals ● all environmental matters identified as non-conforming or requiring improvement were closed out.

Consultation and communication

Activity

Third parties can be directly or indirectly impacted by petroleum activities. Regulators need to interact as the activities develop. An effective consultation and communication process which both informs and educates the stakeholders and the proponent is essential if significant issues are to be addressed in a timely manner.

The degree of consultation will depend on the nature and scale of any planned activity and the nature of the communities in which they occur. Clear consultation and communication regarding a planned activity may further reduce impacts, improve research focus and produce better environmental outcomes.

Environmental issues

Third parties can be impacted directly or indirectly by any planned activity. Potential impacts may include:

- disturbance of natural environment
- disruption of marine and land resource activities
- disturbance to sites of cultural heritage significance
- reduction of aesthetic value of an area
- noise, air, light or other forms of pollution
- increased traffic on local roads
- social impacts through economic development.

Third parties may have knowledge that is significant to the project.

Objectives	Example potential performance criteria
To ensure that third parties have been consulted about the activities so that informed decisions can be taken to avoid or, where avoidance is not possible, reduce to as low as practicable and to an acceptable level the impacts on third party interests.	<ul style="list-style-type: none"> ■ Be able to demonstrate that communication with third parties was in accordance with <i>Principles for Engagement with Communities and Stakeholders</i> (MCMPR 2005). ■ Responses to issues raised by third parties were documented with appropriate accountability for decisions. ■ Physical and management actions can be demonstrated that avoid the risks to third party issues or reduce them to as low as reasonably practical and to an acceptable level.

ENVIRONMENTAL OBJECTIVES – OFFSHORE

Geophysical surveys

Activity

Aerial surveys may be used in addition to marine-based seismic acquisition surveys. This involves either gravimetric or magnetic methods.

A typical seismic acquisition survey involves a vessel towing one or more strings of hydrophones (streamers), each up to several kilometres long. A noise source is typically emitted by an air gun array that is usually close to the vessel. The pulse of acoustic energy travels as a wave into the earth and is reflected off any geological structures. This is then recorded by the hydrophones.

Support vessels may also be present during the seismic acquisition survey. Crews may be mobilised from a port or via a helicopter.

Environmental issues

Program-specific risks should be identified during the planning phase. Generally, potential environmental issues associated with geophysical surveys may include:

- disturbance to other marine resource users
- ship-strike
- accidental loss of streamers
- accidental fuel, oil or chemical spill
- localised reduction in water quality by wastes, leaks (fuel, streamer fill)
- physiological effects, physical harm or disruption to behaviour of marine life due to acoustic impacts
- pollution from vessel air emissions
- disturbance to cultural heritage sites (e.g. shipwrecks)
- introduction of marine pests
- disturbance to benthos via anchors, grounding or collision.

Objectives	Example potential performance criteria
To reduce disturbance to fishing operations or other marine users to as low as reasonably practical and to an acceptable level.	<ul style="list-style-type: none"> ■ There were no complaints from the commercial fishing operators or other marine users. ■ Be able to demonstrate adherence to agreed procedures.
To reduce the risk of collision with other vessels in accordance with maritime standards and to an acceptable level.	<ul style="list-style-type: none"> ■ There were no incidents with other marine resource users. ■ Proper marine safety procedures were in place and observed.
To reduce the risk of release of substances into the marine environment to as low as reasonably practical and to an acceptable level.	<ul style="list-style-type: none"> ■ There was no accidental loss of substances to sea during mobilisation, seismic operations or demobilisation. ■ Be able demonstrate that: <ul style="list-style-type: none"> ● appropriate management procedures were in place and were implemented ● grey water, sewage and other wastes were disposed of in accordance with statutory requirements and agreed procedures.

Objectives

Example potential performance criteria

To reduce the volume of wastes produced to as low as reasonably practical and to an acceptable level. Ensure that any wastes produced are disposed of in appropriate onshore facilities.

- Be able demonstrate that:
 - appropriate management procedures were in place and implemented
 - all solid wastes, chemicals and other wastes were disposed of or recycled at appropriate facilities in accordance with legislative requirements and agreed procedures
 - technological innovation was considered and adopted as appropriate as part of a continuous improvement process.

To reduce the impact on cetaceans and other marine life to as low as reasonably practical and to an acceptable level.

- There were no breaches of legislative requirements; and
- Be able to demonstrate that:
 - appropriate management measures were implemented in accordance with legislative requirements, guidelines and agreed procedures
 - the need for further studies to close any knowledge gaps was considered and appropriate research was undertaken
 - any new knowledge was incorporated into the planning and design of the activity.

To reduce the impacts from events such as spills and loss of equipment to an acceptable level and reduce the risk to as low as reasonably practical.

- There were no reportable accidental losses of hydrocarbons to sea during development or production operations.
- Be able demonstrate that:
 - appropriate management procedures were in place and are implemented
 - an appropriate emergency response plan was in place.

To reduce the risk of introduction of marine pests to as low as reasonably practical and to acceptable levels.

- There were no introductions of invasive or alien marine species recorded.
- Be able to demonstrate that appropriate quarantine management measures were implemented in accordance with legislative requirements and agreed procedures.

To reduce the impacts to benthic communities to acceptable levels and to as low as reasonably practical.

- Be able to demonstrate:
 - that areas of sensitivity related to benthic communities were adequately addressed in the planning process
 - compliance with legislative quarantine requirements, guidelines and agreed procedures
 - the need for further studies to close any knowledge gaps was considered and appropriate research was undertaken
 - any new knowledge was incorporated into the planning and design of the activity.

