

1.0 INTRODUCTION

This document is the Public Environmental Review (PER) prepared by the Gorgon Joint Venturers (GJVs) for the Gorgon Gas Development Revised and Expanded Proposal (Revised Proposal). It has been prepared in accordance with the Environmental Impact Assessment (Part IV Division 1) Administrative Procedures 2002 of the Western Australian *Environmental Protection Act 1986* (EP Act), and to satisfy the requirements for assessment of the Revised Proposal under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

In accordance with the Western Australian EP Act requirements, the GJVs prepared an Environmental Scoping Document (Chevron Australia 2008b) that was endorsed by the EPA in July 2008 and which forms the basis for assessment of this PER.

This PER specifically addresses the changes introduced to the Approved Gorgon Gas Development (Approved Development) by the GJVs Revised Proposal.

This PER and associated appendices make reference to both the Approved Gorgon Gas Development and the Revised Gorgon Gas Development, which is the subject of this PER. For clarification purposes, the following definitions are provided:

- ◆ “the Approved Gorgon Gas Development” or “the Approved Development” refers to the development proposed in the EIS/ERMP (Chevron Australia 2005a) and subsequently approved under Statement No. 748 and EPBC Reference: 2003/1294
- ◆ “the Gorgon Gas Development Revised and Expanded Proposal” or “the Revised Gorgon Gas Development” or “the Revised Proposal” refers to the development proposed in this PER, which is yet to gain approval
- ◆ “the Gorgon Gas Development” refers to the entire proposal. This descriptor may be used when the reference is being made to elements of “the Revised Proposal” described in the PER when they replace the elements of “the Approved Development” which have changed to create the final product as proposed in this PER.

1.1 Proposal Overview

1.1.1 Location

Barrow Island is located approximately 70 km off the north-west coast of Western Australia (Figure 1.1).

The island currently supports a Chevron-operated oil field; this operation has been in place since the 1960s and is expected to continue for another 15 to 20 years.

The Gorgon Gas Development Gas Treatment Plant is part of both the Approved Development and the Revised Proposal. It will be located on the east coast of Barrow Island at Town Point, with related approved terrestrial infrastructure located at a small number of other locations on the Island. The Reservoir Carbon Dioxide Injection System is located north of the Gas Treatment Plant on the east side of Barrow Island. The MOF, which is also part of both the Approved Development and Revised Proposal, will be located within the Port of Barrow Island and extend offshore from Town Point on the east coast of Barrow Island.

1.1.2 Description

The Approved Development was approved by the Western Australian Minister for the Environment on 6 September 2007 by way of Ministerial Implementation Statement (Statement) No. 748 and the then Commonwealth Minister for the Environment and Water Resources on 3 October 2007 (EPBC Reference: 2003/1294) (Appendix A). The Approved Development was assessed at the level of Environmental Impact Statement (EIS – Commonwealth) and Environmental Review and Management Programme (ERMP – Western Australian).

The Commonwealth Minister for the Environment and Water Resources also approved a Sea Dumping Permit (No. SD2004/0030) subject to conditions, on 3 October 2007 for the Approved Development as required under section 19 of the *Environmental Protection (Sea Dumping) Act 1981* (Cth).

In May 2008, under section 45C of the EP Act, the EPA approved some minor changes to the Approved Development (Appendix A) that it considered “not to result in a significant, detrimental, environmental effect in addition to, or different from, the effect of the original proposal”.

The Approved Development comprises a range of offshore and onshore components to recover gas from the Gorgon gas field west of Barrow Island and to process gas from the Greater Gorgon gas fields at, and ship it from, a Gas Treatment Plant on Barrow Island.

Since then, the GJVs have determined the need for the following changes to the Approved Development:

- ◆ addition of a five million tonnes per annum (MTPA) liquefied natural gas (LNG) train, increasing the number of LNG trains from two to three in order to generate more clean-burning natural gas sooner in a rapidly growing global energy market
- ◆ changes to the Reservoir Carbon Dioxide Injection System to allow an increased injection rate associated with the addition of one LNG Train, increasing the number of injection wells and surface drill centre locations
- ◆ revision of the Causeway and the Materials Offloading Facility (MOF) designed to access deeper water to avoid hard rock material and the need for an extensive drilling and blasting program. These elements are further described in Section 2.0.

