NOPSEMA

National Offshore Petroleum Safety and Environmental Management Authority

Christine McDonald
Secretary
Environment and Communications References Committee
PO Box 6100
Parliament House
Canberra ACT 2600

Dear Secretary

Re: Submission by NOPSEMA to the inquiry into the potential, social and economic impacts of BP's planned exploratory oil drilling, and any future oil or gas production in the Great Australian Bight

Thank you for your invitation to provide a submission on behalf of NOPSEMA to the inquiry on offshore oil and gas exploration and drilling in the Great Australian Bight, a matter of significant interest to a broad cross section of the community.

The inquiry presents an important opportunity for community concerns around offshore oil and gas exploration and production to be addressed, with relevant technical and scientific information provided to demonstrate the rigorous, independent regulatory framework applied by NOPSEMA.

Please find attached the NOPSEMA submission and I look forward to providing additional information at the inquiry's hearings, should NOPSEMA be called.

Yours sincerely

Stuart Smith
Chief Executive Officer

31 March 2016

Level 8 Alluvion, 58 Mounts Bay Road, Perth WA 6000
GPO Box 2568, Perth WA 6001 Australia
t 08 6188 8700 f 08 6188 8737

ABN: 22 385 178 289

nopsema.gov.au

NOPSEMA

Submission

March 2016

Environment and Communications References Committee

Inquiry into the potential environmental, social and economic impacts of BP's planned exploratory oil drilling project, and any future oil or gas production in the Great Australian Bight

Submission from the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA)

NOPSEMA

Introduction and structure of submission

This submission to the Senate Environment and Communications References Committee has been prepared by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) in response to an invitation from Committee Secretary Ms Christine McDonald.

The submission is structured to provide information about the role, history and functions of NOPSEMA to support the subsequent specific responses to the Terms of Reference provided by the Committee.

Information contained in sections 1-8 provides important context to NOPSEMA's response to the Terms of Reference. Attachments have been included where relevant to provide further information for the Committee.

Any questions from the Committee regarding the submission or any other matters should be directed to:

Mr Nicholas Page

Manager – Legislative Change, Communications and Stakeholder Relations

Email – communications@nopsema.gov.au

NOPSEMA

Table of contents

NOPSEMA

1. Executive summary

1. The National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) is the national regulator for health and safety, well integrity and environmental management for offshore oil and gas activities in Commonwealth waters and in coastal waters where regulatory powers and functions have been conferred.

2. NOPSEMA is an independent statutory authority established under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGS Act).

3. NOPSEMA's vision is for safe and environmentally responsible Australian offshore petroleum and greenhouse gas storage industries.

4. NOPSEMA's mission is to independently and professionally regulate offshore safety, integrity and environmental management.

5. As the independent regulator of the offshore oil and gas industry, NOPSEMA is not involved in Government policy decisions pertaining to whether fossil fuels should be exploited, the selection or release of areas for petroleum exploration and development or in the granting of petroleum titles.

6. NOPSEMA makes merits based decisions on specific activities and their potential interactions with the environment in which they are proposed to occur. Decisions focus exclusively on the technical and scientific merits of risk management plans and are independent of economic, commercial and political factors.

7. NOPSEMA applies thorough and consistent processes in undertaking all of its statutory functions in accordance with legislative requirements and published policies. A simplified overview of NOPSEMA's regulatory process is provided at Attachment 1.

8. Offshore oil and gas is a major hazard and technically complex industry, the regulation of which requires specialist knowledge and expertise.

9. In order to ensure that its decisions are well informed and scientifically robust, NOPSEMA maintains a core staff of highly trained and qualified technical experts with extensive experience in offshore oil and gas risk management and environmental science.

10. Where considered appropriate to inform its decision making, NOPSEMA can access expertise from a range of external sources such as other international, federal and state government agencies or private sector entities which have roles and interests in areas including oil spill response, petroleum activity regulation, environmental protection and management, fisheries management and scientific research.

11. Where NOPSEMA determines a breach of the legislation has occurred, it may take enforcement action including issuing improvement and prohibition notices, giving directions, requesting a revision or withdrawing acceptance of a risk management plan and/or prosecution.

12. NOPSEMA is subject to statutory independent reviews, two of which were completed in 2015. These reviews found NOPSEMA to be a robust, rigorous and competent regulator.

13. NOPSEMA is currently assessing an environment plan (EP) for exploration drilling in the Great Australian Bight submitted by BP Developments Australia Pty Ltd. A final decision to accept or refuse to accept the EP is yet to be made.

14. NOPSEMA does not provide specific comment on the merits of regulatory submissions that are under assessment as any comment may be perceived to bias NOPSEMA's fair and impartial assessment of the submission in question. This position is in accordance with the Australian Administrative Law Policy Guide and NOPSEMA's published policies.

2. History of NOPSEMA

15. In 1999, the Commonwealth commissioned a review into the adequacy of offshore safety regulation in Australia[1]. At the time, the states and Northern Territory carried out day-to-day offshore safety regulation in Commonwealth waters. The review recommended the establishment of a national petroleum safety regulatory authority. This recommendation was accepted by federal, state and Northern Territory ministers.

16. In 2005, the Commonwealth established the National Offshore Petroleum Safety Authority (NOPSA) to regulate the health and safety of workers on offshore facilities.

17. NOPSA was established as an independent, cost recovered statutory authority. This framework provided the authority the ability to attract and retain highly skilled and experienced technical specialists from an international recruitment pool.

18. In 2009, prior to NOPSEMA becoming the regulator for well integrity and environmental management, an incident occurred at the PTTEP Australasia (Ashmore Cartier) Pty Ltd operated Montara H1 well in the Timor Sea. The incident led to an oil spill and gas leak that lasted 74 days.

19. In 2010, the BP Macondo incident in the Gulf of Mexico claimed 11 lives and led to an oil spill that lasted 87 days.

20. Both incidents drew intense media and public scrutiny and sparked moves for further regulatory reform in Australia and internationally with respect to offshore petroleum.

21. The findings of the Commission of Inquiry into the Montara incident found a series of failures had led to the spill incident. These failures were predominantly attributed to the operator, however the inquiry also found that;

    - the existing legislative regime is largely sufficient to allow effective monitoring and enforcement by regulators of offshore petroleum-related operations – the inadequacies identified by the Inquiry relate primarily to the implementation of this legislation; and
    - a single, independent body should be created and be made responsible for regulating the health and safety, well integrity and environmental management aspects of offshore petroleum operations[2].

22. In April 2011, the Commonwealth extended NOPSA's remit to include the regulation of well integrity. Shortly thereafter, on 1 January 2012, responsibility for regulating offshore environmental management was added to NOPSA's existing functions and the organisation was renamed NOPSEMA.

23. The independent, cost recovered framework has remained in place at NOPSEMA which has allowed the authority to continue to attract and retain highly skilled specialist staff.

24. For example NOPSEMA's Environment Division is staffed by 28 highly trained and qualified technical experts with extensive experience in offshore oil and gas and environmental sciences (8 staff hold PHDs and 14 staff hold Masters' degrees).

25. NOPSEMA has systems in place to ensure that regulatory staff obtain and maintain relevant competencies and that these competencies are demonstrated prior to staff undertaking lead regulatory roles.

26. In February 2014, NOPSEMA became the sole Commonwealth environmental management regulator for offshore oil and gas when the Commonwealth Minister for the Environment endorsed NOPSEMA's environmental management authorisation process under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

---

[1] Report - *Australian Offshore Petroleum Safety Case Review: Future Arrangements For The Regulation Of Offshore Petroleum Safety* - Department of Industry, Science and Resources
http://www.nopsema.gov.au/assets/document/Future-Arrangements-for-regulating-Offshore-Petroleum-Safety.pdf

[2] *Report of the Montara Commission of Inquiry* – June 2010

3. Jurisdiction

27. NOPSEMA regulates all petroleum operations in Commonwealth waters, which comprise those areas beyond three nautical miles from the territorial sea baseline[3].

28. NOPSEMA regulates petroleum operations in coastal waters where a state or territory has conferred regulatory powers and functions on NOPSEMA. As of March 2016, Victoria has conferred powers and functions for the regulation of health and safety and well integrity to NOPSEMA.

4. Governance

29. NOPSEMA's regulation of the offshore petroleum industry is subject to governance controls including parliamentary scrutiny, ministerial policy direction and independent statutory reviews established under the OPGGS Act.

30. NOPSEMA has been subject to an independent operational review of its regulatory performance every three years. It has also been subject to a review of its environmental management performance under the endorsed EPBC Act Program after the first 12 months of operating under this arrangement. Both reviews were most recently completed in 2015 and the reports from these reviews are public documents.

31. The 2015 statutory operational review of NOPSEMA's performance concluded that NOPSEMA is an effective regulator that has made positive contributions to improving safety and well integrity, and managing Australia's offshore environment.

32. Appointed by the responsible Commonwealth Minister, NOPSEMA's Chief Executive Officer (CEO) has overall responsibility for the management of NOPSEMA. The CEO has all the powers and functions that the OPGGS Act and associated regulations assign to NOPSEMA.

33. The NOPSEMA Board is appointed by the responsible Commonwealth Minister and provides independent advice to the NOPSEMA CEO, together with responsible Commonwealth, state and Northern Territory ministers.

34. The responsible Commonwealth Minister, after consultation with each relevant state or Territory minister, may issue policy principles to NOPSEMA that NOPSEMA must comply with. These policy principles direct the manner in which NOPSEMA fulfils its responsibilities.

35. NOPSEMA reports, as appropriate, to the responsible Commonwealth Minister, the Commonwealth Minister for the Environment and each relevant state or territory minister on major investigations.

36. NOPSEMA reports to the Commonwealth Minister for the Environment on its environmental management performance in accordance with administrative arrangements under the endorsed EPBC Act Program (see Section 7).

[3] Note: The territorial sea baseline varies depending upon the shape of the coastline in any given locality. See http://www.ga.gov.au/scientific-topics/marine/jurisdiction/maritime-boundary-definitions for a comprehensive description and maps.

5. Legislated functions

37. NOPSEMA's legislated functions are specified in Section 646 of the Offshore Petroleum and Greenhouse Gas Storage Act 2006 (OPGGS Act), and can be summarised as follows:

- to promote the occupational health and safety of persons engaged in offshore petroleum operations or offshore greenhouse gas storage operations;
- to develop and implement effective monitoring and enforcement strategies to secure compliance under the OPGGS Act and regulations;
- to investigate accidents, occurrences and circumstances that affect occupational health and safety or that relate to deficiencies in environmental management or the structural integrity of facilities, wells and well-related equipment;
- to advise on matters relating to offshore health and safety, environmental management and the structural integrity of facilities, wells and well-related equipment;
- to make reports on investigations to the responsible Commonwealth minister and each responsible state/Northern Territory minister;
- to provide information, assessments, analysis, reports, advice and recommendations on request to the responsible Commonwealth minister;
- to cooperate with other Commonwealth and state/Northern Territory agencies or authorities having functions relating to regulated operations.

38. NOPSEMA administers aspects of the following legislation as they relate to its functions:

- *Offshore Petroleum and Greenhouse Gas Storage Act 2006*
- Offshore Petroleum and Greenhouse Gas Storage (Safety) Regulations 2009
- Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009
- Offshore Petroleum and Greenhouse Gas Storage (Resource Management and Administration) Regulations 2011
- *Offshore Petroleum and Greenhouse Gas Storage (Regulatory Levies) Act 2003*
- Offshore Petroleum and Greenhouse Gas Storage (Regulatory Levies) Regulations 2004

39. In delivering its legislated functions NOPSEMA ensures that all decisions and actions taken by the authority are independent of economic, commercial and political influence.

40. The Organisation for Economic Co-operation and Development (OECD) recognises that;

> *"Establishing a regulator with a degree of independence (both from those it regulates and from government) can provide greater confidence and trust that regulatory decisions are made with integrity. A high level of integrity improves outcomes of the regulatory decisions. Regulators should have provisions for preventing undue influence of their regulatory decision-making powers and maintaining trust in their competence and delivery[4]"*

41. To fulfil its legislated functions NOPSEMA undertakes assessment, inspection, investigation, enforcement, promotion and advisory activities.

42. In alignment with the terms of reference for the inquiry the remainder of this submission focusses on NOPSEMA's environmental management functions and processes.

[4] OECD (2014) *The Governance of Regulators, OECD Best Practice Principles for Regulatory Policy*.

6. Environmental management under the OPGGS Act

43. The OPGGS Act requires that an activity in an offshore area under a permit, lease, authority or consent must be undertaken in a manner that does not interfere with:

- navigation;
- fishing;
- conservation of the resources of the sea and seabed;
- any activities of another person being lawfully carried on by way of:
  - exploration for, recovery of or conveyance of a mineral;
  - construction or operation of a pipeline;
  - the enjoyment of native title rights and interests.

44. The OPGGS Act requires operations to be carried out in accordance with good oilfield practice (all those things that are generally accepted as good and safe in carrying out of exploration for petroleum and petroleum recovery operations) and includes specific provisions addressing the prevention of the escape of petroleum.

45. The OPGGS Act requires titleholders, in the event of an escape of petroleum to eliminate or control the escape, clean up the escaped petroleum, remediate any resulting damage to the environment, and carry out environmental monitoring of the impact of the escape on the environment.

46. If the titleholder fails to do any of these things, NOPSEMA or the responsible Commonwealth Minister may do them instead. The titleholder must reimburse NOPSEMA or the Commonwealth for the costs and expenses of any such action (the Polluter Pays Principle).

47. The OPGGS Act provides for NOPSEMA (or the responsible Commonwealth Minister) to give written directions to titleholders covering all aspects of petroleum exploration and production including compliance with regulations made under the OPGGS Act.

48. The OPGGS Act further provides for NOPSEMA to give remedial directions to current or former titleholders with regard to the restoration of the environment, the removal of property, plugging or closing off of wells, conservation and protection of natural resources, and the making good of damage to the seabed or subsoil.

49. The OPGGS Act provides for the making of regulations relevant to the environmental management of offshore oil and gas operations.

50. The Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (Environment Regulations) in combination with the environmental management requirements of the OPGGS Act detailed above provide the legislative framework for management of environmental impacts and risks arising from offshore oil and gas operations.

6.1 Regulatory approach – Objective based regulation

51. The OPGGS Act and Environment Regulations establish an objective based environmental management regime that is administered by NOPSEMA.

52. The Environment Regulations require titleholders to establish environmental performance outcomes and environmental performance standards specific to their activity that meet the objective of the Environment Regulations and that must be accepted as being appropriate by NOPSEMA.

53. Titleholders are then required to demonstrate how these outcomes and standards will be met through the application of control measures that are best suited to the particular circumstances of their activity.

54. The OPGGS objective based environmental management regime:

- establishes a framework based on specified objectives and requires titleholders to demonstrate how they will achieve those objectives
- ensures that those who create risk are responsible for identifying and managing that risk
- is adaptable, flexible and scalable to the particular circumstances of individual petroleum activities and the environments in which they take place
- provides the opportunity for the offshore oil and gas industry to adopt advances in technology and apply control measures that are best suited to the individual circumstances of the activity
- encourages adoption of best practice environmental management systems and continuous improvement in all aspects of a titleholder's environmental performance
- is recognised as international regulatory best practice for major hazard industries such as offshore oil and gas and the nuclear industry.

55. The objective based approach to regulation is supported internationally by regulatory authorities, risk management professionals and academics as being the most appropriate regulatory framework for major hazard industries. For example, Hopkins[5] describes the four basic features of a successful regulatory regime for oil and gas as being;

- a risk management framework;
- a requirement to “make a case” to the regulator;
- a competent and independent regulator; and
- a general duty of care being placed on the operator (in this case the titleholder).

The regulatory regime under which NOPSEMA operates provides all of these features.

56. The Western Australian Parliamentary Inquiry into safety-related matters relating to FLNG projects off the WA coast found the independent objective based regulatory regime administered by NOPSEMA to be world’s best practice.

[5] Hopkins, Andrew (2012) “*Disastrous Decisions, The Human and Organisational Causes of the Gulf of Mexico Blowout*”

6.2 Overview of how NOPSEMA fulfils its environmental management functions

57. NOPSEMA delivers its environmental management functions through five core regulatory activities which are interlinked and provide an integrated and comprehensive regulatory framework.

58. Put simply, NOPSEMA;

- assesses how a titleholder proposes to manage the environmental impacts and risks of their activity and determines whether the proposal is appropriate;
- inspects the titleholder to determine whether the activity is being managed in accordance with the accepted proposal and other legislative requirements;
- investigates where an incident occurs or where a potential non-compliance with the legislation is suspected;
- takes enforcement action where this is required to rectify non-compliance or to ensure that non-compliance does not reoccur; and
- provides advice to the industry on learnings from assessments, inspections, investigations and enforcements and promotes good environmental management practice.

59. Further information on each of these functions is provided below.

Assessment

60. The Environment Regulations stipulate the detailed requirements for the environmental management of all offshore petroleum activities in Commonwealth waters.

61. The objective of the Environment Regulations is to ensure titleholders carry out activities in a manner;

- consistent with the principles of ecologically sustainable development; and
- by which the environmental impacts and risks of the activity will be reduced to as low as reasonably practicable and to an acceptable level.

62. Each submission that NOPSEMA assesses is specific to the activity or project to which it relates. This ensures that impacts and risks are identified and managed on a case by case basis in the context of the individual activity and the environment in which it is proposed to occur.

63. Further detailed information on the offshore petroleum environmental approvals process is provided in section 6.3 below.

Inspection

64. NOPSEMA conducts inspections to monitor compliance with the law including ongoing implementation and compliance with accepted risk management plans including environment plans (EPs).

65. NOPSEMA undertakes approximately 60 environmental management inspections per year which focus on specific aspects of titleholders' environmental impact and risk management.

66. Inspections are scoped and scheduled using a risk-based methodology that considers relevant risk factors, previous performance and compliance history, current industry incident trends, and responses to recommendations from any previous inspections.

67. Upon completion of an inspection, NOPSEMA provides a detailed report of inspection findings, conclusions and any recommendations for improvement to the titleholder. NOPSEMA may also request a titleholder to provide proposed actions to be taken with respect to the conclusions and recommendations arising from an inspection.

68. Where an inspection finds non-compliance (actual or potential) with legislative requirements including the accepted EP, NOPSEMA may take enforcement action.

Investigation

69. NOPSEMA may commence an investigation where it suspects or becomes aware of a potential non-compliance with the legislation.

70. Investigations are conducted to seek information that may then be utilised as a basis for enforcement, prosecution and/or advice and promotion purposes.

71. Major investigations are led by an independent specialist team of experienced investigators supported by subject matter experts from within NOPSEMA where required.

72. NOPSEMA shares lessons learnt from the investigation of incidents with the industry where these learnings will contribute to continuous improvement in risk management performance.

Enforcement

73. Where NOPSEMA determines a breach of the legislation has occurred, it may take enforcement action requiring the titleholder to rectify the breach, take steps to prevent a recurrence and act as a deterrent to future non-compliance.

74. Enforcement options under the legislation include issuing improvement and prohibition notices, giving directions, requesting a revision or withdrawing acceptance of an EP and/or prosecution.

Promotion and advice

75. With the overall objective of improving industry performance, NOPSEMA has a function to promote and advise on environmental management matters.

76. NOPSEMA proactively seeks to engage with stakeholders through liaison meetings, hosting workshops and information sessions, presentations and participating in industry conferences and forums.

77. NOPSEMA also publishes on its website a suite of industry performance data, policy and guidance material, latest news, reports and a quarterly newsletter[6].

[6] http://www.nopsema.gov.au/resources/

6.3 The Offshore Petroleum Environmental Approvals Process

78. The Environment Regulations establish a two stage environmental approvals process. The type of activity proposed determines whether approval under one or both of these processes will be required. For further information see Attachment 1 to this submission – Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009.

79. For offshore development activities (construction, installation and operation of production facilities etc.) an Offshore Project Proposal must be accepted by NOPSEMA prior to the submission of any related EPs.

80. Offshore Project Proposals are subject to a mandatory public comment period of at least four weeks.

81. The Environment Regulations require titleholders to demonstrate to NOPSEMA that all comments received through the public comment process have been adequately addressed through provision of;

- a summary of all comments received;
- an assessment of the merits of each objection or claim about the project or an activity that is part of the project; and
- a statement of the proponents response or proposed response to each objection or claim, including a demonstration of the changes, if any, that have been made to the proposal as a result of an objection or claim.

82. The Environment Regulations require the publication of the final accepted Offshore Project Proposal.

83. An accepted Offshore Project Proposal does not authorise any activities to proceed. Individual activities that make up an offshore project must also have an environment plan (EP) accepted.

84. For all offshore petroleum activities, titleholders are required to submit an EP to NOPSEMA. It is an offence to undertake an offshore petroleum activity without an accepted EP for that activity.