To reduce greenhouse emissions to as low as reasonably practical and to an acceptable level.

- Be able to demonstrate that the planning and design processes included:
 - a structured assessment of the reduction of greenhouse emissions
 - studies to close any gaps in knowledge
 - the incorporation of new knowledge into the planning and design of the activity
 - a structured process to identify all legislative requirements.
- Accountability was documented for all decisions taken with the potential to cause significant greenhouse emissions.

Drilling operations

Activity

Exploration drilling is used to explore and evaluate geological structures. Once a hydrocarbon bearing reservoir is discovered, development drilling is likely to follow to allow production and/or increase hydrocarbon reserves.

Exploration wells offshore are usually drilled vertically using a mobile offshore drilling unit (MODU). Offshore reservoirs are usually developed with fixed platforms or subsea developments.

The drilling of a well will involve installing surface casing and cementing this in place, installing and testing blow-out preventers (BOPs), followed by drilling and subsequent intermediate casing being installed and cemented into place.

Drilling fluids are usually water-based, but in certain circumstances an oil-based or synthetic fluid system could be used. Drilling fluids are generally recycled during drilling activities and may be discharged overboard at the conclusion of drilling.

Cuttings discharged usually range from very fine to very coarse (< 1 cm) particle sizes. Support vessels will also be on location in association with the MODU.

Environmental issues

Program-specific risks should be identified during the planning phase. Generally, potential environmental issues associated with drilling operations may include:

- disruption to the activities of other marine users
- disturbance to cultural heritage values
- disturbance to marine species
- introduction of marine pests
- smothering of, or disturbance to, benthic flora and fauna
- reduction in quality of the ambient air and noise conditions
- light emissions from the MODU or support vessels
- pollution due to the discharge of wastes including drill cuttings, drilling fluids, wash water, sewage, Normally Occurring Radioactive Material (NORM) and other wastes
- hydrocarbon spills
- loss of drill fluid and/or blow-out
- damage to well integrity
- cross-flow between fluid strata
- accident involving the MODU
- accidents involving support services.

Objectives	Example potential performance criteria
To reduce the disturbance to fishing operations or other marine users to as low as reasonably practical and to an acceptable level.	<ul style="list-style-type: none"> ■ There were no complaints from the commercial fishing operators or other marine users. ■ Appropriate consultation was conducted and liaison was maintained during the operation. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate management measures were in place and were implemented ● appropriate management systems were in place to record complaints ● appropriate systems were in place to document consultation and communication with stakeholders.
To avoid disturbance of areas of cultural heritage significance where practicable and reduce the risk of impacts to cultural heritage value to as low as reasonably practical and to an acceptable level.	<ul style="list-style-type: none"> ■ There was no unauthorised disturbance to areas of cultural heritage significance. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate consultation was conducted ● an approved cultural heritage management plan was in place ● management measures were implemented ● appropriate monitoring programs were conducted to enable impacts to be identified, and the results communicated in accordance with agreed procedures.
To reduce the risk of introduction of marine pests to as low as reasonably practical and to an acceptable level.	<ul style="list-style-type: none"> ■ There were no introductions of invasive or alien marine species recorded. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate quarantine management measures were implemented in accordance with legislative requirements and agreed procedures ● an appropriate monitoring program was in place to identify quarantine breaches.
To reduce the impacts to benthic communities to acceptable levels and to as low as reasonably practical.	<ul style="list-style-type: none"> ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● areas of sensitivity related to benthic communities were adequately addressed in the planning process ● appropriate measures were in place to reduce offshore footprint (including that associated with the disposal of drill cuttings) ● procedures were in place to monitor and record discharged cuttings and drilling fluid volumes and characteristics.
To reduce the impact of air emissions, noise emissions and light to an acceptable level and to as low as reasonably practical.	<ul style="list-style-type: none"> ■ There were no complaints by other marine users. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate management measures were in place to minimise impacts, and these were implemented ● appropriate monitoring programs were conducted to enable impacts to be identified, and the results communicated in accordance with agreed procedures ● appropriate management systems were in place to record complaints ● appropriate systems were in place to document consultation and communication with stakeholders.
To reduce the volume of wastes produced to as low as reasonably practical and to an acceptable level. Ensure that relevant wastes are disposed of in appropriate onshore facilities.	<ul style="list-style-type: none"> ■ Be able demonstrate that: <ul style="list-style-type: none"> ● appropriate management measures were in place and implemented ● all solid wastes, chemicals and other wastes were disposed of or recycled at appropriate facilities in accordance with legislative requirements and agreed procedures.

Objectives	Example potential performance criteria
To reduce the risk of release of material into the marine environment to as low as reasonably practical and to an acceptable level.	<ul style="list-style-type: none"> ■ There was no accidental loss of hydrocarbons to sea during mobilisation, drilling operations or demobilisation. ■ Be able demonstrate that: <ul style="list-style-type: none"> ● appropriate management procedures were in place and are implemented ● grey water, sewage and other wastes were disposed of in accordance with statutory requirements and agreed procedures.
To reduce the risk of damage to well integrity and cross-flow between fluid strata to as low as reasonably practical and to acceptable levels.	<ul style="list-style-type: none"> ■ There was no evidence of unacceptable damage to well integrity or cross-flow. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate drilling procedures were in place and implemented ● an appropriate monitoring program was in place and implemented and appropriate records kept.
To reduce the risk of collision with other vessels in accordance with maritime standards.	<ul style="list-style-type: none"> ■ There were no incidents with other marine resource users. ■ Be able to demonstrate that appropriate management measures were implemented in accordance with legislative requirements, guidelines and agreed procedures.
To reduce greenhouse emissions to as low as reasonably practical and to acceptable levels.	<ul style="list-style-type: none"> ■ Be able to demonstrate that the planning and design processes included: <ul style="list-style-type: none"> ● a structured assessment of the reduction of greenhouse emissions ● studies to close any gaps in knowledge ● the incorporation of new knowledge into the planning and design of the activity ● a structured process to identify all legislative requirements. ■ Accountability was documented for all decisions taken with the potential to cause significant greenhouse emissions.