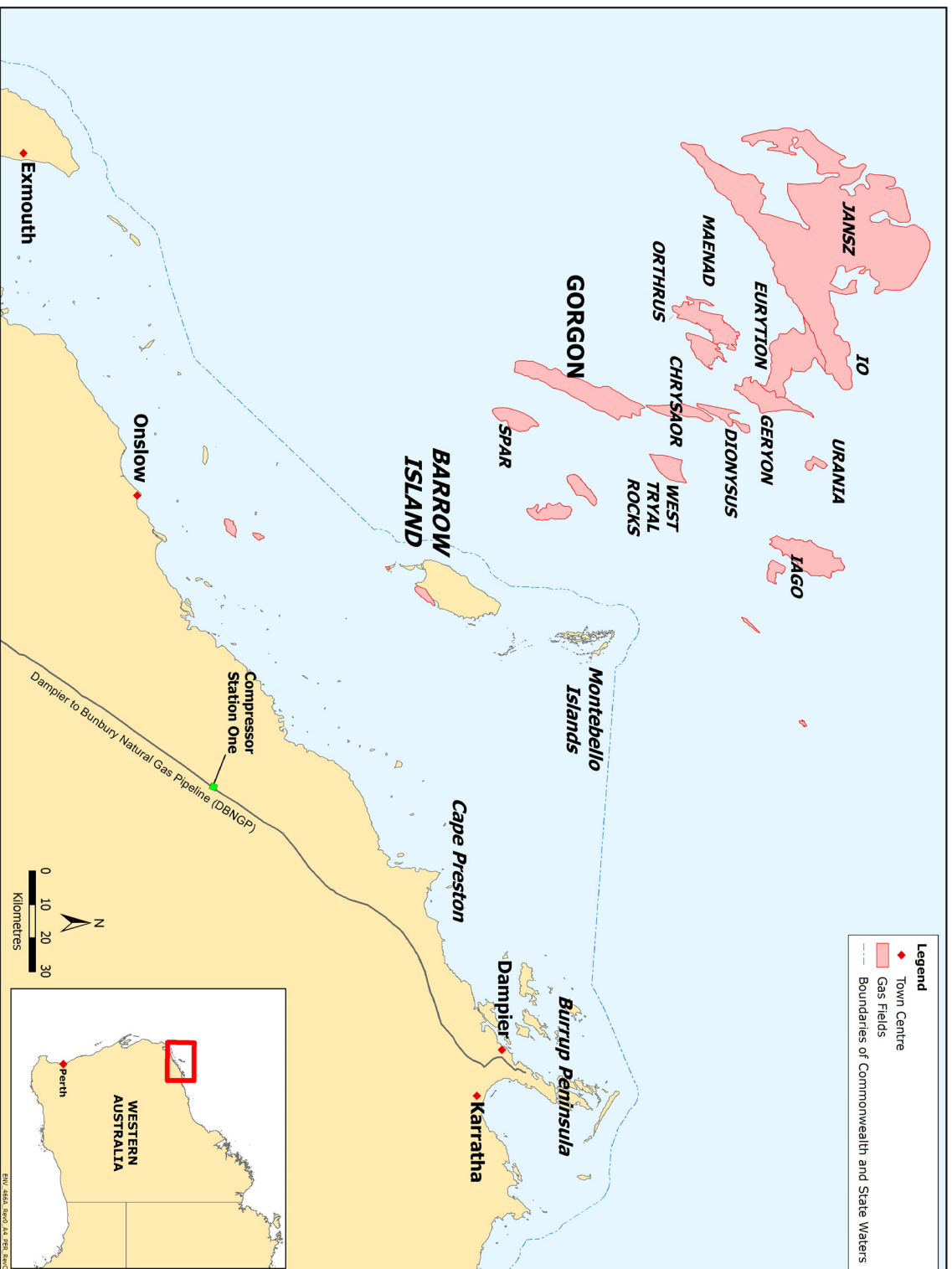


Figure 1.1: Regional Location of Gorgon Gas Development Revised Proposal

1.2 The Proponent

Chevron Australia Pty Ltd (Chevron Australia) is the operator and proponent for both the Approved Development and the Revised Proposal on behalf of the following companies (collectively known as the Gorgon Joint Venturers [GJVs]):