85. NOPSEMA prepares and regularly updates published guidance for titleholders on how to meet the requirements of the Environment Regulations when preparing an EP. For further information see Attachment 2 to this submission – Guidance Note: Environment Plan Content Requirements.

86. Under regulation 10A of the Environment Regulations there are eight acceptance criteria that NOPSEMA must assess each EP against. These criteria are that the EP:

- is appropriate for the nature and scale of the activity;
- demonstrates that the environmental impacts and risks of the activity will be reduced to as low as reasonably practicable;
- demonstrates that the environmental impacts and risks of the activity will be of an acceptable level;
- provides for appropriate environmental performance outcomes, environmental performance standards and measurement criteria;
- includes an appropriate implementation strategy;
- does not occur in a World Heritage Property (with the exception of environmental monitoring or responding to an emergency);
- demonstrates that appropriate consultation has been, and will continue to be, undertaken; and
- complies with the OPGGS Act and its associated regulations.

87. Inherent within the acceptance criteria and explicit in the Environment Regulations is the requirement for titleholders to address (and for NOPSEMA to assess) impacts and risks to matters protected under Part 3 of the EPBC Act.

88. During an assessment, NOPSEMA will have regard to:

- the compliance record of the titleholder, where it relates to matters considered in the EP;
- relevant information, including correspondence from external stakeholders;

- the Department of the Environment policies, guidelines, plans of management and any other material relating to matters protected under Part 3 of the EPBC Act relevant to the activity; and
- reputable, publicly available scientific and other literature relevant to the assessment.

89. All EPs must demonstrate that appropriate consultation with relevant state, territory and Commonwealth agencies and persons or organisations whose functions, interests or activities could be affected by the proposed activity has been undertaken by the titleholder.

90. This demonstration must include;

- provision of a report on consultation between the titleholder and relevant persons;
- an assessment of the merits of any objection or claim about the adverse impact of each activity to which the EP relates;
- a statement of the titleholders response or proposed response to each objection and claim; and
- a copy of the full text of any response by a relevant person.

91. The EP must also include provisions for ongoing consultation with affected persons.

92. NOPSEMA policies and processes ensure that dedicated assessment teams comprising highly qualified and experienced technical experts are assigned to assess each EP in line with their area of expertise.

93. NOPSEMA undertakes a general assessment of the whole EP in all cases. In addition, subject matter experts are assigned to undertake more detailed technical assessments which focus on the highest risk aspects of the activity.

94. NOPSEMA will only accept an EP once it has determined the plan meets all the requirements of the Environment Regulations.

95. An accepted EP establishes the legally binding environmental management conditions that must be met by the titleholder and against which NOPSEMA can secure compliance.

96. Failure to comply with an accepted EP is an offence, and is a ground upon which NOPSEMA can withdraw its acceptance of an EP.

97. As an independent statutory authority, NOPSEMA makes assessment decisions based only on the requirements of the Environment Regulations and the scientific and technical merits of proposed impact and risk management measures.

98. With the exception of potential impacts and risks to socioeconomic aspects of the receiving environment, NOPSEMA does not consider economic, commercial or political factors in its decision making processes.

99. Unless a titleholder withdraws an EP from the assessment process, NOPSEMA is required by law to make a decision to either accept or refuse to accept an EP.

100. In the event that NOPSEMA is not satisfied that an EP meets the requirements of the regulations on first submission NOPSEMA must provide the titleholder with a reasonable opportunity to modify the proposed environmental management of the activity and resubmit the EP.

101. NOPSEMA provides detailed feedback to the titleholder where a submission fails to meet regulatory requirements.

102. NOPSEMA's assessment process is iterative and more than 90% of EPs have at least one interim decision made before a final decision to accept or refuse to accept the EP is made. Interim decisions can include a request by NOPSEMA for further written information or, as mentioned above, provision of an opportunity for the titleholder to modify and resubmit the EP.

NOPSEMA

7. Streamlining under the Environment Protection and Biodiversity Conservation Act 1999

103. In February 2014, the Commonwealth Minister for the Environment endorsed NOPSEMA's environmental authorisation process[7] (the Program) as being appropriate to ensure that offshore oil and gas activities do not have unacceptable impacts on matters protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). For further information see Attachment 3 to this submission – the Program Report.

104. The effect of this endorsement is to make NOPSEMA the sole environment regulator for oil and gas activities in Commonwealth waters (i.e. activities assessed and approved by NOPSEMA no longer require separate assessment and approval under the EPBC Act through the Commonwealth Department of the Environment).

105. NOPSEMA's assessment process explicitly takes into consideration potential impacts on the following matters protected under Part 3 of the EPBC Act:

- world heritage properties;
- national heritage places;
- wetlands of international importance;
- listed threatened species and ecological communities;
- listed migratory species; and
- the Commonwealth marine area.

106. The streamlining of environmental approvals processes reduces duplication in environmental regulation whilst ensuring that strong environmental safeguards are maintained.

107. NOPSEMA and the Department of the Environment continue to operate under agreed administrative arrangements for the transfer of relevant information in relation to matters protected under the EPBC Act and the general administration of the Program. This includes periodic review of NOPSEMA's implementation of the Program.

108. In 2015, following the first 12 months of the Program coming into effect, NOPSEMA was subject to an independent review. The review examined the performance of NOPSEMA's environmental authorisation process in ensuring that impacts on matters protected under Part 3 of the EPBC Act are acceptable.

109. The review found NOPSEMA is delivering the levels of environmental protection required under the EPBC Act, and processes and procedures are in place to continue to do so in the future.

110. On 4 September 2015, the Minister for the Environment's delegate within the Department of the Environment endorsed the EPBC Act Streamlining Review Report.

111. Although no formal recommendations were made in the report, the review identified a range of opportunities for improvement focussed predominantly on communication and information sharing between NOPSEMA and the Department of the Environment. NOPSEMA has accepted and has implemented or is implementing a number of measures to facilitate continuous improvement in its administration of the Program.

112. The environmental assessment and approval processes of NOPSEMA and the Department of the Environment contain the same essential elements. The main difference is that the Environment Regulations administered by NOPSEMA require evaluation of all environmental impacts and risks (including those to matters protected under the EPBC Act) and identification of appropriate control measures to manage and monitor those impacts and risks to be included in a consolidated package in

[7] Note: NOPSEMA's environmental authorisation process covers all aspects of NOPSEMA's environmental management regulatory functions from assessment and approval through to compliance monitoring, investigation and enforcement

an EP. The process administered by the Department of the Environment is restricted to the evaluation of impacts and risks only to matters protected under the EPBC Act in the first assessment phase prior to initial approval being granted. Detailed analysis and identification of control measures are then addressed separately in action management plans post approval to meet conditions set at the time of approval.

113. NOPSEMA's assessment and approval process delivers equivalent consultation outcomes to the process provided for under the EPBC Act with persons who may be affected by an activity.

114. Offshore development activities require an Offshore Project Proposal to be accepted which includes a mandatory public comment period.

115. While preparing an EP, titleholders must consult directly with relevant state, territory and Commonwealth agencies as well as any other person whose functions, interests or activities may be affected by the activities of the titleholder.

116. NOPSEMA's assessment takes into consideration the objections and claims of affected stakeholders. Any relevant objections or claims must be addressed by the titleholder through the EP before NOPSEMA is able to accept the plan.

117. NOPSEMA publishes on its website details regarding the status of an EP assessment and its assessment decisions; this includes submission information, notification of acceptance and the publication of an EP summary. A search tool and subscription service is available to ensure subscribers and other members of the public can be informed of updates.

118. NOPSEMA's staff includes former Department of the Environment employees, regulatory experts and other Australian and international technical scientific experts with extensive knowledge of the OPGGS Act and the EPBC Act regimes to ensure it has the capacity to implement the necessary environmental safeguards.

119. Where considered appropriate to inform its decision making, NOPSEMA can access additional expertise from a range of external sources such as other international, federal and state government agencies or private sector entities which have roles and interests in areas including oil spill response, oil and gas regulation, environmental protection and management, fisheries management and scientific research.

NOPSEMA

8. Offshore oil and gas activities since establishment of NOPSEMA

120. Since NOPSEMA's establishment, it has assessed over 330 EPs for a range of offshore oil and gas activities in offshore waters adjacent to the majority of Australian states and the Northern Territory.

121. Many of the oil and gas activities regulated by NOPSEMA occur in areas utilised by other industries including fisheries, shipping, tourism operations and areas used for recreation. These activities occur in a range of oceanographic and climatic conditions and involve the exploration for and recovery of a range of hydrocarbons from gas through to heavy oils.

122. Several major oil and gas developments are currently in operation in a safe and environmentally responsible manner in environmentally sensitive areas including the Bass Strait and in close proximity to the World Heritage Listed Ningaloo Marine Park.

123. While these developments were approved by the Commonwealth Minister for the Environment prior to streamlining under the EPBC Act, NOPSEMA continues to monitor compliance for these activities to determine whether they are being operated and managed in a way that continuously identifies and reduces environmental impacts and risks to ALARP and acceptable levels.

8.1 Activities the Great Australian Bight

124. Since its establishment, NOPSEMA has accepted five EPs for activities in the Great Australian Bight. These activities comprised four EPs for seismic surveys and one for a site investigation survey.

125. NOPSEMA is aware that there are currently 10 petroleum exploration permits located in the Great Australian Bight, all of which have been granted since 2010. An exploration permit provides the titleholder with the exclusive right to explore within the title area only once environmental approvals have also been gained.

126. NOPSEMA has no role in the selection or release of areas for exploration or in the granting of petroleum titles.

127. On 1 October 2015, NOPSEMA received an EP from BP Developments Australia Pty Ltd (BP) proposing exploration drilling within the permits which it operates with its joint venture partner Statoil Australia Theta B.V. The proposed drilling area has water depths ranging between 1,000 and 2,500 m. At the closest point to the coast, the drilling area is located approximately 395 km west of Port Lincoln and 340 km southwest of Ceduna in South Australia.

128. On 16 November 2015 NOPSEMA notified BP that it was not satisfied that the EP met all of the acceptance criteria of the Environment Regulations and provided BP an opportunity to modify and resubmit the EP.

129. On 15 March 2016 BP resubmitted its modified EP to NOPSEMA.

130. At the time of providing this submission, NOPSEMA is assessing the EP against the requirements of the Environment Regulations.

131. In accordance with the Australian Administrative Law Policy Guide and NOPSEMA's published policies, NOPSEMA does not provide specific comment on the merits of regulatory submissions that are under assessment as any comment may be perceived to bias NOPSEMA's fair and impartial assessment of the submission in question.

9. Addressing the Terms of Reference

9.1 Preface

132. In responding to the specific terms of reference for this inquiry it is important to delineate between the **impacts** of planned offshore oil and gas operations and the potential **consequences** that may arise from a significant offshore incident such as an oil spill.

133. In its assessment process, NOPSEMA considers environmental impacts as being the potential effects of an activity on the receiving environment that arise under normal operations after the implementation of reasonably practicable control measures.

134. Environmental impacts in this context are in many cases localised, well understood and are able to be predicted with a degree of certainty based on the specific details of the activity and the receiving environment.

135. Potential emergencies, such as drilling accidents that may lead to oil spills are assessed as a risk that may be associated with an offshore petroleum activity.

136. Risk is often expressed in terms of the consequences of an event and the associated likelihood of occurrence[8].

137. The Environment Regulations require titleholders to take a precautionary approach to environmental management where titleholders must demonstrate that all reasonably practicable measures to reduce environmental impacts and risks have been identified and will be implemented.

138. This approach includes consideration of measures that will reduce the likelihood of an event occurring as well as measures to manage the consequences of that event should it occur.

139. The majority of control measures relevant to offshore drilling that are assessed by NOPSEMA are aimed at preventing a drilling accident from occurring.

140. It is recognised that, should they occur, drilling accidents of this type can have significant consequences for the environment depending on the nature and scale of the incident.

141. For this reason, titleholders are required to prepare an activity specific Oil Pollution Emergency Plan (OPEP), have post spill scientific monitoring arrangements in place for each activity that they undertake and demonstrate that they hold sufficient financial assurance to initiate and maintain a response. For more information see Attachment 4 – Information Paper: Oil Pollution Risk Management and Attachment 5 – Information Paper: Operational and Scientific Monitoring.

142. The potential for a range of accident events including oil spills are considered by NOPSEMA through its regulatory process. For all of these potential events the titleholder must demonstrate that appropriate control measures are in place that will reduce the risk of the event occurring to levels that are acceptable and ALARP.

143. Given the extremely low likelihood of a major oil spill, it is important to recognise that the potential consequences of these events are not as predictable as the environmental impacts that arise from the normal operations of an activity.

144. Environmental consequences that may result from an offshore drilling accident are highly variable and dependent on a broad range of factors that are specific to the circumstances of the particular activity and the time at which the accident occurs.

145. Factors including, but not limited to, the specific activity location, prevailing meteorological and oceanographic conditions at the time of the event, water depth, hydrocarbon type and formation pressure can all have a bearing on the potential environmental consequences that may arise from a drilling accident.

[8] AS/NZS ISO 31000:2009 – Risk Management Principles and Guidelines

146. The Environment Regulations administered by NOPSEMA define the environment as follows;

> ***environment*** *means:*
>
> (a) ecosystems and their constituent parts including people and communities; and
> (b) natural and physical resources; and
> (c) the qualities and characteristics of locations, places and areas; and
> (d) the heritage value of places; and includes
> (e) the social, economic and cultural features of the matters mentioned in paragraphs (a), (b), (c) and (d).
>
> The Environment Regulations therefore require a titleholder to consider all aspects of the receiving environment when evaluating environmental impacts and risks including the potential consequences of accidents.

9.2 Specific responses to the Terms of Reference

The potential environmental, social and economic impacts of BP's planned exploratory oil drilling project, and any future oil or gas production in the Great Australian Bight, with particular reference to:

(a) the effect of a potential drilling accident on marine and coastal ecosystems, including:

Overview

Responses to this term of reference are based on an interpretation of a "drilling accident" being an incident that may occur during offshore drilling activities that results in a marine oil spill.

Marine oil spills can have the potential to cause severe and widespread environmental consequences. The general community's perception of consequences associated with marine oil spills is often shaped by images of large scale spills, often involving heavy and persistent oils. However, there are a wide variety of factors that can determine the actual extent, severity and persistence of environmental consequences associated with an individual oil spill.

Large scale uncontrolled well blowout scenarios are rare but credible events that are risk-assessed in an EP along with smaller types of spills. The potential environmental consequences of these accidents can vary depending on factors such as the type of oil, the volume, timing and duration of a spill and the environmental setting. Key factors influencing the environmental consequences of an oil spill are elaborated under item (i) below.

(i) impacts on existing marine reserves within the Bight,

147. Commonwealth marine reserves are areas established under the EPBC Act to help protect marine life in Commonwealth waters. Australia's Commonwealth Marine Reserves are situated in five large-scale regional networks and the Coral Sea.

148. The Great Australian Bight area includes a number of Commonwealth Marine Reserves which are part of the South-west Network. Reserves in the Great Australian Bight are part of the Australian Government's independent Commonwealth Marine Reserves Review process and therefore subject to 'transitional management arrangements' while the review is undertaken and management plans are developed.

149. In November 2015, NOPSEMA published a Guidance Note (see Attachment 6) on Activities in Commonwealth Marine Reserves that helps explain transitional management arrangements, including those applying to reserves in the Great Australian Bight, allowable uses in the reserves and implications for titleholders preparing EPs. The Guidance Note was prepared in close consultation with Parks Australia.

150. Proposed Commonwealth Marine Reserves in the Great Australian Bight area include a variety of values and will be zoned to afford an appropriate level of protection to these values including multi-use zones and zones where mining may be excluded. Examples of major conservation values of marine reserves in the South-west network include habitat utilised by EPBC Act listed threatened and migratory species (e.g. sperm, blue, and humpback whales, the Australian sea lion, the white shark,

and various bird species), examples of important bioregions, ecosystems, habitats and associated ecological processes and key ecological features (e.g. seabed features, areas of the ocean with high productivity, benthic communities and habitats).

151. Where there are existing marine reserves and associated values that may be affected by either environmental impacts or risks from planned activities or the consequences of unplanned events, they must be described in the EP and the legal requirements that apply must be recognised and adhered to. For example, if a reserve management plan is in force and it sets out when planned oil and gas activities ('mining') may be allowed/not allowed to occur, then the EP must detail these requirements and explain how they will be met.

152. There are no current management plans in force for the South-west Commonwealth Marine Reserve network.

153. The Director of National Parks is responsible for developing management plans for Commonwealth Marine Reserves and the Commonwealth Minister for the Environment is responsible for approving these plans.

154. Under the Program endorsed by the Minister for the Environment (see section 7), NOPSEMA cannot accept an EP for an activity that is inconsistent with a management plan for a Commonwealth Marine Reserve.

155. In the event that there is no management plan for a Commonwealth Marine Reserve, NOPSEMA cannot accept an EP unless it is consistent with the Australian IUCN Reserve Management Principles[9]. The Principles are not prescriptive in terms of allowable activities, rather they are focused on preservation objectives.

156. The definition of 'environment' that is set out in the Environment Regulations informs NOPSEMA's consideration of the titleholder's predictions of environmental consequences for marine oil spill events that are detailed in the EP. The definition encompasses natural and socio-economic features of the environment, including Commonwealth Marine Reserves.

157. The particular values and sensitivities of the receiving environment, including conservation values of marine reserves, and the potential consequences for those values and sensitivities contribute to the development of the OPEP for an activity. These values are taken into account in the development of response strategies including the identification of priorities for protection.

158. To demonstrate preparedness to respond to an oil spill, a titleholder must show that appropriate response equipment and resources can be accessed and deployed in a timely manner in order to minimise consequences to the marine environment including marine reserves.

159. While marine oil spills have the potential to result in severe and widespread consequences for the environment, there are a wide variety of factors that determine the actual environmental outcome of a spill.

160. In general terms, and considering the array of Commonwealth Marine Reserve conservation values, examples of factors that can influence the environmental consequences of a marine oil spill include:

- Physical and chemical properties of the spilled oil;
- The volume of oil spilled and, the location and duration of the spill event;
- characteristics of the receiving environment such as ocean temperature and depth, the speed and direction of ocean currents and winds, the presence and distribution of biological and social resources, their natural vulnerabilities to oil pollution and their recovery potential; and
- oil pollution response measures implemented and their success at limiting the consequences of oil pollution.

[9] As detailed in Schedule 8 of the "*Environment Protection and Biodiversity Conservation Regulations 2000*"

161. Key causes of environmental consequence for marine oil spills may be grouped in a number of different ways. For the purpose of a general overview, they have been grouped into three broad categories, being:

- exposure to chemical components of oil;
- physical smothering/coating by oil; and
- the consequences of clean-up activities.

162. Considered in the context of these categories and factors listed above, potential consequences from marine oil spills oil may include:

- Chemical contamination of marine and coastal habitats, including toxic effects on plants and animals that utilise those habitats. For example, marine wildlife may come into direct contact with oil, inhale oil vapours or ingest oil-contaminated water and food while moving through, or feeding in, the ocean. This in turn can have negative health outcomes, which in cases of acute toxicity or longer term exposure may have consequences for key life history processes including growth, reproduction and survival. In this way oil toxicity may have knock-on consequences for the abundance and diversity of marine and coastal life and may also negatively affect the productivity of fisheries by affecting fish stocks and the quality of seafood.
- Physical smothering of wildlife and their habitats. Physical effects of oil can result in a decline in the health of individual plants and animals and potentially include mortality. In severe cases, physical smothering of wildlife and habitats by oil may have knock-on consequences for populations. The physical presence of oil may also lessen the amenity value of the environment; and
- Deployment of response and remediation measures that have some consequence for the environment. For example, in order to most effectively and efficiently remove oil stranded on an affected beach, some damage to adjacent coastal vegetation may occur. In this context it is important to note that while some oil spill clean-up measures may themselves have a consequence for the environment, it is widely-accepted that response measures should have a net environmental benefit (i.e. the impact of a response measure should not be greater that the impact of the oil pollution itself).

163. The environment's capacity for recovery from consequences such as those above is highly variable. For some affected parts of the environment recovery may be quite rapid (e.g. ocean plankton communities which have naturally rapid productivity) while for others recovery may take a considerable period of time (e.g. an affected wildlife population). Ultimately, recovery is dependent on the affected receptor's natural vulnerability to oil as well as its resilience to disturbance.

164. In view of the above and in addition to preparedness for mounting an appropriate response to an oil spill, the Environment Regulations require a titleholder to also include provisions for monitoring the environmental consequences of oil spills in the EP. The monitoring provisions must be commensurate to the environmental risks posed by the activity and be sufficient to inform any remediation activities.