Development and production

Activity

The actual configuration of offshore production facilities will be site-specific depending on the nature of the hydrocarbon produced, the size of the reservoir and local environmental conditions. Once the hydrocarbon reaches the surface, it can be processed through a central production facility which gathers and processes the produced fluids (gas, oil and water).

If the field is large enough, there could be satellite platforms linked by subsea flow lines to a central facility. In shallower water, there could be a number of smaller wellhead platforms linked to a central processing facility. These can be via a fixed platform that is either manned or unmanned.

The product could be exported via a ship or pipeline to shore.

Environmental issues

Project-specific risks should be identified during the planning phase. Environmental issues for development and production are usually assessed within an environmental approvals framework applicable to the jurisdiction within which it falls. Generally, potential environmental issues associated with development and production operations may include:

- disruption to the activities of other marine users
- disturbance to cultural heritage values
- disturbance to benthic and pelagic species, and other wildlife (such as birds)
- physical disturbance to the seafloor

- introduction of marine pests
- acoustic disturbances (vibrations, drilling equipment for production wells)
- reduction in air quality associated with emissions
- reduction in visual amenity
- light pollution
- pollution due the discharge of wastes including produced water, solid wastes, NORM, chemicals fuel, hydrocarbons, abandoned equipment and other wastes
- contamination associated with solid and chemical waste disposal onshore
- formation water disposal
- hydrocarbon spills
- cross-flow between fluid strata
- increased risk of ship-strike to marine fauna
- risks to the environment and public safety from the facilities
- socio-economic impacts.

Objectives	Example potential performance criteria
To reduce the impact on other marine resource users to as low as reasonably practical and to an acceptable level.	<ul style="list-style-type: none"> ■ There were no complaints by other marine users. ■ Appropriate consultation was conducted and effective liaison was maintained. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate management measures were in place and were implemented ● appropriate management systems were in place to record complaints ● appropriate systems were in place to document consultation and communication with stakeholders.
To reduce the impact on the beneficial uses of marine waters, including ecosystem maintenance to as low as reasonably practical and to an acceptable level.	<ul style="list-style-type: none"> ■ Impacts were in accordance with legislative requirements and approved (predicted) levels. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate management measures were in place and were implemented ● appropriate biological and water quality surveys were conducted to enable impacts to be identified and the results communicated in accordance with agreed procedures.
To reduce the impacts to benthic communities to acceptable levels and to as low as reasonably practical.	<ul style="list-style-type: none"> ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● areas of sensitivity related to benthic communities were adequately addressed in the planning process ● appropriate measures were in place to reduce offshore footprint.
To avoid disturbance of areas of cultural heritage significance where practicable and reduce the risk of impacts to cultural heritage value to as low as reasonably practical and to an acceptable level.	<ul style="list-style-type: none"> ■ There was no unauthorised disturbance to areas of cultural heritage significance. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate consultation was undertaken ● an approved cultural heritage management plan was in place ● management measures were implemented ● appropriate monitoring programs were conducted to enable impacts to be identified, and the results communicated in accordance with agreed procedures.

Objectives	Example potential performance criteria
To reduce the risk of introduction of marine pests to as low as reasonably practical and to acceptable levels.	<ul style="list-style-type: none"> ■ There were no introductions of invasive or alien marine species recorded. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate quarantine management measures were implemented in accordance with legislative requirements and agreed procedures ● an appropriate monitoring program was in place to identify quarantine breaches.
To reduce risks to the abundance, diversity, geographical spread and productivity of marine species to as low as reasonably practical and to acceptable levels.	<ul style="list-style-type: none"> ■ Impacts were in accordance with predicted levels. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate management measures were in place and were implemented ● appropriate biological surveys were conducted to enable impacts to be identified and the results communicated in accordance with agreed procedures.
To reduce the impact of planned air emissions, noise emissions and light to as low as reasonably practical and to an acceptable level.	<ul style="list-style-type: none"> ■ There were no complaints by other marine users. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate management measures were in place to minimise impacts, and these were implemented ● appropriate monitoring programs were conducted to enable impacts to be identified, and the results communicated in accordance with agreed procedures ● appropriate management systems were in place to record complaints ● appropriate systems were in place to document consultation and communication with stakeholders.
To reduce impact of routine waste discharges on the marine environment to as low as reasonably practical and to an acceptable level.	<ul style="list-style-type: none"> ■ Discharges of materials such as sewage and putrescibles waste were in accordance with legislative requirements and an approved waste management plan. ■ Impacts were in accordance with legislative requirements and approved (predicted) levels. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate management measures were in place and were implemented ● appropriate monitoring programs were conducted to enable discharges to be recorded, impacts to be identified, and the results communicated in accordance with agreed procedures.
To reduce the risk of any unplanned release of material into the marine environment to as low as reasonably practical and to an acceptable level.	<ul style="list-style-type: none"> ■ There were no reportable accidental losses of substances to sea during development or production operations. ■ Be able demonstrate that: <ul style="list-style-type: none"> ● appropriate management procedures were in place and were implemented ● an appropriate emergency response plan was in place.
To reduce the impact of produced formation water on the marine environment to as low as reasonably practical and to an acceptable level.	<ul style="list-style-type: none"> ■ Discharge volume and quality was in accordance with legislative requirements and approved levels. ■ Impacts were in accordance with legislative requirements and approved (predicted) levels. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate management measures were in place and were implemented ● appropriate monitoring programs were conducted to enable discharges to be recorded, impacts to be identified, and the results communicated in accordance with agreed procedures.