- ◆ Chevron Australia Pty Ltd
- ◆ Chevron (TAPL) Pty Ltd
- ◆ Shell Development (Australia) Proprietary Limited
- ◆ Mobil Australia Resources Company Pty Limited.

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1.3 Justification for Proposal

1.3.1 Options Analysis

Barrow Island is the location for the Approved Development. Alternate locations for the Revised Proposal have not been considered due to the requirements of Statement No. 748 to inject reservoir CO₂ as part of the Approved Development. An explanation of the options considered for the Approved Development siting, and the rationale for selecting Barrow Island and the specific sites for the Gorgon Gas Development facilities on, and adjacent to, Barrow Island, are provided in the EIS/ERMP (Chevron Australia 2005a).

1.3.2 Re-evaluation of Design Opportunities

The GJVs have re-evaluated the economics of the Gorgon Gas Development in light of increases in the costs of the materials required to construct the Approved Development. To improve project economics, it is necessary to include one additional LNG train as part of the Development to take advantage of economies of scale. The EIS/ERMP (Chevron Australia 2005a) included information relating to the GJVs' intent to further develop the Gorgon Gas reserves through capacity increases of the processing facilities on Barrow Island in the future, within the 300 ha available on Barrow Island for gas processing under the Western Australian *Barrow Island Act 2003*.

The addition of a third LNG processing train will increase the annual average volume of reservoir CO₂ anticipated to be injected by approximately 25% for the Revised Proposal, however, the total volume of CO₂ to be injected over the life of the project remains the same as for the Approved Development.

The accelerated rate at which reservoir CO₂ is proposed to be injected will require one to two additional injection wells and one to two drill centres, with a corresponding increase in the length of the approved CO₂ pipeline. All land disturbances associated with the injection of reservoir CO₂ will be managed in accordance with the limits imposed by the Gorgon Gas Processing and Infrastructure Project Agreement (*Barrow Island Act 2003* (WA) – Schedule 1).

Marine geophysical and geotechnical information acquired during the Front-End Engineering and Design (FEED) phase of the Gorgon Gas Development has indicated that the rock substrate in the vicinity of the MOF location is significantly harder and more extensive than previous data indicated. This would result in the need to drill and blast approximately 500 000 m³ of material in coastal waters before mechanical removal for the construction of the MOF access channel and berthing pockets.

Re-evaluation of MOF design opportunities has taken into account environmental impacts (during the construction and operation phases), safety, accessibility and functionality. This has resulted in a revised design including a modified MOF orientation and longer MOF structure, which will reduce the required length of the dredged access channel. The extension of the MOF structure into deeper water reduces the need for significant drilling and blasting of the MOF access channel and berthing pockets in the near-shore marine area off Town Point. Further explanation of this proposed revision and the results of the geophysical surveys appear in Section 2.4.

1.3.3 Market Demand

The GJVs are nominating a change to the Approved Development scope from two 5 MTPA LNG trains to three 5 MTPA LNG trains with several other associated component changes. By developing three LNG production units in quick succession the Gorgon Gas Development will generate more clean-burning natural gas sooner in a rapidly growing global energy market.

1.3.4 Benefits of the Gorgon Gas Development

The Gorgon Gas Development is officially the largest ever resource development undertaken in Australia.

Extensive economic modelling conducted in 2008 by an independent third party (ACIL Tasman 2008) has confirmed that the Gorgon Gas Development is a mega project expected to create its own economic environment and significant life-of-project local content benefits.