(ii) impacts on whale and other cetacean populations,

165. A number of whale species have distributions that overlap the Great Australian Bight area. These include Southern Right, Pygmy Blue, Sperm and Killer whales. The utilisation of the Bight area by whales is species-dependent.

166. Some defined localities within the Great Australian Bight have also been identified by the Department of the Environment as biologically important areas for whales. These are areas that are important for the conservation of whales and where aggregations of individuals display biologically important behaviour such as breeding, foraging, resting or migration. For example, biologically important areas for Sperm whale foraging and Southern Right whale calving have been defined in the Great Australian Bight area. The Great Australian Bight is considered a likely, though not well described, part of the migration route for the Pygmy Blue whale.

167. Whales with distributions that overlap Great Australian Bight include species listed as threatened and/or migratory under the EPBC Act. The Department of the Environment maintains a Species Profile and Threats Database[10] that provides information about species and communities listed under the EPBC Act, including whale species. The database includes key information about the distributions and biology of species as well as references to Conservation Advices, Recovery Plans and other relevant management documentation that has been prepared by the Department of the Environment.

168. If there are whales and other cetacean populations that may be affected by either impacts or risks from planned activities or the consequences of unplanned events, those populations must be described in the EP as part of the existing environment and any requirements that apply to the protection of those populations must be recognised and adhered to.

169. As an example, species Recovery Plans, such as the "Conservation Management Plan for the Blue Whale[11]" outline information relevant to managing the recovery of the species of interest. Information contained in recovery plans may include details of distributions, migration patterns and habitat utilisation, threats and risks, management actions and reporting arrangements. This information provides important context for the assessment of potential environmental impacts to these species that NOPSEMA takes into account through its assessment process.

170. Under the Program endorsed by the Minister for the Environment, if there is a recovery plan and/or a threat abatement plan in operation that applies to a particular species, NOPSEMA cannot accept an EP for an activity that is inconsistent with those plans.

171. In addition to any published recovery or threat abatement plans, NOPSEMA must also have regard to any approved conservation advices that apply to a particular species.

172. As well as demonstrating compliance with applicable management plans a titleholder must demonstrate in their EP that impacts and risks to all threatened and migratory species, including cetaceans are acceptable and have been reduced to ALARP.

173. The EP and OPEP must also demonstrate how, in the event of an accidental oil spill, response measures will be undertaken in a way that minimises consequences to whale and other cetacean species. Monitoring must also be undertaken that is appropriate to the nature and scale of the environmental consequences that may arise from oil pollution and response activities.

174. The general description of influencing factors and potential environmental consequences of marine oil spills that is set out under term of reference (i) is applicable to this section regarding whales and other cetacean populations.

[10] http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl
[11] *Conservation Management Plan for the Blue Whale, Commonwealth of Australia 2015*

175. In addition, individual cetaceans may be affected by oil spills in a variety of ways ranging from behavioural responses through general illness to mortality. For example, cetaceans may come into direct contact with oil potentially affecting skin and eyes, they may inhale oil vapours that in turn may damage respiratory tissues, they may ingest oil or oil-contaminated prey which may cause effects on vital systems (e.g. immune, reproduction, digestion) or organs (e.g. liver, kidneys, brain) and they may respond by modifying behaviours in the presence of oil spill response activities.

176. Factors that may influence whether cetacean populations will be measurably affected by an oil spill include; the properties of oil including its toxicity; the spatial distribution of oil relative to important habitats; the general health of any affected and unaffected individuals within a population; the presence or absence of the population at the time of the spill; the species affected; its natural susceptibility to oil and; the types and intensity of oil spill response activities.

177. The consequence for populations from the effects of an oil spill could be expected to range from no discernible effect through to a decline in the population which, depending on the species, will take varying amounts of time to recover.

(iii) impacts on the marine environment,

178. The general description of influencing factors and potential environmental consequences of marine oil spills that is set out under term of reference (i) is also relevant to this term of reference.

179. Environmental impacts to the marine environment from planned offshore oil and gas drilling operations are generally well understood and, with the implementation of appropriate control measures, are able to be effectively managed such that impacts are of an acceptable level and the activity can be carried out in a manner consistent with the principles of ecologically sustainable development.

180. The Environment Regulations also ensure the potential environmental consequences of a drilling accident are appropriately considered and evaluated through requiring all EPs to include a detailed description of the environment that may be affected under potential emergency conditions.

181. This description must include any particular relevant values and sensitivities of the receiving environment, including but not limited to; those values and sensitivities that are matters of National Environmental Significance under Part 3 of the EPBC Act.

182. The regulatory regime administered by NOPSEMA is specifically designed to ensure that the titleholder undertakes a comprehensive activity and location specific, environmental impact and risk identification, evaluation and mitigation process for each drilling activity that is proposed to occur.

183. The outcome of this environmental impact and risk evaluation process is the identification and application of control measures that are tailored to the specific circumstances of the activity.

184. This includes control measures that will be implemented in the event of an emergency such as a drilling accident to minimise consequences to the marine environment.

185. While potential environmental consequences of oil pollution are known at a general level, determining the actual environmental consequences (including recovery) specific to the affected environment requires scientifically sound monitoring efforts. Depending on the nature of the spill, monitoring programs may need to cover a variety of scientific disciplines (chemical/toxicity assessments, wildlife studies, seabed habitat assessments, fisheries studies, social impact studies) and be implemented in both affected and unaffected parts of the environment, potentially for considerable periods of time after a spill is brought under control and response efforts have been terminated.

(b) social and economic impacts, including effects on tourism, commercial fishing activities and other regional industries;

186. NOPSEMA understands that that there may be social and economic benefits that result from any future offshore petroleum developments in the Great Australian Bight, particularly as this industry is currently not well developed in this area. However, these are not, and cannot be, taken into account in NOPSEMA's environmental management decision making processes.

187. NOPSEMA only considers potentially detrimental impacts or risks to the socioeconomic environment, including tourism, fishing and other regional industries that may be affected, when reaching decisions on the acceptability of a titleholder's EP.

188. In the context of the Great Australian Bight area, it is recognised there are a range of activities and communities that may be affected by any oil and gas operations. Examples of these activities include tuna and other commercial fishing, recreational fishing and tourism operations such as whale and dolphin watching.

189. Most of these activities (other than some commercial fishing) occur in close proximity to the coastline as opposed to deep water offshore areas.

190. In accordance with the definition of the environment under the Environment Regulations titleholders must provide details and an evaluation of all the environmental impacts and risks that their activity may pose to the environment including the socioeconomic aspects.

191. The Environment Regulations contain detailed requirements for titleholders to consult with 'relevant persons' whose functions, interests or activities may be affected by their proposed operations.

192. Consultation with potentially affected tourism operators, fishers, regional industries and other potentially affected persons occurs during the preparation of an EP.

193. The intended purpose of consultation is to allow the titleholder to identify and understand the potential impacts that their activity may have on other users of the marine area and to subsequently adopt control measures that will reduce those impacts to acceptable levels and ALARP.

194. The titleholder must then demonstrate to NOPSEMA through the EP that consultation has been appropriate. This demonstration must include;

- provision of a report on consultation between the titleholder and relevant persons
- an assessment of the merits of any objection or claim about the adverse impact of each activity to which the EP relates
- a statement of the titleholders response or proposed response to each objection and claim; and
- a copy of the full text of any response by a relevant person.

195. NOPSEMA assess the information provided in an EP submission to determine whether consultation by the titleholder has been undertaken appropriately. In addition NOPSEMA takes into account any other information that may be relevant to the environmental management of the activity. This can include direct correspondence from external parties to NOPSEMA, reputable, peer reviewed scientific studies and other information sources.

196. In the context of current petroleum titles in the Great Australian Bight, any future petroleum activities such as drilling are likely to take place at a significant distance from the coast.

197. Impacts and risks to socioeconomic receptors that may arise from these types of activities may include risks associated with increased vessel traffic, potential exclusion of activities such as fishing from certain locations while activities are being undertaken and noise from helicopter and vessel activities

(c) current research and scientific knowledge;

198. In order to determine the environmental, social and economic impacts from drilling projects in any location including the Great Australian Bight, a thorough description of the existing environment followed by an environmental impact and risk identification and evaluation process must be undertaken by the titleholder.

199. It is of fundamental importance that the impact and risk evaluation process be supported by current knowledge and scientific evidence, relevant to the proposed activity, its timing, duration and location.

200. Scientific information to support the EP development process may be obtained from a number of sources including government databases, bioregional plans and management documents, published scientific literature, activity specific and strategic scientific studies undertaken by the titleholder.

201. The identification and evaluation of the potential environmental impacts that may arise from a petroleum activity is not a precise science and is based on the analysis of scientific evidence and predictions of environmental impact.

202. The process of making predictions can have a number of steps and the level of confidence in each step is variable based on the current state of scientific knowledge. Where there are gaps in available scientific knowledge, titleholders must acknowledge the uncertainty that those gaps may generate when preparing their impact assessment.

203. An object of the Environment Regulations is to ensure that any petroleum activity is carried out in accordance with the principles of ecologically sustainable development as defined under the EPBC Act.

204. One of these principles, commonly referred to as the precautionary principle, states;

> *"if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation".*

205. Commitments to implementing control measures that aim to reduce or even eliminate uncertainty is one approach that titleholders take in making their case that impacts and risks will be of an acceptable level and ALARP.

206. NOPSEMA must also consider scientific uncertainty and potential gaps in available scientific knowledge in its decision-making.

207. NOPSEMA's assessments of EPs are informed not only by the information contained within the submission, but also by published peer reviewed information and published management planning documents relevant to features of the receiving environment that may be affected and the potential environmental impacts and risks generated by activities. NOPSEMA also applies its professional judgement to impact predictions and management proposals set out in EPs.

208. NOPSEMA is aware of the collaborative Great Australian Bight Research Program, involving BP, CSIRO, the South Australian Research and Development Institute (SARDI), the University of Adelaide and Flinders University. It is also aware of the research themes covered by the Program and scientific knowledge flowing from it that is reaching the public domain.

209. There are also other ongoing research and monitoring efforts that target species which utilise the Great Australian Bight area. For example, regular monitoring is performed off southern Australia to assess Southern Right Whales and Southern Bluefin Tuna stocks. A project led by CSIRO is also working to provide a national assessment of white shark population size, and develop strategies for population monitoring.

210. The assessment of available research and its relevance to an EP and NOPSEMA's decision making process is made on a case by case basis as an EP assessment progresses.

(d) the capacity, or lack thereof, of government or private interests to mitigate the effect of an oil spill; and

Offshore Petroleum and the National Plan for Maritime Environmental Emergencies

211. The National Plan for Maritime Environmental Emergencies (National Plan) establishes a cooperative framework for the management of maritime environmental emergencies. The scope of the National Plan encompasses the prevention, preparedness, response and recovery of maritime emergencies, and explicitly addresses the risk from oil and chemical pollution from both shipping and offshore petroleum activities.

212. Australia adopts a risk based approach to establishing capacity to respond to marine oil spills. This approach is coordinated under the cooperative framework of the National Plan which establishes a collective capacity from industry and government.

213. The National Plan is consistent with a number of international conventions, including the International Convention on Oil Pollution Preparedness, Response and Co-operation 1990 (OPRC) which underpins Commonwealth legislation; placing preparedness and response obligations on various industry sectors and government agencies.

214. The National Plan provides a single integrated response arrangement for all potential and actual oil pollution incidents in Australian waters and fosters a cooperative approach to ensure all incidents are managed in the interests of the Australian community.

215. Australia has established a comprehensive regulatory regime for the offshore petroleum industry for environmental management and oil spill response which has been fully integrated through the cooperative arrangements of the National Plan

216. The National Plan arrangements are underpinned by contingency planning at national, state and territory, regional, local and activity specific levels. Participants in the National Plan have responsibilities for ensuring that contingency plans are in place consistent with the relevant administrative or legislative requirements for each jurisdiction.

217. The Australian Maritime Safety Authority (AMSA) manages the National Plan on behalf of the Australian Government, working with state and Northern Territory governments, emergency services and private industry to maximise Australia's marine pollution response capability.

218. NOPSEMA contributed extensively to the latest revision of the National Plan in 2014 and maintains membership on relevant governance committees. NOPSEMA also participates in National Plan exercises and shares technical expertise through the National Response Team and Environment, Science and Technical network.

219. The petroleum industry contributes to the National Plan via the Australian Marine Oil Spill Centre (AMOSC) under the AMOSPlan. AMOSC holds stockpiles of equipment at various locations, with its largest stockpile at Geelong, Victoria. Smaller equipment holdings are held by a number of companies and these are generally available to other AMOSC members through the mutual aid arrangements of the AMOSPlan.

220. AMOSC further contributes to the National Plan through providing funding to maintain joint industry/government capability and preparedness and also provides training services.

221. NOPSEMA has legislated responsibilities for oversight of oil spill response arrangements for petroleum activities in Commonwealth waters, consistent with its responsibilities under the National Plan.

Oil Pollution Emergency Plans

222. Because large offshore oil spills are very rare and variable in scope, the basic tenet of risk-based preparedness is that arrangements are in place to call in appropriate quantities of resources as required, rather than to require the on-site stockpiling of all the resources that may be required in all foreseeable scenarios. This approach is the basis of the tiered preparedness and response concept.

223. Operational effectiveness relies heavily on the capability being suited to the nature, severity, and extent of the oil spill and the characteristics of the natural resources at risk. There are many known or reasonably predictable parameters that can assist in planning for an offshore petroleum incident and NOPSEMA expects titleholders to identify and utilise this information in their spill planning processes.

224. The precise location of an activity, its surrounding environmental values and sensitivities, the likelihood of incidents occurring, as well as the potential consequences should they occur are all rigorously evaluated as part of an environmental risk assessment. The risk assessment also identifies and evaluates the response activities themselves to ensure the selected countermeasures do not introduce unacceptable additional impacts.

225. A response capability commensurate with the risks posed by the activity must then be established including the identification of appropriate response measures, to manage the particular oil pollution risks as informed by the detailed risk assessment.

226. In establishing a response capability the titleholder is required to demonstrate the level to which they are prepared includes all measures that are not grossly disproportionate in cost to the environmental reduction in risk that could be achieved by implementing them.

227. The OPGGS Act and Environment Regulations establish a duty on titleholders to implement oil spill response and remediation activities, including source control and post spill environmental monitoring.

228. Titleholders are required to demonstrate through an EP and associated OPEP, that all oil spill risks have been identified, evaluated and reduced to ALARP and acceptable levels; and that adequate preparedness and response arrangements are in place prior to an offshore petroleum activity being undertaken.

229. The Environment Regulations require activity specific response planning based on the unique characteristics of the activity and the receiving environment to be undertaken by the titleholder for all proposed activities. The outcomes of this planning are then detailed in the OPEP.

230. The EP and OPEP process recognises and accounts for asymmetric risk. While large oil spill incidents are only predicted at exceptionally low frequency it is clear that they may have significant environmental consequences. In accordance with best practice guidelines titleholders are required to demonstrate capability commensurate with risk utilising representative worst case oil spill scenarios.

231. All oil spill response activities are considered as a component of the EP and OPEP process and are to be prepared (and where possible pre-approved) in advance of an activity being undertaken.

232. This approach allows appropriate response measures to be rapidly implemented in the event that a spill occurs. For example, dispersant use can be pre-approved following demonstration of appropriate pre-spill testing of efficacy and toxicity and consideration of the net environmental benefit and risks of its use.

233. NOPSEMA will only accept an EP, including its OPEP, if it demonstrates that the titleholder has adequate arrangements in place to respond to an oil spill incident. These response arrangements are typically tiered; drawing on local, regional, national and international resources. In terms of response personnel, capability is typically drawn from;

- the National Response Team (managed by AMSA);
- the Petroleum Industry Core Group (managed by AMOSC);
- State and Northern Territory response teams (managed by the respective jurisdictions); and

- membership to oil spill response service providers such as Oil Spill Response Limited.

234. Arrangements for suitable response equipment range from self-owned equipment, to industry cooperatives and service providers, through to government held stockpiles.

235. OPEPs must be updated, tested and maintained by the titleholder and, along with other aspects of the EP, are regularly inspected for compliance by NOPSEMA.

236. Arrangements in OPEPs must be consulted on by the titleholder prior to an EP being accepted. This allows all parties that may be involved in a spill response to understand their designated functions and to put arrangements in place to fulfil those functions in the event of an oil spill.

237. In addition to arrangements for responding to an oil spill, titleholders must also demonstrate that appropriate arrangements are in place to monitor the environmental consequences of oil pollution and response activities. These monitoring programs must be appropriate to the nature and scale of the impacts and risks and be sufficient to inform remediation.

238. The OPGGS Act and Environment Regulations require that titleholders demonstrate that they maintain sufficient financial assurance to meet the costs, expenses and liabilities associated with undertaking a petroleum activity, including the costs, expenses and liabilities that may arise from a petroleum incident.

239. NOPSEMA assesses the financial assurance arrangements of a titleholder as a prior condition to acceptance of an EP.

240. The intention of financial assurance is to allow sufficient funds to be readily available to a titleholder in the event of an oil spill to initiate and maintain an appropriate response, to take steps to remediate the environment and to carry out environmental monitoring.

241. Should a titleholder fail to fulfil their obligations in the event of a spill the OPGGS Act provides the responsible Commonwealth Minister or NOPSEMA the power to direct the titleholder to undertake certain actions.

242. NOPSEMA maintains a specialist Spill Risk team that has been recruited internationally and collectively possess many decades of real-world oil spill contingency planning and response experience.

243. NOPSEMA maintains a specialist Environmental Effects team that maintains many decades of marine scientific research and marine monitoring experience relevant to the oil and gas industry and oil spill response.

244. The consequences of a major, unmitigated oil spill will never be acceptable. However consequences can be significantly reduced through the implementation of a coordinated and well planned oil spill response. It is NOPSEMA's role to assess that the titleholder has demonstrated they have a capability to respond commensurate to the risk.

NOPSEMA

Glossary of terms

Acronym	Full name
ALARP	As Low as Reasonably Practicable
AMOSC	Australian Marine Oil Spill Centre
AMSA	Australian Maritime Safety Authority
BP	BP Developments Australia Pty Ltd
CSIRO	Commonwealth Scientific and Industrial Research Organisation
EP	Environment Plan
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
Environment Regulations	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009
FLNG	Floating Liquefied Natural Gas
IUCN	International Union for Conservation of Nature
National Plan	The National Plan for Maritime Environmental Emergencies
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
NOPSA	National Offshore Petroleum Safety Authority (now NOPSEMA)
OECD	Organisation for Economic Co-operation and Development
OPEP	Oil Pollution Emergency Plan
OPGGS Act	*Offshore Petroleum and Greenhouse Gas Storage Act 2006*
OPRC	International Convention on Oil Pollution Preparedness, Response and Co-operation 1990
SARDI	South Australian Research and Development Institute

NOPSEMA

Attachments

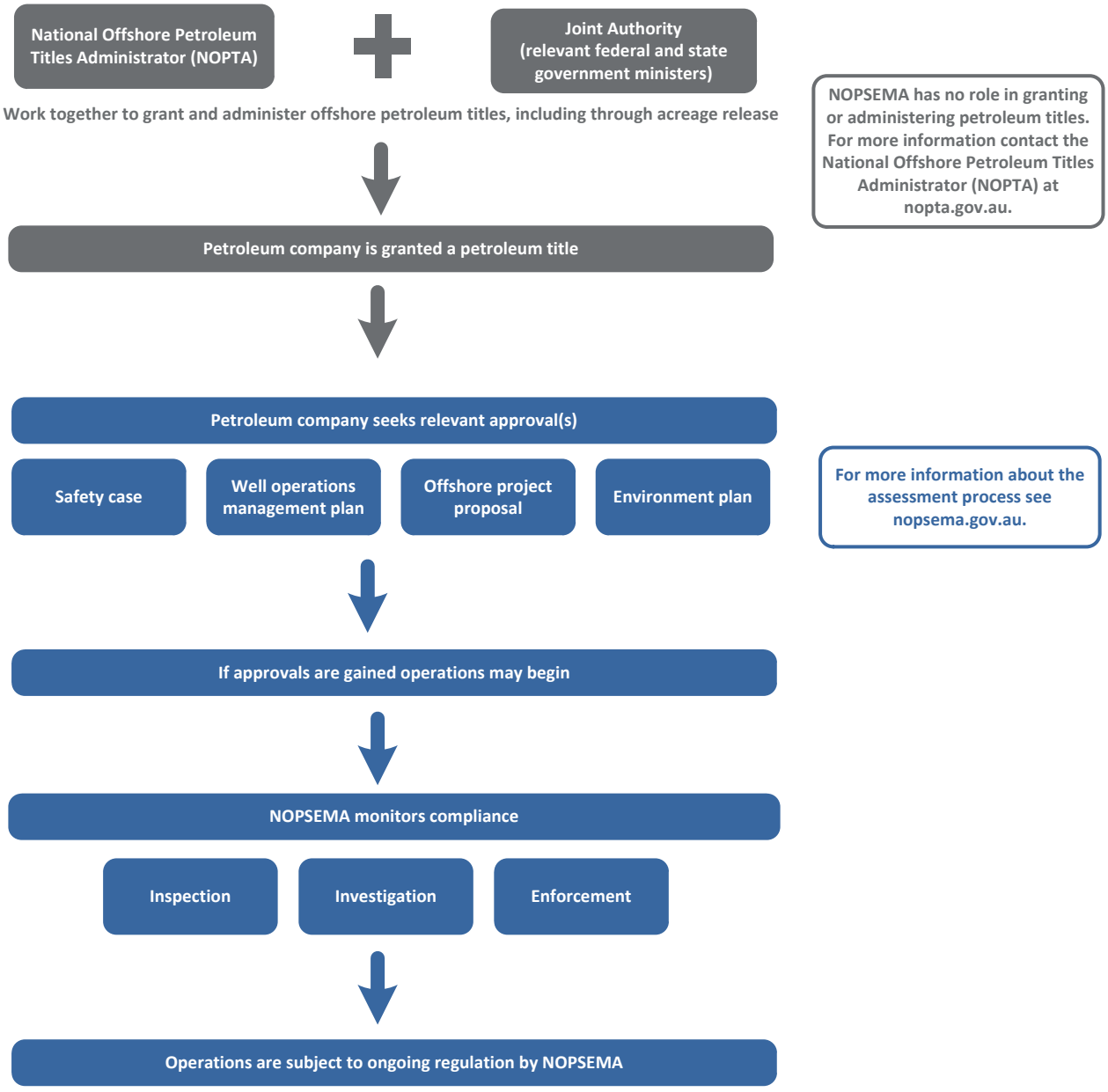
1. Diagram - The offshore petroleum approval and regulatory process – NOPSEMA 2016.
2. Offshore Petroleum and Greenhouse Gas Storage (Environment Regulations) 2009
3. Guidance Note: Environment Plan Content Requirements. NOPSEMA 2015.
4. Program Report: Strategic Assessment of the environmental authorisation process for petroleum and greenhouse gas storage activities administered by the National Offshore Petroleum Safety and Environmental Management Authority under the Offshore Petroleum and Greenhouse Gas Storage Act 2006. Australian Government 2014.
5. Information Paper: Oil Pollution Risk Management. NOPSEMA 2014.
6. Information Paper: Operational and Scientific Monitoring Programs. NOPSEMA 2016.
7. Guidance Note: Activities within Commonwealth Marine Reserves. NOPSEMA 2015.