Objectives	Example potential performance criteria
<p>To reduce the risk of cross-flow between fluid strata to as low as reasonably practical and to an acceptable level.</p>	<ul style="list-style-type: none"> ■ There was no evidence of cross-flow. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate reservoir management procedures were in place and implemented ● an appropriate monitoring program was in place and implemented and appropriate records kept.
<p>To reduce risks to public safety to as low as reasonably practical and to an acceptable level.</p>	<ul style="list-style-type: none"> ■ There were no accidents or incidents involving the public as a result of production operations. ■ Be able demonstrate that: <ul style="list-style-type: none"> ● appropriate safety management procedures were in place and were implemented ● an appropriate emergency response plan was in place.
<p>To reduce greenhouse emissions to as low as reasonably practical and to an acceptable level.</p>	<ul style="list-style-type: none"> ■ Be able to demonstrate that the planning and design processes included: <ul style="list-style-type: none"> ● a structured assessment of the reduction of greenhouse emissions ● studies to close any gaps in knowledge ● the incorporation of new knowledge into the planning and design of the activity ● a structured process to identify all legislative requirements ● accountability was documented for all decisions taken with the potential to cause significant greenhouse emissions.

ENVIRONMENTAL OBJECTIVES – ONSHORE

Geophysical surveys

Activity

Aerial surveys based on either gravimetric or magnetic methods may be used in addition to ground based seismic acquisition surveys.

The purpose of surveys is to identify underlying geological features that may contain hydrocarbons. Seismic surveys use an energy source generally from a vibrating pad mounted beneath a vehicle, or from controlled explosive charges. The energy is transmitted as a pulse through surface layers and is reflected off geological structures and recorded by a series of acoustic receivers. Special cables transmit the electrical signals to a mobile laboratory where they are processed and recorded.

Environmental issues

Program-specific risks should be identified during the planning phase. Generally, potential environmental issues associated with onshore geophysical surveys may include:

- disturbance to cultural heritage values
- erosion and changes to surface hydrology
- vegetation clearance
- introduction of weeds, pests or pathogens
- disturbance to wildlife or livestock
- disturbance to local land uses
- acoustic disturbances (vibrations, explosions)
- low level noise and light from camps
- soil, surface water and groundwater contamination associated with effluent disposal, waste disposal and spills of fuel, hydrocarbons or chemicals
- reduction in visual amenity associated with the presence of seismic lines
- unauthorised third party access of seismic lines.

Objectives	Example potential performance criteria
To avoid disturbance of sites of cultural heritage significance where practicable and reduce the risk to cultural heritage value to as low as reasonably practical and to an acceptable level.	<ul style="list-style-type: none"> ■ There was no unauthorised disturbance to sites of cultural heritage significance. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● an approved cultural heritage management plan was in place ● management measures were implemented ● appropriate monitoring programs were conducted to enable impacts to be identified, and the results communicated in accordance with agreed procedures.
To reduce impacts on soils and surface drainage (including gibber and sand dunes) to acceptable levels and to reduce the risk of impact to as low as reasonably practical.	<ul style="list-style-type: none"> ■ There were no long-term erosion issues or problems due to surface drainage changes. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate management measures were in place and were implemented ● appropriate rehabilitation measures were undertaken ● appropriate surveys were conducted to enable impacts to be identified and the results communicated in accordance with agreed procedures ● appropriate monitoring programs were in place to adequately assess the effectiveness of rehabilitation measures.
To reduce impacts to vegetation and wildlife habitats to acceptable levels and to reduce the risk of impact to as low as reasonably practical.	<ul style="list-style-type: none"> ■ There was no unauthorised clearing of vegetation. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate management measures were in place and were implemented to minimise footprint and manage clearing activities ● appropriate rehabilitation measures were undertaken ● appropriate biological assessments were conducted to enable impacts to be identified and the results communicated in accordance with agreed procedures ● appropriate monitoring programs were in place to adequately assess the effectiveness of rehabilitation measures.
To reduce the risk of introduction (or spread) of weeds, pests and pathogens to as low as reasonably practical and to an acceptable level.	<ul style="list-style-type: none"> ■ There were no weeds, pests and pathogens introduced (or spread). ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate weed and pest management measures were implemented in accordance with legislative requirements and agreed procedures ● appropriate monitoring programs were conducted to enable introductions to be identified, and the results communicated in accordance with agreed procedures ● any weeds, pests and pathogens detected were appropriately dealt with ● where relevant, dieback mitigation procedures were implemented and strictly adhered to.
To reduce the impact on other land users to an acceptable level and to reduce the risk of impact to as low as reasonably practical.	<ul style="list-style-type: none"> ■ There were no complaints by other land users. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate management measures were in place and were implemented ● appropriate management systems were in place to record complaints ● appropriate systems were in place to document consultation and communication with stakeholders.

Objectives

Example potential performance criteria

To reduce the impact of noise, light, odours, traffic and vibration to an acceptable level and to reduce the risk of impacts to as low as reasonably practical.