As the Development progresses through construction and operation it has the potential to deliver a significant economic boost, creating thousands of jobs and generating billions of dollars in government revenue for use on roads, schools and hospitals.

Independent economic analysis (ACIL Tasman 2008) indicates that the substantial infrastructure and investment required for the Development may provide a stimulus with the potential to transform Western Australia into a regional and global petroleum service hub. The development of new technologies and skills for the project, such as carbon dioxide injection and subsea developments, may also establish Western Australia as a global centre of excellence in new areas of expertise.

Key economic findings of ACIL Tasman (2008), based on the first 30 year operation of a 15 million tonne per annum, three train development, include:

- ◆ peak construction employment in Western Australia of around 6000 personnel with more than 3500 direct and indirect jobs sustaining throughout the life of the Gorgon Gas Development
- ◆ the Net Present Value of Australia's Gross Domestic Product (GDP) is expected be boosted by A\$64.3 billion
- ◆ around A\$33 billion in today's dollars are expected to flow to locally purchased goods and services (local content)

- ◆ anticipated government revenue of about A\$39.8 billion in today's dollars.

The GJVs are committed to providing full, fair and reasonable opportunity for Australian industry to supply goods and services.

While developments such as the Gorgon Gas Development require large capital expenditure overseas, local content opportunities for local contractors are being identified and Australian industry will have an opportunity to globally showcase its expertise and its competitiveness, in both cost and quality, in the global energy project market.

All opportunities will be posted on the Industry Capability Network of Western Australia's ProjectConnect website at www.projectconnect.com.au.

1.4 Purpose and Scope of this Document

The purpose of this document is to present a description of the principal components of the Revised Proposal; including environmental impact assessment, mitigation and management measures. It is intended for the consideration of stakeholders; the Western Australian Environmental Protection Authority (EPA), the Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA) and the community at the level of PER.

The scope of this PER is to assess the significance of those environmental impacts of the Revised Proposal that are in addition to, different from, or cumulative with the Approved Development, and whether and how these impacts will be avoided (where possible), minimised and managed.

1.5 Western Australian Environmental Impact Assessment Process

The Revised Proposal was referred to the Western Australian EPA under section 38 of the EP Act on 22 February 2008. On 17 March 2008, the EPA assigned the Revised Proposal a PER level of assessment with an eight week public review period.

An Environmental Scoping Document was prepared to seek EPA endorsement regarding the scope of the assessment of the Revised Proposal as well as providing an indicative timeline for the assessment process. The Draft Environmental Scoping Document was submitted to the EPA on 1 May 2008. It included a summary of the potential environmental impacts, their significance and possible management responses, proposed scope of work to obtain information for the PER, key legislation, stakeholder consultation program, project and assessment schedule and study team. The Final Environmental Scoping Document was endorsed by the EPA on 10 July 2008, following EPA review and comment (Chevron Australia 2008b).

The Environmental Scoping Document and PER were prepared in accordance with the Environmental Impact Assessment (Part IV Division 1) Administrative Procedures 2002 (the Administrative Procedures) for environmental assessment prescribed under the EP Act.

This PER was drafted and submitted to the EPA for review to ensure the document addresses all of the environmental factors and studies identified in the Environmental Scoping Document. The EPA Board authorised this PER for release for public review on 8 September 2008.

The PER document has been released for the eight week public review period during which time members of the public may make submissions on the proposal to the EPA. The submissions will be provided to the GJVs, who formally respond to the issues raised in the submissions. The EPA then undertakes assessment of the PER document, submissions and the GJVs' responses to submissions. The EPA will provide an assessment report (report and recommendations published in an EPA Report) to the Minister for the Environment, who will then decide whether or not the Revised Proposal should be implemented and if so, under what conditions.

Figure 1.2 outlines the procedure for a PER level of assessment under the EP Act and EPBC Act.