NOPSEMA Attachment 1: Submission to the Senate Inquiry into the potential environmental, social and economic impacts of BP's planned exploratory oil drilling project, and any future oil or gas production in the Great Australian Bight

The offshore petroleum approval and regulatory process

The infographic below provides a broad overview of the approval and regulatory process for all offshore petroleum activities in Commonwealth waters. For more information visit **nopsema.gov.au**

Legend
- Outside of NOPSEMA's remit
- NOPSEMA's remit



NOPSEMA Attachment 2: Submission to the Senate Inquiry into the potential environmental, social and economic impacts of BP's planned exploratory oil drilling project, and any future oil or gas production in the Great Australian Bight

Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009

Statutory Rules No. 228, 1999

made under the

Offshore Petroleum and Greenhouse Gas Storage Act 2006

Compilation No. 8

Compilation date:	1 January 2015
Includes amendments up to:	SLI No. 201, 2014
Registered:	21 January 2015

Prepared by the Office of Parliamentary Counsel, Canberra

NOPSEMA Attachment 2

About this compilation

This compilation

This is a compilation of the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009* that shows the text of the law as amended and in force on 1 January 2015 (the ***compilation date***).

This compilation was prepared on 24 December 2014.

The notes at the end of this compilation (the ***endnotes***) include information about amending laws and the amendment history of provisions of the compiled law.

Uncommenced amendments

The effect of uncommenced amendments is not shown in the text of the compiled law. Any uncommenced amendments affecting the law are accessible on ComLaw (www.comlaw.gov.au). The details of amendments made up to, but not commenced at, the compilation date are underlined in the endnotes. For more information on any uncommenced amendments, see the series page on ComLaw for the compiled law.

Application, saving and transitional provisions for provisions and amendments

If the operation of a provision or amendment of the compiled law is affected by an application, saving or transitional provision that is not included in this compilation, details are included in the endnotes.

Modifications

If the compiled law is modified by another law, the compiled law operates as modified but the modification does not amend the text of the law. Accordingly, this compilation does not show the text of the compiled law as modified. For more information on any modifications, see the series page on ComLaw for the compiled law.

Self-repealing provisions

If a provision of the compiled law has been repealed in accordance with a provision of the law, details are included in the endnotes.

NOPSEMA Attachment 2

Contents

NOPSEMA Attachment 2

NOPSEMA Attachment 2

Part 1—Preliminary

1 Name of Regulations

These Regulations are the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009*.

2 Commencement

These Regulations commence on 1 October 1999.

3 Object of Regulations

The object of these Regulations is to ensure that any petroleum activity or greenhouse gas activity carried out in an offshore area is:

(a) carried out in a manner consistent with the principles of ecologically sustainable development set out in section 3A of the EPBC Act; and

(b) carried out in a manner by which the environmental impacts and risks of the activity will be reduced to as low as reasonably practicable; and

(c) carried out in a manner by which the environmental impacts and risks of the activity will be of an acceptable level.

4 Definitions

In these Regulations, unless the contrary intention appears:

accepted offshore project proposal means an offshore project proposal that has been accepted by the Regulator under regulation 5D.

Act means the *Offshore Petroleum and Greenhouse Gas Storage Act 2006*.

Regulation 4

activity means a petroleum activity or a greenhouse gas activity.

control measure means a system, an item of equipment, a person or a procedure, that is used as a basis for managing environmental impacts and risks.

environment means:

(a) ecosystems and their constituent parts, including people and communities; and

(b) natural and physical resources; and

(c) the qualities and characteristics of locations, places and areas; and

(d) the heritage value of places;

and includes

(e) the social, economic and cultural features of the matters mentioned in paragraphs (a), (b), (c) and (d).

environmental impact means any change to the environment, whether adverse or beneficial, that wholly or partially results from an activity.

environmental management system includes the responsibilities, practices, processes and resources used to manage the environmental aspects of an activity.

environmental performance means the performance of a titleholder in relation to the environmental performance outcomes and standards mentioned in an environment plan.

environmental performance outcome means a measurable level of performance required for the management of environmental aspects of an activity to ensure that environmental impacts and risks will be of an acceptable level.

environmental performance standard means a statement of the performance required of a control measure.

NOPSEMA Attachment 2

Environment Minister means the Minister administering section 1 of the EPBC Act.

environment plan means the document known as an environment plan that is submitted to the Regulator under regulation 9.

EPBC Act means the *Environment Protection and Biodiversity Conservation Act 1999*.

facility includes a structure or installation of any kind.

greenhouse gas activity means operations or works in an offshore area undertaken for the purpose of:

(a) exercising a right conferred on a greenhouse gas titleholder under the Act by a greenhouse gas title; or

(b) discharging an obligation imposed on a greenhouse gas titleholder by the Act or a legislative instrument under the Act.

greenhouse gas title means any of the following:

(a) a greenhouse gas assessment permit;

(b) a greenhouse gas holding lease;

(c) a greenhouse gas injection licence;

(d) a greenhouse gas search authority;

(e) a greenhouse gas special authority;

(f) a greenhouse gas research consent.

greenhouse gas titleholder means any of the following:

(a) a greenhouse gas assessment permittee;

(b) a greenhouse gas holding lessee;

(c) a greenhouse gas injection licensee;

(d) a registered holder of a greenhouse gas search authority;

(e) a registered holder of a greenhouse gas special authority;

(f) a holder of a greenhouse gas research consent.

in force, in relation to an environment plan, including a revised environment plan, means that:

(a) the plan has been accepted; and

(b) the acceptance of the plan has not been withdrawn; and

(c) the operation of the plan has not ended.

offshore project means one or more activities that are undertaken for the purpose of the recovery of petroleum, other than on an appraisal basis, including any conveyance of recovered petroleum by pipeline (whether or not the activity is undertaken for other purposes).

Note: See Part 1A.

offshore project proposal means the document known as an offshore project proposal that is submitted to the Regulator under regulation 5A or subregulation 5F(2).

petroleum activity means operations or works in an offshore area undertaken for the purpose of:

(a) exercising a right conferred on a petroleum titleholder under the Act by a petroleum title; or

(b) discharging an obligation imposed on a petroleum titleholder by the Act or a legislative instrument under the Act.

petroleum title means any of the following:

(a) a petroleum exploration permit;

(b) a petroleum retention lease;

(c) a petroleum production licence;

(d) a pipeline licence;

(e) an infrastructure licence;

(f) a petroleum access authority;

(g) a petroleum special prospecting authority;

(h) a petroleum scientific investigation consent.

petroleum titleholder means any of the following:

(a) a petroleum exploration permittee;
(b) a petroleum retention lessee;
(c) a petroleum production licensee;
(d) a pipeline licensee;
(e) an infrastructure licensee;
(f) the registered holder of a petroleum access authority;
(g) the registered holder of a petroleum special prospecting authority;
(h) the holder of a petroleum scientific investigation consent.

proponent means a person who submits an offshore project proposal to the Regulator.

recordable incident, for an activity, means a breach of an environmental performance outcome or environmental performance standard, in the environment plan that applies to the activity, that is not a reportable incident.

Regulator means:
(a) in relation to a petroleum activity—NOPSEMA; or
(b) in relation to a greenhouse gas storage activity—the responsible Commonwealth Minister.

reportable incident, for an activity, means an incident relating to the activity that has caused, or has the potential to cause, moderate to significant environmental damage.

revise, for an environment plan, includes extend or modify.

the regulations means regulations (including these Regulations) made under the Act.

titleholder means:
(a) a greenhouse gas titleholder; or
(b) a petroleum titleholder.

Regulation 5

5 References to an activity

A reference in these Regulations to an activity includes, where the context permits, a reference to:

(a) a proposed activity; and

(b) any stage of an activity.

Part 1A—Offshore project proposals

5A Submission of an offshore project proposal

(1) Before commencing an offshore project, a person must submit an offshore project proposal for the project to the Regulator.

(2) However, subregulation (1) does not apply if the Environment Minister:

(a) has made a decision under section 75 of the EPBC Act that an action that is equivalent to or includes the project is not a controlled action; or

(b) has made a component decision under section 77A of the EPBC Act that a particular provision of Part 3 of that Act is not a controlling provision for an action that is equivalent to or includes the project, because the Minister believes the action will be taken in a particular manner; or

(c) has approved, under Part 9 of the EPBC Act, the taking of an action that is equivalent to or includes the project.

(3) For paragraph (2)(c), despite section 146D of the EPBC Act an approval by the Environment Minister under section 146B of that Act is not taken to be an approval under Part 9 of that Act of the taking of an action.

Note 1: An environment plan for an activity that is, or is part of, an offshore project may be submitted only if there is an accepted offshore project proposal or a decision from the Environment Minister—see subregulation 9(3).

Note 2: A fee is payable for considering the proposal—see regulation 32.

(4) The proposal must be in writing.

(5) The proposal must:

(a) include the proponent's name and contact details; and

(b) include a summary of the project, including the following:

(i) a description of each activity that is part of the project;
(ii) the location or locations of each activity;
(iii) a proposed timetable for carrying out the project;
(iv) a description of the facilities that are proposed to be used to undertake each activity;
(v) a description of the actions proposed to be taken, following completion of the project, in relation to those facilities; and

(c) describe the existing environment that may be affected by the project; and

(d) include details of the particular relevant values and sensitivities (if any) of that environment; and

(e) set out the environmental performance outcomes for the project; and

(f) describe any feasible alternative to the project, or an activity that is part of the project, including:
(i) a comparison of the environmental impacts and risks arising from the project or activity and the alternative; and
(ii) an explanation, in adequate detail, of why the alternative was not preferred.

Note: A proposal will not be suitable for publication and will not be capable of being accepted by the Regulator if an activity or part of an activity will be undertaken in any part of a declared World Heritage property—see regulations 5C and 5D.

(6) Without limiting paragraph (5)(d), particular relevant values and sensitivities may include any of the following:
(a) the world heritage values of a declared World Heritage property within the meaning of the EPBC Act;
(b) the national heritage values of a National Heritage place within the meaning of that Act;
(c) the ecological character of a declared Ramsar wetland within the meaning of that Act;

(d) the presence of a listed threatened species or listed threatened ecological community within the meaning of that Act;

(e) the presence of a listed migratory species within the meaning of that Act;

(f) any values and sensitivities that exist in, or in relation to, part or all of:

(i) a Commonwealth marine area within the meaning of that Act; or

(ii) Commonwealth land within the meaning of that Act.

(7) The proposal must:

(a) describe the requirements, including legislative requirements, that apply to the project and are relevant to the environmental management of the project; and

(b) describe how those requirements will be met.

(8) The proposal must include:

(a) details of the environmental impacts and risks for the project; and

(b) an evaluation of all the impacts and risks, appropriate to the nature and scale of each impact or risk.

5B Further information

(1) If a proponent submits an offshore project proposal, the Regulator may request the proponent to provide further written information about any matter required by regulation 5A to be included in the proposal.

(2) The request must:

(a) be in writing; and

(b) set out each matter for which information is requested; and

(c) specify a reasonable period within which the information is to be provided.

(3) If a proponent receives a request, and provides information requested by the Regulator within the period specified or within a longer period agreed to by the Regulator:
  (a) the information becomes part of the proposal; and
  (b) the Regulator must have regard to the information as if it had been included in the submitted proposal.

5C Suitability of offshore project proposal for publication

(1) Within 30 days after a proponent submits an offshore project proposal:
  (a) if the Regulator is reasonably satisfied that the proposal meets the criteria set out in subregulation (2), the Regulator must decide that the proposal is suitable for publication; or
  (b) if the Regulator is not reasonably satisfied that the proposal meets the criteria set out in subregulation (2), the Regulator must decide that the proposal is not suitable for publication; or
  (c) if the Regulator is unable to make a decision on the proposal within the 30 day period, the Regulator must give the proponent notice in writing and set out a proposed timetable for consideration of the proposal.

(2) For subregulation (1), the criteria for a proposal being suitable for publication are that the proposal:
  (a) appropriately identifies and evaluates the environmental impacts and risks of the project; and
  (b) sets out environmental performance outcomes that are:
    (i) consistent with the principles of ecologically sustainable development; and
    (ii) relevant to the identified environmental impacts and risks for the project; and
  (c) does not involve an activity or part of an activity being undertaken in any part of a declared World Heritage property within the meaning of the EPBC Act; and

(d) sufficiently addresses the matters required by regulation 5A.

(3) If the Regulator decides that the offshore project proposal is suitable for publication, the Regulator must, as soon as practicable:
  (a) publish the proposal on the Regulator's website; and
  (b) publish in the same place a notice:
    (i) inviting the public to comment on the proposal; and
    (ii) specifying a period of at least 4 weeks for giving comments; and
    (iii) explaining how to give comments.

(4) If the Regulator decides that the offshore project proposal is not suitable for publication, the Regulator must notify the proponent, in writing, of the decision as soon as practicable.

(5) A decision by the Regulator that the proposal is, or is not, suitable for publication is not invalid only because the Regulator did not comply with the 30 day period in subregulation (1) in relation to the proposal.

5D Actions after publication of offshore project proposal

(1) As soon as practicable after the end of the period of public comment for an offshore project proposal mentioned in subparagraph 5C(3)(b)(ii), the proponent:
  (a) may alter the content of the proposal; and
  (b) must give the Regulator another copy of the proposal (whether or not the proponent has altered its content); and
  (c) must include with the copy of the proposal:
    (i) a summary of all comments received; and
    (ii) an assessment of the merits of each objection or claim about the project or any activity that is part of the project; and
    (iii) a statement of the proponent's response or proposed response to each objection or claim, including a

demonstration of the changes, if any, that have been made to the proposal as a result of an objection or claim.

(2) If the proponent gives the Regulator a copy of the proposal as described in paragraph (1)(b), the Regulator may request the proponent to provide further written information about:
  (a) any matter required by regulation 5A to be included in the proposal; or
  (b) any matter required by paragraph (1)(c) to be included with a copy of the proposal.

(3) The request must:
  (a) be in writing; and
  (b) set out each matter for which information is requested; and
  (c) specify a reasonable period within which the information is to be provided.

(4) If the proponent receives a request, and provides information requested by the Regulator within the period specified or within a longer period agreed to by the Regulator:
  (a) if the information is about a matter required by regulation 5A to be included in the proposal—the information becomes part of the proposal and the Regulator must have regard to the information as if it had been included in the submitted proposal; and
  (b) if the information is about a matter required by paragraph (1)(c) to be included with a copy of the proposal—the Regulator must have regard to the information as if it had been so included.

(5) Within 30 days after the proponent gives the Regulator a copy of the proposal as described in paragraph (1)(b):
  (a) if the Regulator is reasonably satisfied that the proposal meets the criteria set out in subregulation (6), the Regulator must accept the proposal; or

(b) if the Regulator is not reasonably satisfied that the proposal meets the criteria set out in subregulation (6), the Regulator must refuse to accept the proposal; or

(c) if the Regulator is unable to make a decision on the proposal within the 30 day period, the Regulator must give the proponent notice in writing and set out a proposed timetable for consideration of the proposal.

(6) For subregulation (5), the criteria are that the proposal:

(a) adequately addresses comments given during the period for public comment; and

(b) is appropriate for the nature and scale of the project; and

(c) appropriately identifies and evaluates the environmental impacts and risks of the project; and

(d) sets out appropriate environmental performance outcomes that:

(i) are consistent with the principles of ecologically sustainable development; and

(ii) demonstrate that the environmental impacts and risks of the project will be managed to an acceptable level; and

(e) does not involve an activity or part of an activity being undertaken in any part of a declared World Heritage property within the meaning of the EPBC Act.

(7) If the Regulator accepts the proposal, the Regulator must, within 10 days after making the decision, publish the accepted proposal on the Regulator's website.

(8) If the Regulator refuses to accept the proposal, the Regulator must, as soon as practicable:

(a) notify the proponent, in writing, of the decision; and

(b) publish a notice on the Regulator's website setting out the decision and the reasons for it.

(9) A decision by the Regulator to accept, or refuse to accept, the proposal is not invalid only because the Regulator did not comply

with the 30 day period in subregulation (5) in relation to the proposal.

5E Withdrawal of offshore project proposal

(1) A proponent may, by notice in writing, withdraw a submitted offshore project proposal at any time before the Regulator has made a decision to accept or refuse to accept the proposal.

(2) If a proponent withdraws a proposal after it has been published on the Regulator's website, the Regulator must publish on the website a notice that the proposal has been withdrawn.

5F Use of the offshore project proposal system for other activities

(1) This regulation applies to an activity that a person proposes to commence for at least one of the following purposes (whether or not the activity is undertaken for other purposes):
  (a) exploration for petroleum;
  (b) recovering petroleum on an appraisal basis;
  (c) exploration for a potential greenhouse gas storage formation;
  (d) exploration for a potential greenhouse gas injection site;
  (e) injecting or storing, on an appraisal basis, a greenhouse gas substance in a part of a geological formation;
  (f) injecting or permanently storing a greenhouse gas substance into an identified greenhouse gas storage formation;
  (g) the conveyance of a greenhouse gas substance by pipeline;
  (h) decommissioning a facility, a petroleum pipeline or a greenhouse gas pipeline.

(2) If a person wishes to use the arrangements in this Part for one or more activities to which this regulation applies, the person may:
  (a) prepare an offshore project proposal for the activity or activities as if they were an offshore project; and
  (b) submit the proposal to the Regulator.

NOPSEMA Attachment 2

(3) If a person submits an offshore project proposal to the Regulator under subregulation (2):

(a) subregulations 5A(4) to (8), regulations 5B to 5E and regulation 32 apply as if the activity or activities were an offshore project; but

(b) the activity or activities are not otherwise to be treated as an offshore project.

Part 1B—Financial assurance

5G Demonstration of financial assurance prior condition for acceptance of environment plan

(1) This regulation applies:

(a) if:

(i) an environment plan for a petroleum activity is submitted under regulation 9; and

(ii) there is a titleholder in relation to the activity immediately before the Regulator decides whether or not to accept the plan under regulation 10; or

(b) if a proposed revision of an environment plan for a petroleum activity is submitted under regulation 17, 18 or 19.