- There were no complaints by other land users regarding amenity.
- Be able to demonstrate that:
 - appropriate management measures were in place to minimise impacts, and these were implemented
 - appropriate monitoring programs were conducted to enable impacts to be identified, and the results communicated in accordance with agreed procedures
 - appropriate management systems were in place to record complaints
 - appropriate systems were in place to document consultation and communication with stakeholders.

To reduce the volume of waste produced to as low as reasonably practical and to an acceptable level. Ensure that relevant wastes are disposed of in appropriate facilities.

- Be able demonstrate that:
 - waste was managed in accordance with a waste management plan
 - all solid wastes, chemicals and other wastes were disposed of or recycled at appropriate facilities in accordance with legislative requirements and agreed procedures.

To reduce visual impacts of seismic survey operations to as low as reasonably practical and to an acceptable level.

- Be able to demonstrate that:
 - areas of visual sensitivity were adequately addressed in the planning process
 - appropriate measures were in place to reduce visual impact (including weaving of lines).

To discourage third party access following completion of operations to as low as reasonably practical and to an acceptable level.

- Be able to demonstrate that third party access is not encouraged or facilitated as a result of seismic surveys.

To reduce greenhouse emissions to as low as reasonably practical and to an acceptable level.

- Be able to demonstrate that the planning and design processes included:
 - a structured assessment of the reduction of greenhouse emissions
 - studies to close any gaps in knowledge
 - the incorporation of new knowledge into the planning and design of the activity
 - a structured process to identify all legislative requirements.
- Accountability was documented for all decisions taken with the potential to cause significant greenhouse emissions.

Drilling operations

Activity

The actual location of well sites, access tracks and associated infrastructure will be site-specific depending on the location and characteristics of the hydrocarbon reservoir and local environmental conditions.

Onshore, individual well sites have a small footprint (usually in the order of 250m²). Drilling operations require the establishment of a well pad suitable to safely accommodate the drilling rig and associated equipment. Tracks may need to be constructed to facilitate access. Water is required by the drilling process and may be pumped or trucked to site or a new bore drilled.

The workforce is typically accommodated in a mobile camp located in close proximity to the well site.

Environmental issues

Program-specific risks should be identified during the planning phase. Generally, potential environmental issues associated with onshore drilling operations may include:

- disturbance to cultural heritage values
- erosion and changes to surface hydrology
- vegetation clearance
- introduction of weeds, pests or pathogens
- disturbance to wildlife or livestock
- disturbance to local land uses
- low-level noise and light from camps
- acoustic disturbances (vibrations, drilling equipment)
- low-level reduction in local air quality associated with emissions from vehicles, drilling equipment, and well testing
- soil, surface water and groundwater contamination associated with effluent disposal, waste disposal and spills of fuel, hydrocarbons or chemicals
- cross-flow between fluid strata
- reduction in visual amenity
- third party access
- risks to public safety.

Objectives

To avoid disturbance of sites of cultural heritage significance where practicable and reduce the risk of impacts to cultural heritage value to as low as reasonably practical and to an acceptable level.

Example potential performance criteria

- There was no unauthorised disturbance to sites of cultural heritage significance.
- Be able to demonstrate that:
 - there was appropriate cultural heritage consultation
 - an approved cultural heritage management plan was in place
 - management measures were implemented
 - appropriate monitoring programs were conducted to enable impacts to be identified, and the results communicated in accordance with agreed procedures.

Objectives	Example potential performance criteria
<p>To reduce impacts on soils of vegetation disturbance, surface drainage (including gibber) and other activities to acceptable levels and reduce the risk of impacts to as low as reasonably practical.</p>	<ul style="list-style-type: none"> ■ There were no long-term erosion issues or problems due to vegetation disturbance, surface drainage or other activities. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate management measures were in place and were implemented ● appropriate rehabilitation measures were undertaken ● appropriate surveys were conducted to enable impacts to be identified and the results communicated in accordance with agreed procedures ● appropriate monitoring programs were in place to adequately assess the effectiveness of rehabilitation measures.
<p>To maintain the beneficial uses of surface and groundwater, including ecosystem maintenance and reduce the risk of impacts to as low as reasonably practical and to an acceptable level.</p>	<ul style="list-style-type: none"> ■ Impacts to water quality were in accordance with legislative requirements and agreed levels. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate management measures were in place and were implemented ● appropriate monitoring programs were conducted to enable impacts to be identified and the results communicated in accordance with agreed procedures.
<p>To reduce impacts to vegetation and wildlife habitats to acceptable levels and reduce the risk of impacts to as low as reasonably practical.</p>	<ul style="list-style-type: none"> ■ There was no unauthorised clearing of vegetation. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate management measures were in place and were implemented to minimise footprint and manage clearing activities ● appropriate rehabilitation measures were undertaken ● appropriate biological surveys were conducted to enable impacts to be identified and the results communicated in accordance with agreed procedures ● appropriate monitoring programs were in place to adequately assess the effectiveness of rehabilitation measures.
<p>To reduce the risk of introduction (or spread) of weeds, pests and pathogens to as low as reasonably practical and to an acceptable level.</p>	<ul style="list-style-type: none"> ■ There were no weeds, pests and pathogens introduced (or spread). ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate quarantine management measures were implemented in accordance with legislative requirements and agreed procedures ● appropriate monitoring programs were conducted to enable introductions to be identified, and the results communicated in accordance with agreed procedures ● any weeds, pests and pathogens detected were appropriately dealt with.
<p>To reduce the impact on other land users and livestock to an acceptable level and reduce the risk of impacts to as low as reasonably practical.</p>	<ul style="list-style-type: none"> ■ There were no complaints by other land users regarding. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate management measures were in place to minimise impacts to land users and livestock, and these were implemented ● appropriate management systems were in place to record complaints ● appropriate systems were in place to document consultation and communication with stakeholders.
<p>To reduce the impact of noise, light, odours, traffic and vibration to an acceptable level and reduce the risk of impacts to as low as reasonably practical.</p>	<ul style="list-style-type: none"> ■ There were no complaints by other land users regarding amenity. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate management measures were in place to minimise impacts, and these were implemented ● appropriate monitoring programs were conducted to enable impacts to be identified, and the results communicated in accordance with agreed procedures ● appropriate management systems were in place to record complaints ● appropriate systems were in place to document consultation and communication with stakeholders.