1.6 Commonwealth Environmental Impact Assessment Process

The Revised Proposal was referred to the Commonwealth Minister for the Environment, Water, Heritage and the Arts, under the EPBC Act, on 21 April 2008. On 23 May 2008, the Department of Environment, Water, Heritage and the Arts (DEWHA) advised that the action was considered to be a 'controlled action' under the EPBC Act due to the potential significant impacts on the following controlling provisions:

- ◆ listed threatened species and communities (sections 18 and 18A)
- ◆ listed migratory species (sections 20 and 20A).

As the Revised Proposal will be assessed by the Western Australian Government at the PER level of assessment, the Western Australian/Commonwealth Assessment Bilateral Agreement will apply to the Revised Proposal. The parallel assessment process is shown in Figure 1.2.

Following receipt of public submissions on the PER (via the process described in Section 1.5), the DEWHA will also undertake an assessment of the PER document, submissions and the GJVs' responses to submissions. The DEWHA will deliver their assessment report to the Federal Minister for the Environment, who will then decide whether or not the Revised Proposal should be implemented and if so, under what conditions.

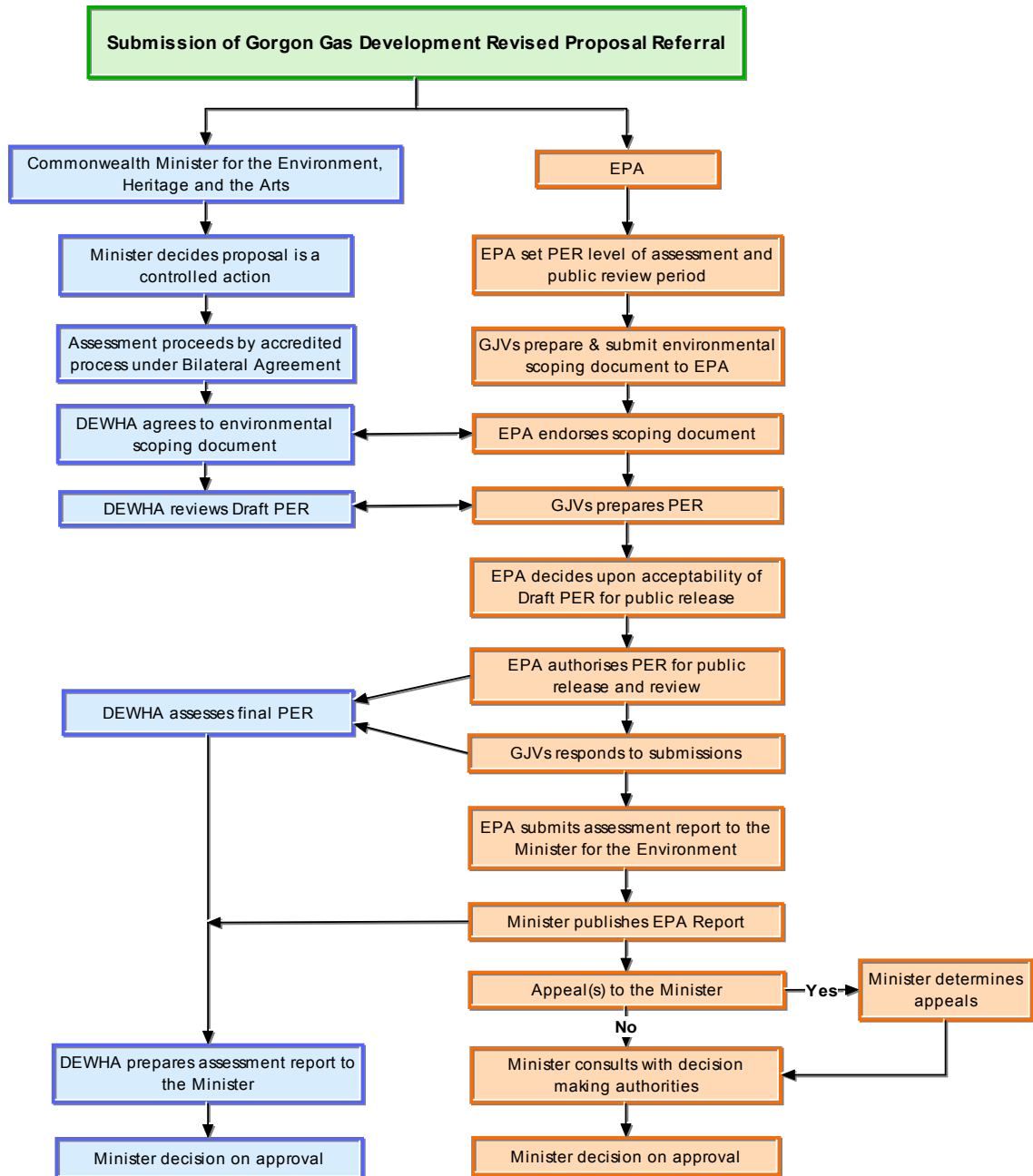


Figure .2: Parallel Processing of EP Act (WA) and EPBC Act (Cth) Approvals Processes for the Gorgon Gas Development Revised Proposal

1.7 Relevant Environmental Legislation and Policy

1.7.1 Commonwealth and Western Australian Legislation

The Revised Proposal must comply with applicable Western Australian and Commonwealth legislation. Current key Western Australian and Commonwealth legislation (with an environmental focus) applicable to the Revised Proposal is outlined in Table 1.1.

Table 1.1: Key Commonwealth and Western Australian Legislation Relevant to the Revised Proposal

Western Australian	Commonwealth
<i>Aboriginal Heritage Act 1972 (WA)</i>	<i>Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (Cth)</i>
<i>Agricultural and Related Resources Protection Act 1976 (WA)</i>	<i>Australian Maritime Safety Authority Act 1990 (Cth)</i>
<i>Barrow Island Act 2003 (WA)</i>	<i>Energy Efficiency Opportunities Act 2006 (Cth)</i>