(2) For paragraphs 571(3)(a) and (b) of the Act, NOPSEMA must not accept the environment plan, or the proposed revision of the environment plan, unless NOPSEMA is reasonably satisfied that:

(a) the titleholder is compliant with subsection 571(2) of the Act in relation to the petroleum activity; and

(b) the compliance is in a form that is acceptable to NOPSEMA.

Note: Failure by a petroleum titleholder to maintain compliance with subsection 571(2) of the Act, in a form acceptable to NOPSEMA, is a ground for withdrawal of acceptance of an environment plan—see paragraph 23(2)(e).

Part 2—Environment plans

Division 2.1—Requirement for an environment plan

6 Accepted environment plan required for an activity

(1) A titleholder commits an offence if:
  (a) the titleholder undertakes an activity; and
  (b) there is no environment plan in force for the activity.

Penalty: 80 penalty units.

(1A) An offence against subregulation (1) is an offence of strict liability.

Note: For ***strict liability***, see section 6.1 of the *Criminal Code*.

(2) This regulation does not affect any other requirement under the regulations for a consent to construct or install, or a consent to use, a facility.

Note: The term 'the regulations' is defined in regulation 4 to mean '. regulations (including these Regulations) made under the Act'.

7 Operations must comply with the accepted environment plan

(1) A titleholder must not undertake an activity in a way that is contrary to:
  (a) the environment plan in force for the activity; or
  (b) any limitation or condition applying to operations for the activity under these Regulations.

Penalty: 80 penalty units.

(1A) An offence against subregulation (1) is an offence of strict liability.

Note: For ***strict liability***, see section 6.1 of the *Criminal Code*.

(2) Subregulation (1) does not apply in relation to an activity if the titleholder has the consent in writing of the Regulator to undertake the activity in that way.

Note: A defendant bears an evidential burden in relation to the matter in subregulation (2)—see subsection 13.3(3) of the *Criminal Code*.

(3) The Regulator must not give a consent under subregulation (2) unless there are reasonable grounds for believing that the way in which the activity is to be carried out will not result in the occurrence of any significant new environmental impact or risk, or significant increase in any existing environmental impact or risk.

8 Operations must not continue if new or increased environmental risk identified

(1) A titleholder commits an offence if:

(a) the titleholder undertakes an activity after the occurrence of:

(i) any significant new environmental impact or risk arising from the activity; or

(ii) any significant increase in an existing environmental impact or risk arising from the activity; and

(b) the new impact or risk, or increase in the impact or risk, is not provided for in the environment plan in force for the activity.

Penalty: 80 penalty units.

(1A) An offence against subregulation (1) is an offence of strict liability.

Note: For ***strict liability***, see section 6.1 of the *Criminal Code*.

(2) Subregulation (1) does not apply in relation to an activity if the titleholder submits a proposed revision of the environment plan in force for the activity in accordance with subregulation 17(6) and the Regulator has not refused to accept the revision.

Note 1: Under subregulation 17(6), the titleholder is required to submit a proposed revision of the environment plan before, or as soon as

NOPSEMA Attachment 2

practicable after, the occurrence of a significant new, or significantly increased, environmental impact or risk.

Note 2: A defendant bears an evidential burden in relation to the matter in subregulation (2)—see subsection 13.3(3) of the *Criminal Code*.

Division 2.2—Acceptance of an environment plan

9 Submission of an environment plan

(1) Before commencing an activity, a titleholder must submit an environment plan for the activity to the Regulator.

(2) An applicant for a petroleum access authority, petroleum special prospecting authority, pipeline licence, greenhouse gas search authority or greenhouse gas special authority:

(a) may submit an environment plan for an activity under the authority or licence to the Regulator; and

(b) is taken to be a titleholder for the purposes of this Division and Divisions 2.2A and 2.3.

Submission of plan for offshore project

(3) However, a titleholder (or an applicant for a title) may submit an environment plan for an activity that is, or is part of, an offshore project only if:

(a) the Regulator has accepted an offshore project proposal that includes that activity; or

(b) the Environment Minister:

(i) has made a decision under section 75 of the EPBC Act that an action that is equivalent to or includes the activity is not a controlled action; or

(ii) has made a component decision under section 77A of the EPBC Act that a particular provision of Part 3 of that Act is not a controlling provision for an action that is equivalent to or includes the activity, because the Minister believes the action will be taken in a particular manner; or

(iii) has approved, under Part 9 of the EPBC Act, the taking of an action that is equivalent to or includes the activity.

NOPSEMA Attachment 2

(4) If a titleholder (or an applicant for a title) submits an environment plan for an activity in contravention of subregulation (3), the plan is taken not to have been submitted.

(5) For subparagraph (3)(b)(iii), despite section 146D of the EPBC Act an approval by the Environment Minister under section 146B of that Act is not taken to be an approval under Part 9 of that Act of the taking of an action.

Form of environment plan

(6) An environment plan must be in writing.

(7) An environment plan may, if the Regulator approves, relate to:
- (a) one or more stages of an activity; or
- (b) a specified activity in one or more identified locations specified in the plan; or
- (c) more than one activity; or
- (d) an activity or activities to be undertaken under 2 or more titles held by different titleholders.

Publication of information

(8) If an environment plan is submitted to the Regulator, the Regulator must, as soon as practicable, publish on the Regulator's website:
- (a) the name of the titleholder; and
- (b) a description of the activity or stage of the activity to which the environment plan relates; and
- (c) the location of the activity; and
- (d) a link or other reference to the place where the accepted offshore project proposal (if any) is published; and
- (e) details of the titleholder's nominated liaison person for the activity; and
- (f) the decision (if any) made by the Regulator in relation to the environment plan.

Withdrawal

(9) A titleholder may, by notice in writing, withdraw a submitted environment plan at any time before the Regulator has made a decision to accept or refuse to accept the plan.

(10) If an environment plan is withdrawn, the Regulator must publish a notice on the Regulator's website.

9A Further information

(1) If a titleholder submits an environment plan, the Regulator may request the titleholder to provide further written information about any matter required by these Regulations to be included in an environment plan.

(2) The request must:
  (a) be in writing; and
  (b) set out each matter for which information is requested; and
  (c) specify a reasonable period within which the information is to be provided.

(3) If a titleholder receives a request, and provides information requested by the Regulator within the period specified or within a longer period agreed to by the Regulator:
  (a) the information becomes part of the environment plan; and
  (b) the Regulator must have regard to the information as if it had been included in the submitted environment plan.

10 Making decision on submitted environment plan

(1) Within 30 days after a titleholder submits an environment plan:
  (a) if the Regulator is reasonably satisfied that the environment plan meets the criteria set out in regulation 10A, the Regulator must accept the plan; or
  (b) if the Regulator is not reasonably satisfied that the environment plan meets the criteria set out in regulation 10A,

the Regulator must give the titleholder notice in writing under subregulation (2); or

(c) if the Regulator is unable to make a decision on the environment plan within the 30 day period, the Regulator must give the titleholder notice in writing and set out a proposed timetable for consideration of the plan.

(2) A notice to a titleholder under this subregulation must:

(a) state that the Regulator is not reasonably satisfied that the environment plan submitted by the titleholder meets the criteria set out in regulation 10A; and

(b) identify the criteria set out in regulation 10A about which the Regulator is not reasonably satisfied; and

(c) set a date by which the titleholder may resubmit the plan.

(3) The date referred to in paragraph (2)(c) must give the titleholder a reasonable opportunity to modify and resubmit the plan.

(4) Within 30 days after the titleholder has resubmitted the modified plan:

(a) if the Regulator is reasonably satisfied that the environment plan meets the criteria set out in regulation 10A, the Regulator must accept the plan; or

(b) if the Regulator is still not reasonably satisfied that the environment plan meets the criteria set out in regulation 10A, the Regulator must:

(i) give the titleholder a further notice under subregulation (2); or

(ii) refuse to accept the plan; or

(iii) act under subregulation (6); or

(c) if the Regulator is unable to make a decision on the environment plan within the 30 day period, the Regulator must give the titleholder notice in writing and set out a proposed timetable for consideration of the plan.

(5) If the titleholder does not resubmit the plan by the date referred to in paragraph (2)(c), or a later date agreed to by the Regulator, the Regulator must:
  (a) refuse to accept the plan; or
  (b) act under subregulation (6).

(6) For subparagraph (4)(b)(iii) and paragraph (5)(b), the Regulator may do either or both of the following:
  (a) accept the plan in part for a particular stage of the activity;
  (b) accept the plan subject to limitations or conditions applying to operations for the activity.

(7) A decision by the Regulator to accept, or refuse to accept, an environment plan is not invalid only because the Regulator did not comply with the 30 day period in subregulation (1) or (4).

10A Criteria for acceptance of environment plan

For regulation 10, the criteria for acceptance of an environment plan are that the plan:
  (a) is appropriate for the nature and scale of the activity; and
  (b) demonstrates that the environmental impacts and risks of the activity will be reduced to as low as reasonably practicable; and
  (c) demonstrates that the environmental impacts and risks of the activity will be of an acceptable level; and
  (d) provides for appropriate environmental performance outcomes, environmental performance standards and measurement criteria; and
  (e) includes an appropriate implementation strategy and monitoring, recording and reporting arrangements; and
  (f) does not involve the activity or part of the activity, other than arrangements for environmental monitoring or for responding to an emergency, being undertaken in any part of a declared World Heritage property within the meaning of the EPBC Act; and

NOPSEMA Attachment 2

(g) demonstrates that:
  (i) the titleholder has carried out the consultations required by Division 2.2A; and
  (ii) the measures (if any) that the titleholder has adopted, or proposes to adopt, because of the consultations are appropriate; and
(h) complies with the Act and the regulations.

11 Notice of decision on environment plan and submission of summary

(1) The Regulator must give the titleholder notice in writing of a decision by the Regulator to:
  (a) accept the environment plan; or
  (b) refuse to accept the plan; or
  (c) accept the plan in part for a particular stage of the activity, or subject to limitations or conditions.

Note: For a petroleum activity, NOPSEMA must not accept the environment plan unless NOPSEMA is reasonably satisfied that the titleholder is compliant with subsection 571(2) of the Act in relation to the petroleum activity and the compliance is in a form that is acceptable to NOPSEMA: see regulation 5G.

(2) A notice of a decision mentioned in paragraph (1)(b) or (c) must set out:
  (a) the terms of the decision and the reasons for it; and
  (b) any limitations or conditions that are to apply to operations for the activity.

(3) Within 10 days after receiving notice that the Regulator has accepted an environment plan (whether in full, in part or subject to limitations or conditions), the titleholder must submit a summary of the accepted plan to the Regulator for public disclosure.

(4) The summary:

Regulation 11

(a) must include the following material from the environment plan:
  (i) the location of the activity;
  (ii) a description of the receiving environment;
  (iii) a description of the activity;
  (iv) details of environmental impacts and risks;
  (v) a summary of the control measures for the activity;
  (vi) a summary of the arrangements for ongoing monitoring of the titleholder's environmental performance;
  (vii) a summary of the response arrangements in the oil pollution emergency plan;
  (viii) details of consultation already undertaken, and plans for ongoing consultation;
  (ix) details of the titleholder's nominated liaison person for the activity; and
(b) must be to the satisfaction of the Regulator.

NOPSEMA Attachment 2

Division 2.2A—Consultation

11A Consultation with relevant authorities, persons and organisations, etc

(1) In the course of preparing an environment plan, or a revision of an environment plan, a titleholder must consult each of the following (a ***relevant person***):

(a) each Department or agency of the Commonwealth to which the activities to be carried out under the environment plan, or the revision of the environment plan, may be relevant;

(b) each Department or agency of a State or the Northern Territory to which the activities to be carried out under the environment plan, or the revision of the environment plan, may be relevant;

(c) the Department of the responsible State Minister, or the responsible Northern Territory Minister;

(d) a person or organisation whose functions, interests or activities may be affected by the activities to be carried out under the environment plan, or the revision of the environment plan;

(e) any other person or organisation that the titleholder considers relevant.

(2) For the purpose of the consultation, the titleholder must give each relevant person sufficient information to allow the relevant person to make an informed assessment of the possible consequences of the activity on the functions, interests or activities of the relevant person.

(3) The titleholder must allow a relevant person a reasonable period for the consultation.

Division 2.3—Contents of an environment plan

12 Contents of an environment plan

An environment plan for an activity must include the matters set out in regulations 13, 14, 15 and 16.

13 Environmental assessment

Description of the activity

(1) The environment plan must contain a comprehensive description of the activity including the following:

(a) the location or locations of the activity;

(b) general details of the construction and layout of any facility;

(c) an outline of the operational details of the activity (for example, seismic surveys, exploration drilling or production) and proposed timetables;

(d) any additional information relevant to consideration of environmental impacts and risks of the activity.

Note: An environment plan will not be capable of being accepted by the Regulator if an activity or part of the activity, other than arrangements for environmental monitoring or for responding to an emergency, will be undertaken in any part of a declared World Heritage property—see regulation 10A.

Description of the environment

(2) The environment plan must:

(a) describe the existing environment that may be affected by the activity; and

(b) include details of the particular relevant values and sensitivities (if any) of that environment.

Note: The definition of ***environment*** in regulation 4 includes its social, economic and cultural features.

(3) Without limiting paragraph (2)(b), particular relevant values and sensitivities may include any of the following:

(a) the world heritage values of a declared World Heritage property within the meaning of the EPBC Act;

(b) the national heritage values of a National Heritage place within the meaning of that Act;

(c) the ecological character of a declared Ramsar wetland within the meaning of that Act;

(d) the presence of a listed threatened species or listed threatened ecological community within the meaning of that Act;

(e) the presence of a listed migratory species within the meaning of that Act;

(f) any values and sensitivities that exist in, or in relation to, part or all of:

(i) a Commonwealth marine area within the meaning of that Act; or

(ii) Commonwealth land within the meaning of that Act.

Requirements

(4) The environment plan must:

(a) describe the requirements, including legislative requirements, that apply to the activity and are relevant to the environmental management of the activity; and

(b) demonstrate how those requirements will be met.

Evaluation of environmental impacts and risks

(5) The environment plan must include:

(a) details of the environmental impacts and risks for the activity; and

(b) an evaluation of all the impacts and risks, appropriate to the nature and scale of each impact or risk; and

(c) details of the control measures that will be used to reduce the impacts and risks of the activity to as low as reasonably practicable and an acceptable level.

(6) To avoid doubt, the evaluation mentioned in paragraph (5)(b) must evaluate all the environmental impacts and risks arising directly or indirectly from:

(a) all operations of the activity; and

(b) potential emergency conditions, whether resulting from accident or any other reason.

Environmental performance outcomes and standards

(7) The environment plan must:

(a) set environmental performance standards for the control measures identified under paragraph (5)(c); and

(b) set out the environmental performance outcomes against which the performance of the titleholder in protecting the environment is to be measured; and

(c) include measurement criteria that the titleholder will use to determine whether each environmental performance outcome and environmental performance standard is being met.

14 Implementation strategy for the environment plan

(1) The environment plan must contain an implementation strategy for the activity in accordance with this regulation.

(2) The implementation strategy must:

(a) state when the titleholder will report to the Regulator in relation to the titleholder's environmental performance for the activity; and

(b) provide that the interval between reports will not be more than 1 year.

NOPSEMA Attachment 2

Note: Regulation 26C requires a titleholder to report on environmental performance in accordance with the timetable set out in the environment plan.

(3) The implementation strategy must contain a description of the environmental management system for the activity, including specific measures to be used to ensure that, for the duration of the activity:

(a) the environmental impacts and risks of the activity continue to be identified and reduced to a level that is as low as reasonably practicable; and

(b) control measures detailed in the environment plan are effective in reducing the environmental impacts and risks of the activity to as low as reasonably practicable and an acceptable level; and

(c) environmental performance outcomes and standards set out in the environment plan are being met.

(4) The implementation strategy must establish a clear chain of command, setting out the roles and responsibilities of personnel in relation to the implementation, management and review of the environment plan, including during emergencies or potential emergencies.

(5) The implementation strategy must include measures to ensure that each employee or contractor working on, or in connection with, the activity is aware of his or her responsibilities in relation to the environment plan, including during emergencies or potential emergencies, and has the appropriate competencies and training.

(6) The implementation strategy must provide for sufficient monitoring, recording, audit, management of nonconformance and review of the titleholder's environmental performance and the implementation strategy to ensure that the environmental performance outcomes and standards in the environment plan are being met.

Regulation 14

(7) The implementation strategy must provide for sufficient monitoring of, and maintaining a quantitative record of, emissions and discharges (whether occurring during normal operations or otherwise), such that the record can be used to assess whether the environmental performance outcomes and standards in the environment plan are being met.

(8) The implementation strategy must contain an oil pollution emergency plan and provide for the updating of the plan.

(8AA) The oil pollution emergency plan must include adequate arrangements for responding to and monitoring oil pollution, including the following:

(a) the control measures necessary for timely response to an emergency that results or may result in oil pollution;

(b) the arrangements and capability that will be in place, for the duration of the activity, to ensure timely implementation of the control measures, including arrangements for ongoing maintenance of response capability;

(c) the arrangements and capability that will be in place for monitoring the effectiveness of the control measures and ensuring that the environmental performance standards for the control measures are met;

(d) the arrangements and capability in place for monitoring oil pollution to inform response activities.

(8A) The implementation strategy must include arrangements for testing the response arrangements in the oil pollution emergency plan that are appropriate to the response arrangements and to the nature and scale of the risk of oil pollution for the activity.

(8B) The arrangements for testing the response arrangements must include:

(a) a statement of the objectives of testing; and

(b) a proposed schedule of tests; and

(c) mechanisms to examine the effectiveness of response arrangements against the objectives of testing; and

NOPSEMA Attachment 2

(d) mechanisms to address recommendations arising from tests.

(8C) The proposed schedule of tests must provide for the following:

(a) testing the response arrangements when they are introduced;

(b) testing the response arrangements when they are significantly amended;

(c) testing the response arrangements not later than 12 months after the most recent test;

(d) if a new location for the activity is added to the environment plan after the response arrangements have been tested, and before the next test is conducted—testing the response arrangements in relation to the new location as soon as practicable after it is added to the plan;

(e) if a facility becomes operational after the response arrangements have been tested and before the next test is conducted—testing the response arrangements in relation to the facility when it becomes operational.

(8D) The implementation strategy must provide for monitoring of impacts to the environment from oil pollution and response activities that:

(a) is appropriate to the nature and scale of the risk of environmental impacts for the activity; and

(b) is sufficient to inform any remediation activities.

(8E) The implementation strategy must include information demonstrating that the response arrangements in the oil pollution emergency plan are consistent with the national system for oil pollution preparedness and response.

(9) The implementation strategy must provide for appropriate consultation with:

(a) relevant authorities of the Commonwealth, a State or Territory; and

(b) other relevant interested persons or organisations.

(10) The implementation strategy must comply with the Act, the regulations and any other environmental legislation applying to the activity.

15 Details of titleholder and liaison person

(1) The environment plan must include the following details for the titleholder:

(a) name;
(b) business address;
(c) telephone number (if any);
(d) fax number (if any);
(e) email address (if any);
(f) if the titleholder is a body corporate that has an ACN (within the meaning of the *Corporations Act 2001*)—ACN.

(2) The environment plan must also include the following details for the titleholder's nominated liaison person:

(a) name;
(b) business address;
(c) telephone number (if any);
(d) fax number (if any);
(e) email address (if any).

(3) The environment plan must include arrangements for notifying the Regulator of a change in the titleholder, a change in the titleholder's nominated liaison person or a change in the contact details for either the titleholder or the liaison person.

16 Other information in the environment plan

The environment plan must contain the following:

(a) a statement of the titleholder's corporate environmental policy;

NOPSEMA Attachment 2

(b) a report on all consultations between the titleholder and any relevant person, for regulation 11A, that contains:

(i) a summary of each response made by a relevant person; and

(ii) an assessment of the merits of any objection or claim about the adverse impact of each activity to which the environment plan relates; and

(iii) a statement of the titleholder's response, or proposed response, if any, to each objection or claim; and

(iv) a copy of the full text of any response by a relevant person;

(c) details of all reportable incidents in relation to the proposed activity.

Division 2.4—Revision of an environment plan

17 Revision because of a change, or proposed change, of circumstances or operations

New activity

(1) A titleholder may, with the Regulator's approval, submit to the Regulator a proposed revision of an environment plan before the commencement of a new activity.

Submission of revision for activity in offshore project

(2) However, a titleholder may submit a proposed revision of an environment plan for a new activity that is, or is part of, an offshore project only if:

(a) the Regulator has accepted an offshore project proposal that includes the new activity; or

(b) the Environment Minister:

(i) has made a decision under section 75 of the EPBC Act that an action that is equivalent to or includes the new activity is not a controlled action; or

(ii) has made a component decision under section 77A of the EPBC Act that a particular provision of Part 3 of that Act is not a controlling provision for an action that is equivalent to or includes the new activity, because the Minister believes the action will be taken in a particular manner; or

(iii) has approved, under Part 9 of the EPBC Act, the taking of an action that is equivalent to or includes the new activity.