Objectives	Example potential performance criteria
<p>To reduce planned emissions to an acceptable level and reduce the risk of impacts to as low as reasonably practical.</p>	<ul style="list-style-type: none"> ■ Impacts were in accordance with legislative requirements and approved (predicted) levels. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate management measures were in place and were implemented ● appropriate monitoring programs were conducted to enable emissions to be recorded, impacts to be identified, and the results communicated in accordance with agreed procedures.
<p>To reduce the volume of waste produced to as low as reasonably practical and to an acceptable level. Ensure that relevant wastes are disposed of in appropriate facilities.</p>	<ul style="list-style-type: none"> ■ Be able demonstrate that: <ul style="list-style-type: none"> ● waste was managed in accordance with an approved waste management plan ● all solid wastes, chemicals and other wastes were disposed of or recycled at appropriate facilities in accordance with legislative requirements and agreed procedures.
<p>To reduce the risk of unplanned release of substances to land to as low as reasonably practical and to an acceptable level.</p>	<ul style="list-style-type: none"> ■ There were no reportable accidental losses of substances to land during drilling operations. ■ Be able demonstrate that: <ul style="list-style-type: none"> ● appropriate management procedures were in place and were implemented ● an appropriate emergency response plan was in place.
<p>To reduce the risk of cross-flow between fluid strata to acceptable levels and to as low as reasonably practical.</p>	<ul style="list-style-type: none"> ■ There was no evidence of cross-flow. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate reservoir management procedures were in place and implemented ● an appropriate monitoring program was in place and implemented and appropriate records kept.
<p>To reduce visual impacts of drilling operations to an acceptable level.</p>	<ul style="list-style-type: none"> ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● areas of visual sensitivity were adequately addressed in the planning process ● appropriate measures were in place to reduce visual impact.
<p>To reduce risks to public safety to as low as reasonably practical and to an acceptable level.</p>	<ul style="list-style-type: none"> ■ There were no accidents or incidents involving the public as a result of drilling operations. ■ Be able demonstrate that: <ul style="list-style-type: none"> ● appropriate safety management procedures were in place and were implemented ● an appropriate emergency response plan was in place.
<p>To reduce greenhouse emissions to as low as reasonably practical and to an acceptable level.</p>	<ul style="list-style-type: none"> ■ Be able to demonstrate that the planning and design processes included: <ul style="list-style-type: none"> ● a structured assessment of the reduction of greenhouse emissions ● studies to close any gaps in knowledge ● the incorporation of new knowledge into the planning and design of the activity ● a structured process to identify all legislative requirements. ■ Accountability was documented for all decisions taken with the potential to cause significant greenhouse emissions.

Development and production

Activity

The actual configuration of onshore production facilities will be site-specific depending on the nature of the hydrocarbon produced, the size and location of the reservoir, existing infrastructure and local environmental conditions.

Production facilities could also be tied back via a pipeline to an offshore component. Facilities may range in size from several hectares to over 100 hectares. They may incorporate a range of activities and infrastructure for processing and storing the hydrocarbon and its by-products. Hydrocarbons may be exported by road, rail, ship or pipeline.

In remote areas, production facilities may incorporate workforce accommodation, power production, water sources, waste disposal facilities, and a range of supporting infrastructure.

Environmental issues

Project-specific risks should be identified during the planning phase. Environmental issues for development and production are usually assessed within an environmental approvals framework applicable to the jurisdiction within which it falls. Generally, potential environmental issues associated with development and production operations may include:

- disturbance to cultural heritage values
- erosion and changes to surface hydrology
- vegetation clearance
- introduction of weeds, pests or pathogens
- disturbance to wildlife
- impacts on land-uses including livestock
- low-level noise, vibration and light from facilities
- reduction in local air quality associated with planned emissions
- greenhouse gas emissions
- pollution due the discharge of wastes including produced water, solid wastes, NORM, chemicals fuel, hydrocarbons and other wastes
- hydrocarbon spills
- cross-flow between fluid strata
- reduction in visual amenity
- Socio-economic impacts
- Risks to the environment and public safety from the facilities.