<i>Conservation and Land Management Act 1984 (WA)</i>	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i>
<i>Dangerous Goods and Safety Act 2004 (WA)</i>	<i>Environment Protection (Sea Dumping) Act 1981 (Cth)</i>
<i>Environmental Protection Act 1986 (WA)</i>	<i>Historic Shipwrecks Act 1976 (Cth)</i>
<i>Fish Resources Management Act 1994 (WA)</i>	<i>Native Title Act 1993 (Cth)</i>
<i>Heritage of Western Australia Act 1990 (WA)</i>	<i>National Greenhouse and Energy Reporting Act 2007 (Cth)</i>
<i>Jetties Act 1926 (WA)</i>	<i>Navigation Act 1912 (Cth)</i>
<i>Land Administration Act 1997 (WA)</i>	<i>Offshore Petroleum Act 2006 (Cth)</i>
<i>Local Government Act 1995 (WA)</i>	<i>Protection of the Sea (Prevention of Pollution from Ships) Act 1983 (Cth)</i>
<i>Marine and Harbours Act 1981 (WA)</i>	<i>Sea Installations Act 1987 (Cth)</i>
<i>Occupational Safety and Health Act 1984 (WA)</i>	
<i>Petroleum Act 1967 (WA)</i>	
<i>Petroleum Pipeline Act 1969 (WA)</i>	
<i>Petroleum Safety Act 2004 (WA)</i>	
<i>Petroleum (Submerged Lands) Act 1982 (WA)</i>	
<i>Planning and Development Act 2005 (WA)</i>	
<i>Pollution of Waters by Oils and Noxious Substances Act 1987 (WA)</i>	
<i>Shipping and Pilotage Act 1967 (WA)</i>	
<i>Soil and Land Conservation Act 1945 (WA)</i>	
<i>Wildlife Conservation Act 1950 (WA)</i>	

1.7.2 Barrow Island Act (WA)

In-principle support for the Gorgon Gas Development was granted by the Western Australian Government in August 2003. This in-principle support is expressed in the Gorgon Gas Processing and Infrastructure Project Agreement and its ratifying Act, the *Barrow Island Act 2003 (WA)*, which was promulgated on 20 November 2003. The *Barrow Island Act 2003 (WA)* sets out the rights and obligations of both the GJVs and the Western Australian Government in regard to the Gorgon Gas Development. In particular, it:

- ◆ provides a mechanism by which the Western Australian Government may authorise the implementation of the Gorgon Gas Development

- ◆ makes provision for land on Barrow Island to be used for gas processing project purposes
- ◆ makes provision for underground disposal of reservoir CO₂
- ◆ has regard for the need to minimise environmental disturbance on Barrow Island and provide support for conservation programs.