(3) If a titleholder submits a proposed revision of an environment plan for a new activity in contravention of subregulation (2), the revision is taken not to have been submitted.

(4) For subparagraph (2)(b)(iii), despite section 146D of the EPBC Act an approval by the Environment Minister under section 146B of that Act is not taken to be an approval under Part 9 of that Act of the taking of an action.

Significant modification or new stage of activity

(5) A titleholder must submit to the Regulator a proposed revision of the environment plan for an activity before the commencement of any significant modification or new stage of the activity that is not provided for in the environment plan as currently in force.

New or increased environmental impact or risk

(6) A titleholder must submit a proposed revision of the environment plan for an activity before, or as soon as practicable after:

(a) the occurrence of any significant new environmental impact or risk, or significant increase in an existing environmental impact or risk, not provided for in the environment plan in force for the activity; or

(b) the occurrence of a series of new environmental impacts or risks, or a series of increases in existing environmental impacts or risks, which, taken together, amount to the occurrence of:

(i) a significant new environmental impact or risk; or

(ii) a significant increase in an existing environmental impact or risk;

that is not provided for in the environment plan in force for the activity.

Change in titleholder

(7) If a change in the titleholder will result in a change in the manner in which the environmental impacts and risks of an activity are managed, the new titleholder must submit a proposed revision of the environment plan for the activity as soon as practicable.

Transitional arrangements—changes to management of impacts and risks

(8) Subregulation (9) applies if:

(a) a titleholder proposes to change the manner in which the environmental impacts and risks of an activity are managed from the way in which they are managed under the environment plan in force for the activity; and

(b) the environment plan was in force immediately before 28 February 2014.

(9) The titleholder must submit a proposed revision of the environment plan no later than 31 August 2014.

(10) Subregulation (11) applies if:

(a) a titleholder proposes to change the manner in which the environmental impacts and risks of an activity are managed from the way in which they are managed under the environment plan in force for the activity; and

(b) regulation 44 applied to the acceptance of the environment plan (whether as a new plan or as a revision of an earlier plan).

(11) The titleholder must submit a proposed revision of the environment plan within 6 months after the day on which the Regulator notified the titleholder that the environment plan was accepted.

18 Revision on request by the Regulator

(1) A titleholder must submit to the Regulator a proposed revision of the environment plan for an activity if the Regulator requests the titleholder to do so.

(2) A request by the Regulator must be in writing and set out the following:

(a) the matters to be addressed by the revision;

(b) the proposed date of effect of the revision;

(c) the grounds for the request.

(3) The titleholder may make a submission in writing to the Regulator stating the titleholder's reasons for 1 or more of the following matters:

(a) why the revision should not occur;

(b) why the revision should be in different terms from the proposed terms;

(c) whether or not the titleholder gives other reasons—why the revision should take effect on a date later than the proposed date.

(4) A submission by the titleholder must be made within 21 days after receiving the request, or within any longer period that the Regulator in writing allows.

(5) If a submission complies with subregulations (3) and (4), the Regulator must:

(a) decide whether to accept 1 or more of the reasons stated in the submission; and

(b) give the titleholder notice in writing of the decision; and

(c) to the extent (if any) that the Regulator accepts the reasons, give the titleholder notice in writing that varies or withdraws the request in accordance with the decision; and

(d) to the extent (if any) that the Regulator does not accept the reasons, give the titleholder notice in writing of the grounds for not accepting them.

(6) A titleholder must comply with a request made by the Regulator under subregulation (1) and not withdrawn, or with a variation of a request under paragraph (5)(c), as soon as practicable.

(7) Subregulations (8) to (13) apply if an environment plan:

(a) was accepted by the Designated Authority before the commencement day; and

(b) is continued in force under regulation 40.

Note: As a result of amendments made by the *Offshore Petroleum and Greenhouse Gas Storage Amendment (National Regulator) Act 2011*, NOPSEMA, as the new Regulator, may consider it appropriate to request revision of environment plans that were accepted by a different Regulator.

(8) The titleholder for the activity to which the plan relates must submit to the Regulator a proposed revision of the plan if the Regulator requests the titleholder to do so.

(9) The Regulator may make a request under subregulation (8) if the Regulator is not satisfied that the environment plan meets one or more of the criteria set out in subregulation 11(1).

(10) If the Regulator makes a request under subregulation (8), the Regulator must identify the criteria set out in subregulation 11(1) about which the Regulator is not satisfied.

(11) If the Regulator makes a request under subregulation (8), the titleholder may, within 21 days after receiving the request, or within a longer period that the Regulator, in writing, allows, make a written submission to the Regulator setting out the titleholder's reasons why the plan meets the criteria identified by the Regulator in the request.

(12) If a titleholder makes a submission under subregulation (11), the Regulator must:

(a) decide whether to accept one or more of the reasons stated in the submission; and

(b) give the titleholder notice, in writing, of the decision; and

(c) to the extent (if any) that the Regulator accepts the reasons, give the titleholder notice, in writing, that varies or withdraws the request in accordance with the decision; and

(d) to the extent (if any) that the Regulator does not accept the reasons, give the titleholder notice, in writing, of the grounds for not accepting them.

(13) A titleholder must comply with a request made by the Regulator under subregulation (8) and not withdrawn, or a request as varied under paragraph (12)(c), as soon as practicable.

(14) In this regulation:

commencement day means the day on which Part 1 of Schedule 2 to the *Offshore Petroleum and Greenhouse Gas Storage Amendment (National Regulator) Act 2011* commences.

19 Revision at the end of each 5 years

(1) A titleholder must submit to the Regulator a proposed revision of the environment plan for an activity at least 14 days before the end of each period of 5 years, commencing on the latest of the following:

(a) the day on which the environment plan is first accepted under regulation 11 by the Regulator;

(b) the day on which a revised environment plan submitted under this regulation is accepted under regulation 11 by the Regulator;

(c) for a revision of an environment plan submitted under regulation 17 or 18, the day (if any) notified by the Regulator under subregulation (2).

(2) For paragraph (1)(c), the Regulator may notify the titleholder that the effect of a revision of an environment plan submitted under regulation 17 or 18 is that the period of 5 years mentioned in subregulation (1) starts on the date specified in the notification.

20 Form of proposed revision

A proposed revision must be in the form of a revised environment plan or, if the titleholder and the Regulator so agree, a revised part of the environment plan.

Regulation 20A

20A Publication of information about proposed revision

If a proposed revision of an environment plan is submitted to the Regulator, the Regulator must, as soon as practicable, publish on the Regulator's website:

(a) the name of the titleholder; and

(b) a description of the activity or stage of the activity to which the revised environment plan or revised part relates; and

(c) the reason for the revision; and

(d) the location of the activity; and

(e) a link or other reference to the place where the accepted offshore project proposal (if any) is published; and

(f) details of the titleholder's nominated liaison person for the activity; and

(g) the decision (if any) made by the Regulator in relation to the revised environment plan or revised part.

21 Acceptance of a revised environment plan

Regulations 9A, 10, 10A, 11 and 11A apply to the proposed revision as if:

(a) a reference in those regulations to the submission, acceptance or non-acceptance of the environment plan were a reference to the submission, acceptance or non-acceptance of the proposed revision; and

(b) any other reference in those regulations to the environment plan were a reference to the plan as revised by the proposed revision.

Note: These regulations deal with the consideration and acceptance of an environment plan, and the consultation required with relevant authorities, persons and organisations.

NOPSEMA Attachment 2

22 Effect of non-acceptance of proposed revision

If a proposed revision is not accepted, the provisions of the environment plan in force for the activity existing immediately before the proposed revision was submitted remain in force, subject to the Act and these Regulations, (in particular, the provisions of Division 2.5), as if the revision had not been proposed.

Division 2.5—Withdrawal of acceptance of an environment plan

23 Withdrawal of acceptance of environment plan

(1) The Regulator, by notice in writing to the titleholder for an activity, may withdraw the acceptance of the environment plan for the activity on any ground set out in subregulation (2).

(2) For subregulation (1), the grounds are that:

(a) the titleholder has not complied with:

(i) a provision of the Act relating to environmental requirements; or

(ii) a direction given by the Regulator under section 574, 576B, 580, 586 or 592 of the Act; or

(b) the titleholder has not complied with regulation 7, 8, 17, 18 or 19; or

(c) the Regulator has refused to accept a proposed revision of the environment plan; or

(d) the Regulator is not reasonably satisfied, after 2 or more requests for modification of a report on environmental performance under subregulation 26C(3), that the titleholder has given the Regulator sufficient information to enable the Regulator to determine whether the environmental performance outcomes and standards in the environment plan have been met; or

(e) for a petroleum activity—the titleholder has failed to maintain compliance with subsection 571(2) of the Act, in a form acceptable to NOPSEMA, in relation to the activity.

(3) A notice under subregulation (1) must set out the reasons for the decision.

NOPSEMA Attachment 2

24 Steps to be taken before withdrawal of acceptance

(1) Before withdrawing the acceptance of an environment plan for an activity the Regulator must comply with subregulations (2), (4) and (5).

(2) The Regulator must give the titleholder at least 30 days notice in writing of the Regulator's intention to withdraw acceptance of the plan.

(3) The Regulator may give a copy of the notice to such other persons (if any) as the Regulator thinks fit.

(4) The Regulator must specify in the notice a date (the ***specified date***) on or before which the titleholder (or any other person to whom a copy of the notice has been given) may submit to the Regulator, in writing, any matters for the Regulator to take into account.

(5) The Regulator must take into account:
  (a) any action taken by the titleholder to remove the ground for withdrawal of acceptance, or to prevent the recurrence of that ground; and
  (b) any matter submitted to the Regulator before the specified date by the titleholder or a person to whom a copy of the notice has been given.

25 Withdrawal of acceptance not affected by other provisions

(1) The Regulator may withdraw the acceptance of an environment plan for an activity on the ground that the titleholder has not complied with a provision of the Act, or of a regulation mentioned in paragraph 23(2)(b), even though the titleholder has been convicted of an offence by reason of the failure to comply with that provision.

(2) If the Regulator withdraws the acceptance of an environment plan on the ground that the titleholder has not complied with a provision of the Act, or of a regulation mentioned in paragraph 23(2)(b), the

titleholder may be convicted of an offence by reason of the failure to comply with the provision even though the acceptance of the environment plan has been withdrawn.

Division 2.6—End of environment plan

25A Plan ends when titleholder notifies completion

The operation of an environment plan ends when:

(a) the titleholder notifies the Regulator that:

(i) the activity or activities to which the plan relates have ended; and

(ii) all of the obligations under the environment plan have been completed; and

(b) the Regulator accepts the notification.

Part 3—Incidents, reports and records

26 Notifying reportable incidents

(1) A titleholder commits an offence if:

(a) the titleholder undertakes an activity; and

(b) there is a reportable incident; and

(c) the titleholder does not notify the reportable incident in accordance with subregulation (4).

Penalty: 40 penalty units.

(2) However, it is a defence to a prosecution for an offence against subregulation (1) if the titleholder has a reasonable excuse.

Note: A defendant bears an evidential burden in relation to the question whether he or she has a reasonable excuse (see section 13.3 of the *Criminal Code*).

(3) An offence against subregulation (1) is an offence of strict liability.

Note: For ***strict liability***, see section 6.1 of the *Criminal Code*.

(4) A notification under subregulation (1):

(a) must be given to the Regulator; and

(b) must be given as soon as practicable, and in any case not later than 2 hours after:

(i) the first occurrence of the reportable incident; or

(ii) if the reportable incident was not detected by the titleholder at the time of the first occurrence—the time the titleholder becomes aware of the reportable incident; and

(c) must be oral; and

(d) must contain:

(i) all material facts and circumstances concerning the reportable incident that the titleholder knows or is able, by reasonable search or enquiry, to find out; and

(ii) any action taken to avoid or mitigate any adverse environment impacts of the reportable incident; and

(iii) the corrective action that has been taken, or is proposed to be taken, to stop, control or remedy the reportable incident.

(5) Subregulation 11A.01(5) of the *Offshore Petroleum and Greenhouse Gas Storage (Resource Management and Administration) Regulations 2011* does not apply to a notification mentioned in subregulation (1).

(6) As soon as practicable after the titleholder notifies a reportable incident, the titleholder must give a written record of the notification to:

(a) the Regulator; and

(b) the Titles Administrator; and

(c) the Department of the responsible State Minister, or the responsible Northern Territory Minister.

(7) The titleholder is not required to include in the record anything that was not included in the notification.

26A Written report of reportable incidents

(1) A titleholder commits an offence if:

(a) the titleholder undertakes an activity; and

(b) there is a reportable incident; and

(c) the titleholder does not submit a written report of the reportable incident in accordance with subregulation (4).

Penalty: 40 penalty units.

(2) However, it is a defence to a prosecution for an offence against subregulation (1) if the titleholder has a reasonable excuse.

Note: A defendant bears an evidential burden in relation to the question whether he or she has a reasonable excuse (see section 13.3 of the *Criminal Code*).

(3) An offence against subregulation (1) is an offence of strict liability.

Note: For ***strict liability***, see section 6.1 of the *Criminal Code*.

(4) A written report under subregulation (1):

(a) must be given to the Regulator; and

(b) must be given as soon as practicable, and in any case:

(i) not later than 3 days after the first occurrence of the reportable incident; or

(ii) if the Regulator specifies, within 3 days after the first occurrence of the reportable incident, another period within which the report must be provided—within that period; and

(c) must contain:

(i) all material facts and circumstances concerning the reportable incident that the titleholder knows or is able, by reasonable search or enquiry, to find out; and

(ii) any action taken to avoid or mitigate any adverse environment impacts of the reportable incident; and

(iii) the corrective action that has been taken, or is proposed to be taken, to stop, control or remedy the reportable incident; and

(iv) the action that has been taken, or is proposed to be taken, to prevent a similar incident occurring in the future.

(5) Within 7 days after giving a written report of a reportable incident to the Regulator, the titleholder must give a copy of the report to:

(a) the Titles Administrator; and

(b) the Department of the responsible State Minister, or the responsible Northern Territory Minister.

26AA Additional written reports if requested

(1) This regulation applies if a titleholder notifies a reportable incident in accordance with regulation 26.

(2) The Regulator may, by notice in writing, require the titleholder to submit one or more written reports of the reportable incident after the written report required under regulation 26A.

(3) The notice must:

(a) identify the information to be contained in a report or the matters to be addressed; and

(b) specify when the report must be given to the Regulator.

(4) The date or time specified for giving the report must give the titleholder a reasonable time for preparing the report.

(5) A titleholder must submit a written report of a reportable incident in accordance with a notice given by the Regulator to the titleholder under this regulation.

Penalty: 40 penalty units.

(6) It is a defence to a prosecution for an offence against subregulation (5) if the titleholder has a reasonable excuse.

Note: A defendant bears an evidential burden in relation to the question whether he or she has a reasonable excuse—see subsection 13.3(3) of the *Criminal Code*.

(7) An offence against subregulation (5) is an offence of strict liability.

Note: For strict liability, see section 6.1 of the *Criminal Code*.

26B Reporting recordable incidents

(1) A titleholder commits an offence if:

(a) the titleholder undertakes an activity; and

(b) there is a recordable incident; and

Regulation 26B

(c) the titleholder does not submit a written report of the recordable incident in accordance with subregulation (4).

Penalty: 40 penalty units.

(2) However, it is a defence to a prosecution for an offence against subregulation (1) if the titleholder has a reasonable excuse.

Note: A defendant bears an evidential burden in relation to the question whether he or she has a reasonable excuse (see section 13.3 of the *Criminal Code*).

(3) An offence against subregulation (1) is an offence of strict liability.

Note: For ***strict liability***, see section 6.1 of the *Criminal Code*.

(4) A written report under subregulation (1):

(a) must be given to the Regulator; and

(b) must relate to a calendar month; and

(c) must be given as soon as practicable after the end of the calendar month, and in any case not later than 15 days after the end of the calendar month; and

(d) must contain:

(i) a record of all recordable incidents that occurred during the calendar month; and

(ii) all material facts and circumstances concerning the recordable incidents that the titleholder knows or is able, by reasonable search or enquiry, to find out; and

(iii) any action taken to avoid or mitigate any adverse environment impacts of the recordable incidents; and

(iv) the corrective action that has been taken, or is proposed to be taken, to stop, control or remedy the recordable incident; and

(v) the action that has been taken, or is proposed to be taken, to prevent a similar incident occurring in the future.

NOPSEMA Attachment 2

26C Reporting environmental performance

(1) A titleholder undertaking an activity must submit a report to the Regulator in relation to the titleholder's environmental performance for the activity, at the intervals provided for in the environment plan.

Note: Subregulation 14(2) requires an environment plan to state when the titleholder will submit reports.

(2) If the Regulator is not reasonably satisfied that a report is sufficient to enable the Regulator to determine whether the environmental performance outcomes and standards in the environment plan have been met, the Regulator may ask the titleholder to modify the report.

(3) The request must:

(a) be in writing; and

(b) identify the reasons the Regulator is not reasonably satisfied with the report.

Note: If the Regulator is still not reasonably satisfied after 2 or more requests for a modified report, this is a ground for the Regulator to withdraw acceptance of the environment plan—see paragraph 23(2)(d).

27 Storage of records

(1) A titleholder commits an offence if the titleholder does not store the environment plan in force for an activity in a way that makes retrieval of the environment plan reasonably practicable.

Penalty: 30 penalty units.

(2) A titleholder commits an offence if the titleholder does not store a version of an environment plan for an activity that was previously in force in a way that makes retrieval of the version reasonably practicable.

Penalty: 30 penalty units.

Regulation 27

(3) It is a defence to a prosecution for an offence against subregulation (2) if it is more than 5 years after the day when the version ceased to be in force (whether because the plan was revised, acceptance of the plan was withdrawn, or the operation of the plan ended).

Note: A defendant bears an evidential burden in relation to the matter in subregulation (3)—see subsection 13.3(3) of the *Criminal Code*.

(4) A titleholder commits an offence if the titleholder:

(a) creates a document or other record mentioned in subregulation (6); and

(b) does not store the document or record in a way that makes retrieval of the document or record reasonably practicable.

Penalty: 30 penalty units.

(5) It is a defence to a prosecution for an offence against subregulation (4) if it is more than 5 years after the day that the document or record was created.

Note: A defendant bears an evidential burden in relation to the matter in subregulation (5)—see subsection 13.3(3) of the *Criminal Code*.

(6) For subregulation (4), the documents or other records are the following:

(a) written reports (including monitoring, audit and review reports) about environmental performance, or about the implementation strategy, under an environment plan;

(b) records relating to environmental performance, or the implementation strategy, under an environment plan;

(c) records of emissions and discharges into the environment made in accordance with an environment plan;

(d) records of calibration and maintenance of monitoring devices used in accordance with an environment plan;

(e) records and copies of reports mentioned in:

(i) regulations 26, 26A and 26AA, relating to reportable incidents; and

(ii) regulation 26B, relating to recordable incidents; and
(iii) regulation 26C, relating to the titleholder's environmental performance for an activity.

(7) An offence against subregulation (1), (2) or (4) is an offence of strict liability.

Note: For strict liability, see section 6.1 of the *Criminal Code*.

28 Making records available

(1) A titleholder must make available, in accordance with this regulation, copies of the records mentioned in regulation 27.

Penalty: 30 penalty units.

(1A) An offence against subregulation (1) is an offence of strict liability.

Note: For ***strict liability***, see section 6.1 of the *Criminal Code*.

(2) The titleholder must make copies of the records available to any of the following persons, on request in writing by the person:
(a) the Regulator;
(b) a delegate, under section 778 of the Act, of the responsible Commonwealth Minister;
(c) a greenhouse gas project inspector, a NOPSEMA inspector or a Greater Sunrise visiting inspector.

(3) If the person making the request states that copies of the records be made available to an agent of the person, the titleholder must make the copies available to the agent.

(4) However, if the titleholder:
(a) requests a person who is a delegate of the Regulator to produce written evidence of the delegation; or
(b) requests a person who is a greenhouse gas project inspector or a NOPSEMA inspector to produce written evidence of the person's appointment as a greenhouse gas project inspector or a petroleum project inspector; or

(c) requests a person who is a Greater Sunrise visiting inspector to produce written evidence of the person's appointment as a Greater Sunrise visiting inspector; or

(d) requests a person who is an agent to produce written evidence of the person's appointment as an agent;

the titleholder is not required to make the records available unless the person produces the evidence to the titleholder.