Objectives	Example potential performance criteria
To avoid disturbance of sites of cultural heritage significance where practicable and reduce the risk of impacts to cultural heritage values to as low as reasonably practical and to an acceptable level.	<ul style="list-style-type: none"> ■ There was appropriate cultural heritage consultation. ■ There was no unauthorised disturbance to sites of cultural heritage significance. Be able to demonstrate that: <ul style="list-style-type: none"> ● An approved Cultural Heritage Management Plan was in place; ● Management measures were implemented; and ● Appropriate monitoring programs were conducted to enable impacts to be identified, and the results communicated in accordance with agreed procedures.
To reduce the impact on the beneficial uses of surface and groundwater, including ecosystem maintenance, to as low as reasonably practical and to an acceptable level.	<ul style="list-style-type: none"> ■ Impacts to water quality were in accordance with legislative requirements and agreed levels. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate management measures were in place and were implemented ● appropriate monitoring programs were conducted to enable impacts to be identified and the results communicated in accordance with agreed procedures.
To reduce impacts to vegetation, wildlife and wildlife habitats to acceptable levels and reduce the risk of impacts to as low as reasonably practical.	<ul style="list-style-type: none"> ■ There was no unauthorised clearing of vegetation. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate management measures were in place and were implemented to minimise footprint and manage clearing activities ● appropriate rehabilitation measures were undertaken ● appropriate biological surveys were conducted to enable impacts to vegetation abundance, diversity, geographical spread and productivity to be identified and the results communicated in accordance with agreed procedures ● appropriate monitoring programs were in place to adequately assess the effectiveness of rehabilitation measures.
To reduce the risk of introduction (or spread) of weeds, pests and pathogens to as low as reasonably practical and to an acceptable level.	<ul style="list-style-type: none"> ■ There were no weeds, pests and pathogens introduced (or spread). ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate quarantine management measures were implemented in accordance with legislative requirements and agreed procedures ● appropriate monitoring programs were conducted to enable introductions to be identified, and the results communicated in accordance with agreed procedures ● any weeds, pests and pathogens detected were appropriately dealt with.
To reduce the impact of noise, light, odours, traffic and vibration on other land users to an acceptable level and reduce the risk of impacts to as low as reasonably practical.	<ul style="list-style-type: none"> ■ There were no complaints by other land users regarding amenity. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate management measures were in place to minimise impacts to land users, and these were implemented ● appropriate monitoring programs were conducted to enable impacts to be identified, and the results communicated in accordance with agreed procedures ● appropriate management systems were in place to record complaints ● appropriate systems were in place to document consultation and communication with stakeholders.
To reduce planned emissions to an acceptable level and reduce the risk of impacts to as low as reasonably practical.	<ul style="list-style-type: none"> ■ Impacts were in accordance with legislative requirements and approved (predicted) levels. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate management measures were in place and were implemented ● appropriate monitoring programs were conducted to enable emissions to be recorded, impacts to be identified, and the results communicated in accordance with agreed procedures.

Objectives	Example potential performance criteria
To reduce the volume of waste produced to as low as reasonably practical and to an acceptable level. Ensure that relevant wastes are recycled where practicable or disposed of in appropriate facilities.	<ul style="list-style-type: none"> ■ Be able demonstrate that: <ul style="list-style-type: none"> ● waste was managed in accordance with an approved waste management plan ● all solid wastes, chemicals and other wastes were disposed of or recycled at appropriate facilities in accordance with legislative requirements and agreed procedures.
To reduce the risk of any unplanned release of substances to land to as low as reasonably practical and to an acceptable level.	<ul style="list-style-type: none"> ■ There were no reportable accidental losses of substances to land during drilling operations. ■ Be able demonstrate that: <ul style="list-style-type: none"> ● appropriate management procedures were in place and were implemented ● an appropriate emergency response plan was in place.
To reduce the risk of cross-flow between fluid strata to as low as reasonably practical and to acceptable levels.	<ul style="list-style-type: none"> ■ There was no evidence of cross-flow. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● appropriate reservoir management procedures were in place and implemented ● an appropriate monitoring program was in place and implemented and appropriate records kept.
To reduce visual impacts of production operations to an acceptable level and reduce the risk of impacts to as low as reasonably practical.	<ul style="list-style-type: none"> ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● areas of visual sensitivity were adequately addressed in the planning process ● appropriate measures were in place to reduce visual impact.
To reduce adverse socio-economic impacts to an acceptable level and reduce the risk of impacts to as low as reasonably practical.	<ul style="list-style-type: none"> ■ There were no complaints by other land users regarding socio-economic impacts. ■ Be able to demonstrate that: <ul style="list-style-type: none"> ● an appropriate program of consultation and communication was undertaken ● appropriate management measures were in place to minimise socio-economic impacts, and these were implemented ● appropriate monitoring programs were conducted to enable impacts to be identified, and the results communicated in accordance with agreed procedures ● appropriate management systems were in place to record complaints and any necessary corrective measures were undertaken.
To reduce risks to public safety to as low as reasonably practical and to an acceptable level.	<ul style="list-style-type: none"> ■ There were no accidents or incidents involving the public as a result of drilling operations. ■ Be able demonstrate that: <ul style="list-style-type: none"> ● appropriate safety management procedures were in place and were implemented ● an appropriate emergency response plan was in place.
To reduce greenhouse emissions to as low as reasonably practical and to an acceptable level.	<ul style="list-style-type: none"> ■ Be able to demonstrate that the planning and design processes included: <ul style="list-style-type: none"> ● a structured assessment of the reduction of greenhouse emissions ● studies to close any gaps in knowledge ● the incorporation of new knowledge into the planning and design of the activity ● a structured process to identify all legislative requirements.
	<p>Accountability was documented for all decisions taken with the potential to cause significant greenhouse emissions.</p>

Decommissioning

Activity

It is a requirement of all petroleum developments that production facilities be removed at the end of their operating life, that the facilities be disposed of properly and that the site be made good. This is termed the decommissioning process. Decommissioning is controlled by federal and state government legislation, and is the responsibility of the operator.