1.7.3 Environmental Protection Act (WA)

The Revised Proposal will be assessed under Part IV of the EP Act (Section 1.5). In addition, Part V of the EP Act provides that Works Approvals and Environmental Licences are required for various listed prescribed premises. No such approvals have yet been sought for the Approved Development.

A Works Approval is required for the construction of some elements of the Approved Development, and there will be no change to this requirement for the Revised Proposal. A Licence will also be required for the operation of some elements of the Approved Development, and there will be no change to this requirement for the Revised Proposal.

1.7.4 Other Applicable Environmental Management Instruments

A number of environmental management instruments are applicable to the Revised Proposal, including:

International

- ◆ China Australia Migratory Birds Agreement (CAMBA 1988)
- ◆ Convention on Biological Diversity (Secretariat of the Convention on Biological Diversity 1992)
- ◆ Convention on the Conservation of Migratory Species of Wild Animals (Secretariat of the Convention for the Conservation of Migratory Species of Wild Animals 1979)
- ◆ Convention on Wetlands of International Importance (RAMSAR 1971)
- ◆ International Convention for the Prevention of Pollution from Ships 1973, as modified by the protocol of 1978 (MARPOL 73/78) (International Maritime Organization 1973)
- ◆ Japan Australia Migratory Birds Agreement (JAMBA 1974)
- ◆ Republic of Korea Australia Migratory Birds Agreement (ROKAMBA 2006)
- ◆ United Nations Framework Convention on Climate Change (United Nations 1992) and Kyoto Protocol (United Nations 1997)

Commonwealth

- ◆ Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ 2000)
- ◆ National Strategy for Ecologically Sustainable Development (Commonwealth Government of Australia 1992a)
- ◆ National Water Quality Management Strategy (COAG 1994)
- ◆ Intergovernmental Agreement on the Environment (Commonwealth Government of Australia 1992b)
- ◆ National Strategy for Conservation of Australia's Biological Diversity (Commonwealth Government of Australia 1996)

State (Western Australia)

- ◆ Barrow Island Interim Environmental Quality Criteria (Department of Environment and Conservation 2007)
- ◆ Department of Environment and Conservation (DEC) Guidelines for Air Quality Modelling (Department of Environment 2006)
- ◆ Indicative Management Plan for the Proposed Montebello/Barrow Islands Marine Conservation Reserves (Department of Conservation and Land Management 2004)
- ◆ Environmental Weed Strategy for Western Australia (Department of Conservation and Land Management 1999)
- ◆ DEC Guidelines for Ambient Air Quality (Department of Environment 2004)
- ◆ Premier's Climate Change Action Statement, "Climate Change: Making Decisions for the Future" (Government of Western Australia 2007)
- ◆ State Water Quality Management Strategy (Document No. 6) (Government of Western Australia 2004)
- ◆ Western Australia State Sustainability Strategy (Government of Western Australia 2003)
- ◆ Western Australia Greenhouse Strategy (Western Australian Greenhouse Task Force 2004)
- ◆ Western Australian Planning Policy No. 2.6. – State Coastal Planning (Western Australian Planning Commission 2003)
- ◆ State Conservation Strategy (1987)

A number of EPA Guidance and Position Statements are also relevant to the Revised Proposal. These are listed and described in the relevant environmental factor sections of this PER (Section 6.0 through Section 12.0). Key environmental and sustainability principles have also been incorporated in the Revised Proposal, and are discussed in detail in Section 14.3 and Section 14.4 respectively.