(5) The copies of the records must be made available:

(a) in the case of an emergency relating to an activity—as soon as possible at any time of the day or night on any day during the emergency; or

(b) in any other case—during normal business hours on a business day in the place where the records are kept.

(6) The copies of the records must be made available at the place where the records are kept or, if agreed between the titleholder and the person making the request (or the person's agent), at any other place (including by means of electronic transmission to the person or agent at that place).

(7) If the records are stored on a computer, the records must be made available in print-out form or, if the titleholder and the Regulator so agree, in electronic form.

Part 4—Miscellaneous

Division 4.1—Information requirements

29 Notifying start and end of activity

(1) A titleholder must notify the Regulator that an activity is to commence at least 10 days before the activity commences.

(2) A titleholder must notify the Regulator that an activity is completed within 10 days after the completion.

30 Notifying certain operations to State or Territory

(1) A titleholder commits an offence if:

(a) the titleholder commences drilling operations or seismic survey operations; and

(b) the titleholder did not notify the proposed date of commencement to the Department of the responsible State Minister or responsible Northern Territory Minister.

Penalty: 30 penalty units.

(2) An offence against subregulation (1) is an offence of strict liability.

Note: For strict liability, see section 6.1 of the *Criminal Code*.

31 Titleholder may refer to information previously given

(1) If:

(a) a titleholder is required, under these Regulations, to give the Regulator information or include information in a document; and

(b) the same information has previously been given to the Regulator for another purpose under the Act or the regulations;

the titleholder may comply with the requirement to give or include the information by referring to the information previously given.

(2) Subregulation (1) does not apply if the Regulator tells the titleholder that the information is no longer available to the Regulator.

(3) If the Regulator has power to assess whether information is sufficient or adequate for a purpose, the Regulator is not required to accept that information is sufficient or adequate for a purpose different from the one for which it was originally given.

NOPSEMA Attachment 2

Division 4.2—Fees

32 Offshore project proposals

(1) For subsection 685(1) of the Act, a fee is payable to NOPSEMA for the consideration of an offshore project proposal in accordance with Part 1A.

(2) The fee is the total amount of the expenses incurred by NOPSEMA in considering the proposal.

(3) However, NOPSEMA may remit the whole or a part of an amount of the fee if NOPSEMA considers that there are good reasons for doing so.

(4) The fee is:

(a) due when NOPSEMA issues an invoice for the fee to the person who submitted the proposal; and

(b) payable in accordance with the requirements of the invoice.

Note 1: Consideration of an offshore project proposal would ordinarily end with a decision by the Regulator whether to accept the proposal. However, the process may terminate before that point (for example, if the proposal is withdrawn): the fee will represent the Regulator's expenses in considering the proposal to whatever point is reached.

Note 2: It is expected that the Regulator and the person who submitted the offshore project proposal will agree on the terms of payment of the fee. The invoice will state the terms, whether or not there is an agreement.

33 Financial assurance

(1) For section 685 of the Act, a fee is payable to NOPSEMA by the titleholder for a petroleum activity if NOPSEMA assesses financial assurance arrangements, proposed by the titleholder in relation to the activity, for the purposes of regulation 5G.

Regulation 33

(2) The amount or rate of the fee is an amount or rate determined by the Chief Executive Officer of NOPSEMA and must not exceed the total of the expenses incurred by NOPSEMA for the purposes of assessing the proposed financial assurance arrangements.

(3) The fee is payable at the time or times agreed in writing between the Chief Executive Officer of NOPSEMA and the titleholder.

Part 5—Transitional arrangements

Division 5.1—Transitional arrangements relating to the Offshore Petroleum and Greenhouse Gas Storage Amendment (National Regulator) Act 2011

38 Definitions for Division 5.1

In this Division:

commencement day means the day on which Part 1 of Schedule 2 to the *Offshore Petroleum and Greenhouse Gas Storage Amendment (National Regulator) Act 2011* commences.

40 Environment plans accepted before commencement day

(1) If an environment plan was in force immediately before the commencement day, the plan continues to be in force under these Regulations.

(2) The plan is taken to have been accepted by the Regulator on the day it was accepted by the Designated Authority.

Note: The day from which the periods of 5 years are worked out for regulation 19 does not change. Regulation 19 explains how the periods of 5 years change.

41 Environment plans submitted but not accepted before commencement day

If:

(a) an environment plan was submitted to the Designated Authority before the commencement day; and

(b) the Designated Authority neither accepted the plan nor refused to accept the plan before the commencement day;

the plan is taken to have been submitted to the Regulator under regulation 9 on the commencement day.

NOPSEMA Attachment 2

Division 5.2—Transitional arrangements relating to the Offshore Petroleum and Greenhouse Gas Storage Legislation Amendment (Environment Measures) Regulation 2014

42 Definitions for Division 5.2

In this Division:

amending regulation means the *Offshore Petroleum and Greenhouse Gas Storage Legislation Amendment (Environment Measures) Regulation 2014.*

old Regulations means these Regulations as in force before 28 February 2014.

43 Environment plan accepted before commencement of amendments

If an environment plan was in force immediately before 28 February 2014, the plan continues to be in force under these Regulations.

44 Environment plan submitted but not accepted before commencement of amendments

(1) This regulation applies if:

(a) the operator of an activity has:

(i) submitted an environment plan for an activity to the Regulator under regulation 9 of the old Regulations; or

(ii) submitted a proposed revision of an environment plan for an activity to the Regulator under regulation 17, 18 or 19 of the old Regulations; and

(b) the Regulator has not given the operator notice in writing of a decision to accept the plan or proposed revision (whether in full, in part or subject to limitations or conditions) or to refuse to accept the plan or proposed revision.

(2) The environment plan or proposed revision is taken to have been submitted by the titleholder for the activity, on the date that it was submitted by the operator of the activity.

(3) The Regulator must make its decision on the acceptance of the plan or proposed revision having regard to the requirements of these Regulations as in force immediately before 28 February 2014.

45 Notice given under old Regulations of intention to withdraw acceptance of environment plan

If:

(a) the Regulator has given the operator of an activity a notice under subregulation 24(2) of the old Regulations of the Regulator's intention to withdraw acceptance of the environment plan for the activity; and

(b) the Regulator has not made a decision whether to withdraw acceptance of the environment plan;

the notice has no effect.

46 Reporting and recording requirements for operators

(1) This regulation applies in relation to:

(a) a reportable incident or recordable incident that occurred before 28 February 2014; and

(b) documents and other records made in relation to an activity before 28 February 2014.

NOPSEMA Attachment 2

(2) Despite the amendments made by the amending regulation, the requirements of Part 3 of the old Regulations continue to apply on and after 28 February 2014 to a person who was an operator of an activity before 28 February 2014.

Note: The requirements of Part 3 of the old Regulations in relation to an operator of an activity include notifying a reportable incident, submitting a written report of a reportable incident or recordable incident, storing records and making records available.

47 Reporting on environmental performance

Regulation 26C does not apply in relation to an environment plan if:

(a) the plan was in force before 28 February 2014 and has not been revised; or

(b) the plan was in force before 28 February 2014 and any revision of the plan was submitted to the Regulator before 28 February 2014; or

(c) the plan was submitted to the Regulator under regulation 9 of the old Regulations (but was not yet in force).

48 Notifying operations

Regulation 30 applies to drilling operations or seismic survey operations if the environment plan for the activity to which they relate was submitted to the Regulator under regulation 9 on or after 28 February 2014.

Division 5.3—Transitional arrangements relating to the Offshore Petroleum and Greenhouse Gas Storage (Environment) Amendment (Financial Assurance) Regulation 2014

49 Application

The amendments made by items 1, 2 and 5 of Schedule 1 to the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Amendment (Financial Assurance) Regulation 2014* do not apply in relation to an environment plan, or a proposed revision of an environment plan, submitted before 1 January 2015.

Endnotes

Endnote 1—About the endnotes

The endnotes provide information about this compilation and the compiled law.

The following endnotes are included in every compilation:

Endnote 1—About the endnotes
Endnote 2—Abbreviation key
Endnote 3—Legislation history
Endnote 4—Amendment history

Endnotes about misdescribed amendments and other matters are included in a compilation only as necessary.

Abbreviation key—Endnote 2
The abbreviation key sets out abbreviations that may be used in the endnotes.

Legislation history and amendment history—Endnotes 3 and 4
Amending laws are annotated in the legislation history and amendment history.

The legislation history in endnote 3 provides information about each law that has amended (or will amend) the compiled law. The information includes commencement details for amending laws and details of any application, saving or transitional provisions that are not included in this compilation.

The amendment history in endnote 4 provides information about amendments at the provision (generally section or equivalent) level. It also includes information about any provision of the compiled law that has been repealed in accordance with a provision of the law.

Misdescribed amendments
A misdescribed amendment is an amendment that does not accurately describe the amendment to be made. If, despite the misdescription, the amendment can be given effect as intended, the amendment is incorporated into the compiled law and the abbreviation "(md)" added to the details of the amendment included in the amendment history.

If a misdescribed amendment cannot be given effect as intended, the amendment is set out in the endnotes.

NOPSEMA Attachment 2
Endnotes

Endnote 2—Abbreviation key

A = Act
ad = added or inserted
am = amended
amdt = amendment
c = clause(s)
C[x] = Compilation No. x
Ch = Chapter(s)
def = definition(s)
Dict = Dictionary
disallowed = disallowed by Parliament
Div = Division(s)
exp = expires/expired or ceases/ceased to have effect
F = Federal Register of Legislative Instruments
gaz = gazette
LI = Legislative Instrument
LIA = *Legislative Instruments Act 2003*
(md) = misdescribed amendment
mod = modified/modification
No. = Number(s)
o = order(s)
Ord = Ordinance
orig = original
par = paragraph(s)/subparagraph(s) /sub-subparagraph(s)
pres = present
prev = previous
(prev…) = previously
Pt = Part(s)
r = regulation(s)/rule(s)
Reg = Regulation/Regulations
reloc = relocated
renum = renumbered
rep = repealed
rs = repealed and substituted
s = section(s)/subsection(s)
Sch = Schedule(s)
Sdiv = Subdivision(s)
SLI = Select Legislative Instrument
SR = Statutory Rules
Sub-Ch = Sub-Chapter(s)
SubPt = Subpart(s)
underlining = whole or part not commenced or to be commenced

Endnote 3—Legislation history

Number and year	FRLI registration or gazettal	Commencement	Application, saving and transitional provisions
1999 No. 228	29 Sept 1999	1 Oct 1999 (r 2)	
2001 No. 346	21 Dec 2001	21 Dec 2001 (r 2)	—
2005 No. 318	19 Dec 2005 (F2005L03952)	20 Dec 2005 (r 2)	r 4
2009 No. 383	16 Dec 2009 (F2009L04589)	17 Dec 2009 (r 2)	—
2011 No. 251	14 Dec 2011 (F2011L02671)	1 Jan 2011 (r 2 and F2011L02622)	r 4
238, 2013	8 Nov 2013 (F2013L01914)	Sch 2 (items 1, 2): 28 Nov 2013 (s 2 item 3)	—
5, 2014	19 Feb 2014 (F2014L00157)	Sch 1 (items 1–99): 28 Feb 2014 (s 2 item 2) Sch 2: 1 Oct 2014 (s 2 item 3)	—
201, 2014	17 Dec 2014 (F2014L01742)	1 Jan 2015 (s 2)	—

NOPSEMA Attachment 2
Endnotes

Endnote 4—Amendment history

Provision affected	How affected
Part 1 heading	
r 1	rs No 383, 2009
r 3	rs No 383, 2009
	am No 5, 2014
r 4	am No 318, 2005; No 383, 2009; No 251, 2011; No 5, 2014
r 5	am No 383, 2009
Part 1A heading	ad No 5, 2014
r 5A	ad No 5, 2014
r 5B	ad No 5, 2014
r 5C	ad No 5, 2014
r 5D	ad No 5, 2014
r 5E	ad No 5, 2014
r 5F	ad No 5, 2014
Part 1B heading	ad No 201, 2014
r 5G	ad No 201, 2014
Part 2 heading	
Division 2.1 heading	
r 6	am 2001 No 346; 2005 No 318; 2009 No 383; No 5, 2014
r 7	am 2001 No 346; 2005 No 318; 2009 No 383; No 5, 2014
r 8	am 2001 No 346; 2005 No 318; 2009 No 383; No 5, 2014
Division 2.2 heading	rs No 5, 2014
r 9	am No 318, 2005; No 383, 2009
	rs No 5, 2014
r 9A	ad No 5, 2014
r 10	am No 318, 2005; No 383, 2009
	rs No 5, 2014
r 10A	ad No 5, 2014

NOPSEMA Attachment 2

Endnote 4—Amendment history

Provision affected	How affected
r 11	am No 318, 2005; No 383, 2009; No 251, 2011
	rs No 5, 2014
	am No 201, 2014
Division 2.2A heading	ad No 251, 2011
11A	ad No 251, 2011
	am No 5, 2014
Division 2.3 heading	
r 12	am No 383, 2009
r 13	am No 318, 2005; No 383, 2009
	am No 5, 2014
r 14	am No 318, 2005; No 383, 2009; No 251, 2011; No 5, 2014
r 15	am No 383, 2009; No 251, 2011
	rs No 5, 2014
r 16	am No 318, 2005; No 251, 2011; No 5, 2014
Division 2.4 heading	
r 17	am No 318, 2005; No 383, 2009
	rs No 5, 2014
r 18	am No 383, 2009; No 251, 2011; No 5, 2014
r 19	rs No 383, 2009
	am No 5, 2014
r 20	am No 383, 2009; No 5, 2014
r 20A	ad No 5, 2014
r 21	am No 383, 2009; No 251, 2011; No 5, 2014
Division 2.5 heading	
r 23	am No 383, 2009; No 5, 2014; No 201, 2014
r 24	am No 318, 2005; No 383, 2009; No 5, 2014
r 25	am No 383, 2009; No 5, 2014
Division 2.6 heading	ad No 5, 2014
r 25A	ad No 5, 2014

NOPSEMA Attachment 2
Endnotes

Endnote 4—Amendment history

Provision affected	How affected
Part 3 heading	
r 26	rs No 346, 2001; No 318, 2005
	am No 383, 2009; No 238, 2013; No 5, 2014
r 26A	ad No 318, 2005
	am No 383, 2009; No 5, 2014
r 26AA	ad No 251, 2011
	rs No 5, 2014
r 26B	ad No 318, 2005
	am No 383, 2009; No 5, 2014
r 26C	ad No 5, 2014
r 27	am No 346, 2001; No 318, 2005; No 383, 2009
	rs No 5, 2014
r 28	am No 346, 2001; No 383, 2009; No 5, 2014
Part 4 heading	
Division 4.1 heading	rs No 5, 2014
r 29	am No 346, 2001
	rs No 318, 2005
	am No 383, 2009
	rs No 5, 2014
r 29A	ad No 318, 2005
	am No 383, 2009
	rep No 5, 2014
r 30	am No 318, 2005
	rs No 5, 2014
r 31	am No 383, 2009
	rs No 5, 2014
Division 4.2 heading	rs No 5, 2014
r 32	am No 346, 2011; No 383, 2009
	rs No 5, 2014
	am No 201, 2014

NOPSEMA Attachment 2

Endnote 4—Amendment history

Provision affected	How affected
r 33	am No 383, 2009
	rep No 5, 2014
	ad No 201, 2014
r 34	am No 383, 2009
	rep No 5, 2014
r 35	am No 383, 2009
	rep No 5, 2014
r 36	am No 383, 2009
	rep No 5, 2014
r 33	ad No 201, 2014
Division 4.3 heading	rep No 238, 2013
r 37	am No 383, 2009
	rep No 238, 2013
r 38	rep No 346, 2001
Division 4.4 heading	rep 2005 No 318
r 39	rep 2005 No 318
Part 5 heading	ad No 251, 2011
	rs No 5, 2014
Division 5.1 heading	ad No 5, 2014
r 38	ad No 251, 2011
	am No 5, 2014
r 39	ad No 251, 2011
	rep No 5, 2014
r 40	ad No 251, 2011
	am No 5, 2014
r 41	ad No 251, 2011
Division 5.2 heading	ad No 5, 2014
r 42	ad No 5, 2014
r 43	ad No 5, 2014
r 44	ad No 5, 2014

NOPSEMA Attachment 2
Endnotes

Endnote 4—Amendment history

Provision affected	How affected
r 45	ad No 5, 2014
r 46	ad No 5, 2014
r 47	ad No 5, 2014
r 48	ad No 5, 2014
Division 5.3 heading	ad No 201, 2014
r 49	ad No 201, 2014

Endnote 5—Miscellaneous

The *Petroleum (Submerged Lands) Act 1967* was repealed on 01/07/2008 by the *Offshore Petroleum (Repeals and Consequential Amendments) Act 2006* (No. 17 of 2006) however this instrument remains in force under the transitional provisions in clause 4 of Schedule 6 to the *Offshore Petroleum Act 2006*.

NOPSEMA

Guidance note

N04750-GN1344 Revision No 2 September 2015

Environment plan content requirements

Environment plan core concepts

- The Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (the Environment Regulations) require a titleholder to have an accepted environment plan (EP) in place for any petroleum activity or greenhouse gas activity[1].
- The Environment Regulations define the regulatory requirements relating to environmental management that must be met when undertaking a petroleum activity in Commonwealth waters.
- The object of the Environment Regulations, as set out in regulation 3, is to ensure that any petroleum activity or greenhouse gas activity carried out in an offshore area is carried out in a manner consistent with the principles of ecologically sustainable development (ESD) as set out in section 3A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and carried out in a manner by which the environmental impacts and risks of the activity will be reduced to as low as reasonably practicable (ALARP) and acceptable levels.
- The required content of an EP is detailed within the Environment Regulations; an EP must include all elements specified.
- NOPSEMA must accept an EP if it is reasonably satisfied that the EP meets the criteria for acceptance outlined in regulation 10A.
- NOPSEMA's role is one of assessing and deciding to 'accept' or 'refuse to accept' the titleholder's EP and subsequently monitoring the titleholder's compliance with the EP, the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (the OPGGS Act) and the Environment Regulations.
- The Environment Regulations are:
  - objective-based, where general requirements are provided in a non-prescriptive manner. The titleholder is responsible for determining their approach to managing environmental impacts and risks;
  - risk-based, where a central part of the EP is the assessment and management of the environmental impacts and risks of the activity;
  - performance-based, where appropriate environmental performance outcomes and environmental performance standards are in place that have measurement criteria to determine if they are being met; and
  - system-based, where an environmental management system is implemented to effectively identify and continuously reduce impacts and risks to ALARP and acceptable levels for the duration of the activity.
- The Environment Regulations place the onus on the duty holder to demonstrate in the EP that impacts and risks have been detailed, evaluated and reduced to levels that are acceptable and as low as reasonably practicable. This demonstration must explicitly address impacts and risks to matters protected under part 3 of the EPBC Act.
- This guidance note interprets the EP content requirements that need to be met and demonstrated under the Environment Regulations. Consistent with an objective-based regime, the particular way these requirements will be met should be determined by a titleholder in a manner that best suits

[1] While this guidance note refers predominantly to petroleum activities, all concepts are equally applicable to greenhouse gas activities.

their internal and external context, which may include the titleholder's policies, processes, systems, operating environment, economic constraints, stakeholder needs and regulatory requirements.

- This document is intended to provide guidance as to the approach that NOPSEMA takes in carrying out regulatory functions for environmental management. When NOPSEMA undertakes an EP assessment, monitoring or enforcement activity, these are undertaken in accordance with the OPGGS Act and the Environment Regulations. It is not the intention of the guidance note to provide legal advice or regulatory assessment criteria. None of the views expressed in this document should be treated as a substitute for legal advice.

Table of contents

Acronym list

ALARP	as low as reasonably practicable
AS/NZS ISO	Australian Standard/New Zealand Standard International Organisation for Standardisation
Environment Regulations	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009
EP	environment plan
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESD	Ecologically Sustainable Development
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
OPGGS Act	*Offshore Petroleum and Greenhouse Gas Storage Act 2006*
OPEP	Oil Pollution Emergency Plan
OPP	Offshore Project Proposal
S.M.A.R.T.	Specific, Measurable, Achievable, Relevant, Time-based

1 Introduction

1.1 NOPSEMA advice documents

To assist titleholders in interpreting and meeting the requirements of the OPGGS Act and the Environment Regulations, NOPSEMA has published a suite of advice documents. These advice documents have been developed to fulfil NOPSEMA's functions to advise persons, either on its own initiative or on request, on matters relating to offshore petroleum environmental management (OPGGS Act section 646(gn)).

References to other NOPSEMA advice documents relevant to this guidance note are included in Section 5.