Decommissioning is particularly important for offshore facilities, where a number of factors must be taken into consideration, including potential impacts on the environment, navigation safety, possible impact on the fishing industry and other marine users and operators, workforce and public safety, technical feasibility and cost.

International guidelines today prohibit instalment of an offshore facility unless its entire removal is feasible. Approval under Australia's environmental legislation (EPBC Act) includes consideration of the feasibility of removal, and development approval conditions usually require plans to be submitted for approval before decommissioning.

A number of decommissioning options are available to operators, depending on the structure, its location, physical factors and government regulations. The options include alternative use of the facility, leaving the facility in place, demolition in situ, partial removal, and full removal and disposal as an artificial reef, in deep water or onshore.

Environmental issues

The potential environmental issues associated with decommissioning generally can be identified in the planning stage. This process is guided by regulations and associated guidelines. Program-specific risks should be identified during the planning stage. Generally, potential environmental and other issues associated with decommissioning may include:

- potential impacts on the marine environment
- potential impacts on marine habitats and biodiversity
- potential impacts on areas of ecological significance
- pestoration of the environment disturbed by production and decommissioning
- management of chemicals and other wastes associated with the facility, including radioactive wastes
- recycling of materials in the facility
- possible use of the facility as an artificial reef
- disturbance to other marine resource users during and after decommissioning
- possible impact on fish stocks of partial removal or disposal at sea
- potential for any structure left on the seabed to enhance breeding/conservation of fish stocks
- method and technology used for removal or partial removal
- implications for navigation of any structures left in place or disposed on the seabed
- workplace and public safety during decommissioning
- maritime safety if structures are left in place, partially removed or disposed on the seabed
- possible impact on other facilities in the area
- possible impacts during and after decommissioning on recreational marine users
- proper disposal onshore
- stakeholder engagement and approval of the decommissioning plan.

Objectives	Example potential performance criteria
to reduce impacts to the marine environment to as low as reasonably practical and to an acceptable level.	<p>Decommissioning was in accordance with approval conditions.</p> <ul style="list-style-type: none"> ■ Potential impacts to the environment were minimised. ■ Be able demonstrate that: <ul style="list-style-type: none"> ● there was a properly structured risk assessment of the decommissioning activities ● appropriate management procedures were in place to minimise impacts and these were implemented ● there were no breaches of legislative requirements ● there were no unplanned incidents during decommissioning ● appropriate monitoring programs were conducted to enable any impacts to be identified, and that results were communicated in accordance with agreed procedures ● the facility was deconstructed or removed and disposed of according to approved conditions.
To restore the seabed, or other disturbed area, to its original condition or to reduce disturbance to as low as reasonably practical and to an acceptable level.	<p>Site restoration measures were planned and approved before decommissioning started.</p> <ul style="list-style-type: none"> ■ Making good the site did not impact adversely on marine habitats, fish stocks or other seabed features. ■ A site inspection after decommissioning confirmed restoration objectives were met. ■ Be able to demonstrate: <ul style="list-style-type: none"> ● appropriate management measures were in place and were implemented ● decommissioning was monitored , a post-decommissioning inspection was conducted and the final outcome recorded and communicated ● if the structure, or part of it, is left in situ, this was done according to approved conditions.
To reduce the risk of release of chemicals or other wastes into the marine environment to as low as reasonably practical and to an acceptable level.	<p>The facility was inspected and all chemicals and other wastes were removed or secured before decommissioning to prevent release into the marine environment.</p> <ul style="list-style-type: none"> ■ All chemicals and other wastes removed were properly disposed onshore. ■ There was no accidental loss of substances to sea during decommissioning. ■ Be able demonstrate that: <ul style="list-style-type: none"> ● appropriate management procedures were in place and were implemented ● decommissioning proceeded according to plans and all actions were documented ● the procedure was properly monitored and recorded ● all chemicals and other wastes were properly secured during decommissioning, or removed and safely disposed ashore.

Objectives

Example potential performance criteria

To ensure there is no on-going risk to navigation or other marine operators or users, or that the risk is as low as reasonably practical and to an acceptable level.

If the facility was left in place, partly removed or disposed at sea, this was done according to approved conditions.

- Appropriate authorities and organisations were made aware of any potential navigation risk after decommissioning.
- Plans are in place to monitor the situation
- Be able demonstrate that:
 - appropriate management procedures were in place and implemented
 - there were proper communications with appropriate marine authorities and organisations
 - part removal or at-sea disposal was completed according to approved conditions and guidelines, and properly recorded
 - there were no breaches of legislative requirements.

To ensure stakeholders were fully aware of decommissioning and approved decommissioning plans.

Decommissioning planning included communication with all appropriate stakeholders.

- Stakeholder engagement was documented and recorded.
- Be able to demonstrate that:
 - appropriate management procedures were in place and are implemented
 - guidelines were followed and there were no breaches of legislative requirements
 - stakeholders were aware of de-commissioning options and the benefits of the chosen option
 - stakeholders were kept informed at all stages during decommissioning planning and execution
 - any stakeholder concerns were recorded and taken into account during decommissioning planning, to the extent reasonably practical.

ABBREVIATIONS

APPEA	Australian Petroleum Production & Exploration Association
MCMPR	The Ministerial Council on Minerals and Petroleum Resources
NORM	Naturally Occurring Radioactive Material

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Association
in the peak
representing the
interests of the upstream
gas exploration and production
industry. The association has
68 full member companies
explore for and produce
gas resources. An
estimated 98 per cent
petroleum production
PEA also represents
associate
view