All published advice from NOPSEMA will be subject to periodic review and revision. NOPSEMA provides a website subscription service through which titleholders and other stakeholders can request notifications of news and updates including revision of advice documents. Titleholders and other stakeholders may send enquiries and feedback regarding NOPSEMA advice documents to information@nopsema.gov.au.

1.2 Scope of this guidance note

This guidance note is part of a series of documents that provide further detail on the requirements of the Environment Regulations. This guidance note provides NOPSEMA's interpretation of the EP content requirements of the Environment Regulations.

The criteria for acceptance of an EP are discussed to the extent that they relate to the content requirements of an EP. The scope of this guidance note does not detail NOPSEMA's assessment or decision-making processes, or the administrative requirements of the Environment Regulations. NOPSEMA advice which addresses these matters is referenced in Section 5.

1.3 Background

1.3.1 Requirements for Titleholders and Applicants

The Environment Regulations require a titleholder to have an accepted EP in place for any petroleum activity. The Environment Regulations allow an applicant for a petroleum access authority, a petroleum special prospecting authority, a pipeline license, a greenhouse gas search authority or a greenhouse gas special authority to submit an EP prior to grant of the title (subregulation 9(2)). The 'applicant' is taken to be the 'titleholder' for the purposes of preparation, submission and acceptance of an EP. Wherever this document refers to titleholders, the information is applicable to applicants for the abovementioned titles. The titleholder is responsible for determining if an activity meets the definition of a petroleum activity under the Environment Regulations. Refer to NOPSEMA's Petroleum Activities Guidance Note for further information (refer Section 5).

An EP for an activity that is, or is part of, an 'offshore project' as defined under the Environment Regulations cannot be submitted unless NOPSEMA has accepted an 'offshore project proposal' (OPP) that includes that activity or the Environment Minister has provided a relevant decision or approval under the EPBC Act. For those EPs that contain activities that are, or are part of, an offshore project, the titleholder should ensure that the content of the EP is consistent with the accepted OPP. Further information on OPP's is available through NOPSEMA advice documents for OPP's, referenced in Section 5.

The titleholder of the activity is responsible for submission of the EP and retains responsibility under the OPGGS Act and the Environment Regulations.

1.3.2 Objective-based regulation

The Environment Regulations were first developed in 1999 to enable the implementation of an objective-based regulatory system for environmental management of the offshore petroleum industry. Prior to 1999, the offshore petroleum industry in Commonwealth waters was regulated under standing Directions. These were prescriptive in nature and formed a regime whereby performance standards, management practices and technology options were prescribed by Regulatory agencies. The regime did not encourage continuous improvement nor did it encourage industry to adopt best practice environmental management practices and technologies to ensure that high standards of environmental performance were achieved.

At the time of the development of the Regulations, options for the regulatory framework were identified and considered (as described in 'Petroleum (Submerged Lands) (Management of Environment) Regulations 1999 No. 228 Explanatory Statement'). Prescriptive regulations were considered, as was the concept of self-regulation. However the preferred option was objective-based regulation, which provides a framework within which the government, industry and the community can work together to ensure that the environmental impacts and risks of petroleum activities are ALARP and acceptable and which encourages continuous improvement in industry environmental performance.

The Environment Regulations were developed to provide an objective-based regime within which titleholders are free to adopt environmental management practices and technologies best suited to individual company circumstances, activities and locations, subject to demonstrating that appropriate environmental performance outcomes and environmental performance standards will be met.

This guidance note describes NOPSEMA's interpretation of the Environment Regulations and provides a guide for titleholders to the way NOPSEMA is likely to approach the meaning and intent of the various provisions in the Environment Regulations.

This guidance note was developed based on an examination of the EP contents required by the Environment Regulations. Where the Environment Regulations do not provide a complete explanation of a requirement, additional material was used to develop an interpretation, including Australian Standards, case law and the explanatory statements published under the Environment Regulations.

1.3.3 The Program endorsed under the EPBC Act

NOPSEMA's environmental management authorisation process has been endorsed by the Federal Minister for the Environment as a Program (the Program) that meets the requirements of Part 10, section 146, of the EPBC Act. Under the Program, the Minister for the Environment has approved a class of actions which, if undertaken in accordance with the endorsed Program, will not require referral, assessment and approval under the EPBC Act. This makes NOPSEMA the sole Commonwealth regulator for these activities. The endorsed Program consists of the following components:

- The Environment Regulations inclusive of amendments that took effect from 28 February 2014; and
- The Program commitments as specified in the Program Report - Streamlining Offshore Petroleum Environmental Approvals, Program Report February 2014[2].

Petroleum and greenhouse gas activities undertaken in Commonwealth waters in accordance with the Program are considered to be an "approved classes of action", with the exception of petroleum and greenhouse gas activities that:

- have, will have or are likely to have a significant impact on the environment on Commonwealth land
- are taken in any area of the sea or seabed that is declared to be part of the Great Barrier Reef Marine Park under the *Great Barrier Reef Marine Park Act 1975* (Cth)
- have, will have or are likely to have a significant impact on the world heritage values of the Great Barrier Reef World Heritage property or on the national heritage values of the Great Barrier Reef National Heritage place
- are taken in the Antarctic
- are injection and / or storage of greenhouse gas.

1.4 Recognised standards for a systematic approach

The Environment Regulations are consistent with recognised standards and systems including the approaches adopted by ISO and AS/NZS standards and guidance, in particular AS/NZS ISO 31000: Risk management – Principles and guidelines (Figure 2) and AS/NZS ISO 14001: Environmental management

[2] The report can be accessed at: http://www.industry.gov.au/resource/UpstreamPetroleum/OffshorePetroleumEnvironment/Pages/StreamliningOffshorePetroleumEnvironmentalApprovals.aspx

systems – Requirements with guidance for use (Figure 3). As a result, these standards are referred to throughout this guidance note to assist with the consistent and robust application of the concepts, processes and elements embodied in the Environment Regulations. Reference to these standards also provides titleholders with access to a large body of available guidance. Adopting the process described in these standards during the preparation of an EP will provide a good basis for addressing the requirements of the Environment Regulations.

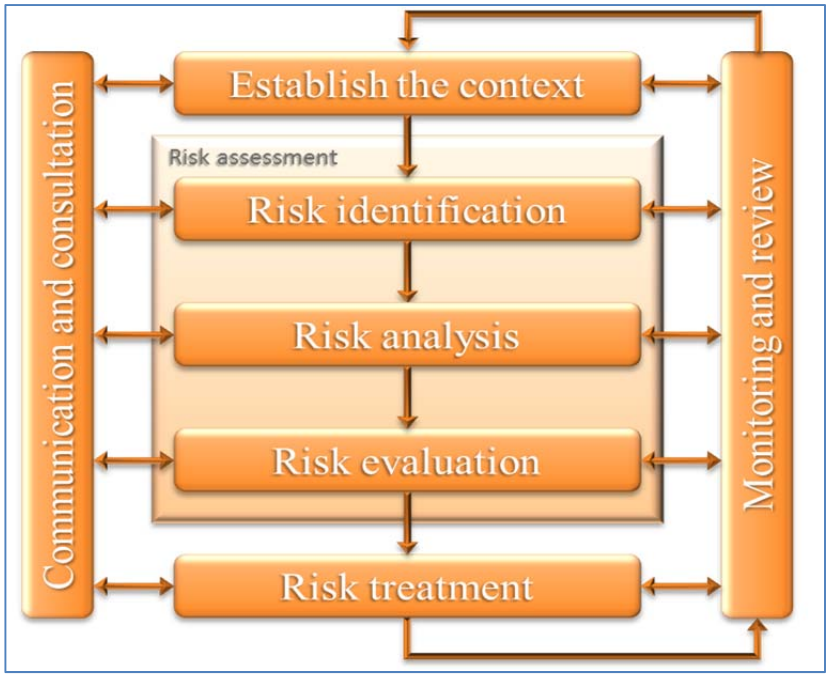


Figure 2: AS/NZS ISO 31000 – Risk management process

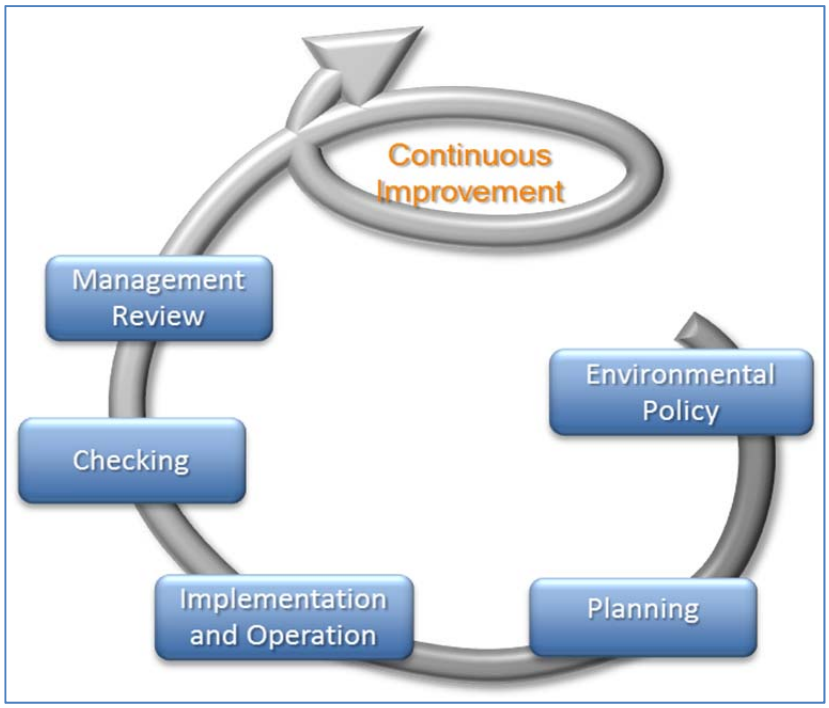


Figure 3: AS/NZS ISO 14001 – Environmental management system model

2 Environment plan overview

2.1 Environment plan key principles

2.1.1 Criteria for acceptance of an EP

The titleholder must address the regulatory requirements in a way that allows NOPSEMA to be reasonably satisfied that the EP meets the criteria for acceptance (subregulation 10(1)). These criteria for acceptance closely relate to the content requirements of an EP and will be discussed in more detail in section 3. Critical factors for success in preparation of an EP are discussed in Section 4, with reference to the content requirements and the criteria for acceptance of an EP.

The criteria for acceptance of an EP, set out in regulation 10A, are that the plan:

a. is appropriate for the nature and scale of the activity; and

b. demonstrates that the environmental impacts and risks of the activity will be reduced to as low as reasonably practicable; and

c. demonstrates that the environmental impacts and risks of the activity will be of an acceptable level; and

d. provides for appropriate environmental performance outcomes, environmental performance standards and measurement criteria; and

e. includes an appropriate implementation strategy and monitoring, recording and reporting arrangements; and

f. does not involve the activity or part of the activity, other than arrangements for environmental monitoring or for responding to an emergency , being undertaken in any part of a declared World Heritage Property within the meaning of the EPBC Act; and

g. demonstrates that:

   i. the titleholder has carried out the consultations required by Division 2.2A; and

   ii. the measures (if any) that the titleholder has adopted, or proposes to adopt, because of the consultations are appropriate; and

h. complies with Act and the [Environment] regulations

There are two key principles that apply to the whole EP and should be considered in detail during preparation of an EP:

- The EP must be appropriate for the nature and scale of the activity (subregulation 10A(a))
- The principles of ecologically sustainable development (ESD) (subregulation 3(a))

2.1.2 Nature and scale of the activity

Criterion 10A(a) for acceptance for an EP is that it is “appropriate for the nature and scale of the activity”. This particular criterion is considered to be a key principle in that it must be reflected throughout the EP content and is relevant to all other criteria for acceptance.

All aspects of the EP must be appropriate to the nature and scale of the activity, while meeting all the requirements of the Environment Regulations. General requirements for an EP are relative to the sensitivity of the receiving environment and also to the activity’s scale (time and space), complexity, and its potential and actual environmental consequences.

A higher expectation in terms of the content and level of detail should be applied to an activity with high potential for environmental impact and risk, predictive uncertainty or use of innovative technology. While the EP should be appropriate for the nature and scale of the activity, the robustness and rigour of the risk management approach should be consistent regardless of the size, complexity and environmental risk level of an activity.

2.1.3 Object of the Regulations – the principles of ESD

Australia's National Strategy for Ecologically Sustainable Development (1992) (the national strategy) defines ESD as: 'using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased'. The national strategy provides broad strategic direction and a framework to facilitate a coordinated and co-operative approach to ESD. The core objectives and guiding principles of the national strategy may assist titleholders and NOPSEMA to approach the EP requirements and assessment process with a common understanding of the Australian Government's goal for ESD.

Regulation 3 states that the object of the Environment Regulations is to ensure that any petroleum activity or greenhouse gas activity carried out in an offshore area is carried out in a manner consistent with the principles of ESD. As defined in Section 3A of the EPBC Act, the following are principles of ecologically sustainable development:

a) Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations;
b) if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;
c) the principle of inter-generational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;
d) the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making;
e) improved valuation, pricing and incentive mechanisms should be promoted.

The guiding principles need to be considered as a package; no principle should predominate over the others. A balanced approach is required that takes into account all these principles to pursue the goal of ESD.

2.2 EP content & process overview

Division 2.3 of the Environment Regulations reflects the principles of risk management systems developed by recognised bodies such as ISO and AS/NZS as discussed above in Section 1.4. Meeting the content requirements for an EP provides assurance that impacts and risks are being appropriately managed. Consequently, the EP assessment and acceptance process is conducted with consideration of the contents requirements for an EP detailed in regulations 13, 14, 15 and 16. These content requirements are summarised below:

- The EP must **describe** the activity, environment, regulatory and other requirements, and acceptable levels for impacts and risks.
- The EP must **detail** impacts and risks for the activity, which includes identifying sources of impacts and risks, the related events and their causes. It also includes analysis of the likelihood and consequence of those impacts and risks.
- The EP must **evaluate** impacts and risks (including direct and indirect impacts from operational and potential emergency conditions), **detail** the control measures that will be used to reduce impacts and risks and **demonstrate** that they are reduced to ALARP and acceptable levels.
- The EP must **define** the environmental performance outcomes and set the environmental performance standards against which the environmental performance of the titleholder is to be measured during the activity. The EP must also include measurement criteria that will allow the titleholder and NOPSEMA to determine if the performance outcomes and performance standards have been met.
- **Consultation** processes must be in place and evidence must be provided to demonstrate the titleholder has undertaken consultation in preparation of the EP, has adopted any appropriate measures resulting from the consultation and has provided for appropriate ongoing consultation.

- The EP must include an appropriate **implementation strategy** that provides a systematic approach to ensure the environmental performance outcomes and environmental performance standards of the plan are met and are monitored on an ongoing basis. The implementation strategy must describe the environmental management system for the activity, that will ensure that impacts and risks will be continuously identified and reduced to ALARP, and that requirements of the Environment Regulations are met.
- As well as the core requirements discussed above, the EP must also include details for relevant **liaison persons** and **additional content requirements** as prescribed by the Environment Regulations.

Each of the EP content requirements within the Environment Regulations link together to form a coherent system. The Environment Regulations reflect the "plan – do – check – act" cycle that is the basis of a systematic approach to environmental management under AS/NZ ISO 14001; where the 'plan' relates to preparation of an EP and the 'do, check, act' components relate to the implementation of the EP for the duration of the activity. The regulatory process and EP content requirements provide a framework that allows titleholders to apply a systematic approach to meeting the EP content requirements of the Environment Regulations.

Figure 4 below identifies the content requirements for an EP (and the corresponding section references of this document) and illustrates how these may be applied within the systematic approach described within AS/NZ ISO 31000 and AS/NZS ISO 14001. It should be noted that many of these steps are related and iterative and due to their complexity these relationships have not been comprehensively illustrated in Figure 4. However these considerations have been discussed within the corresponding document sections referenced within Figure 4.

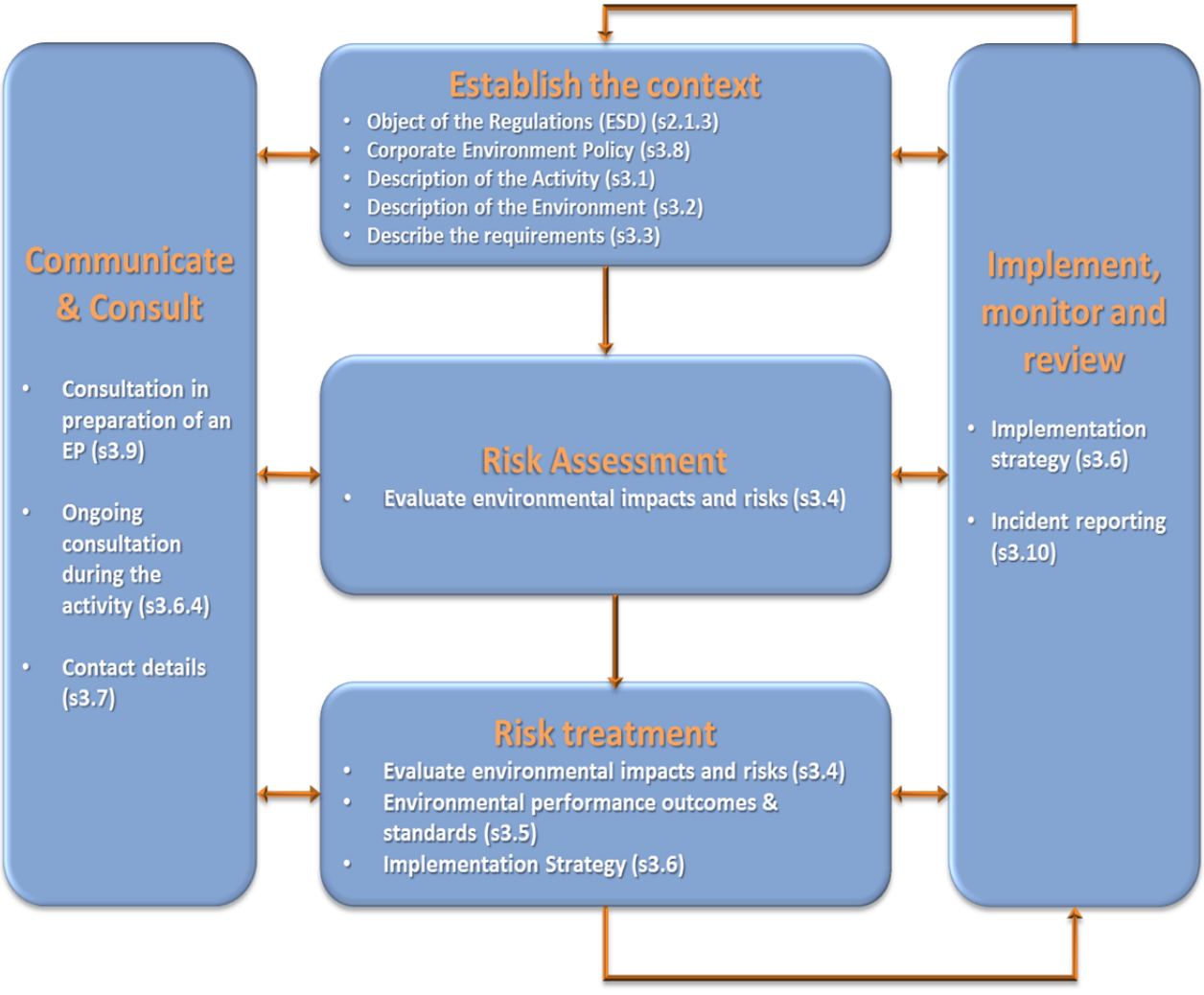


Figure 4: The content requirements for an EP within the framework outlined in AS/NZS ISO 31000.

3 Environment plan content requirements

The following sections provide further interpretation and description of the EP content requirements as required by the Environment Regulations. The sections reflect the content requirements of the Environment Regulations in regulations 13, 14, 15 and 16. Each section is structured with the following subheadings:

1. **Applicable regulations:** identifies the key content requirement as well as any other relevant regulations, such as definitions or the criteria for acceptance of an EP.
2. **Regulatory purpose:** provides the main goal or intent of the content requirement.
3. **Core concepts:** provides the specific content requirements that must be met.
4. **Considerations:** provides an explanation as to why that content requirement is necessary, how it may relate to other EP content requirements and provides discussion of some common considerations that may assist in preparation of an EP. Further reading and guidance is referenced in Section 5.

It should also be noted that titleholders may refer to information previously given to NOPSEMA for another purpose (regulation 31). A number of the content requirements for an EP may mirror the requirements of other submissions to NOPSEMA. To avoid the need to repeat information, the Environment Regulations allow a titleholder to refer to information previously given to NOPSEMA. For example, if an OPP includes a large amount of detail describing the environment in which the activity is to take place, the titleholder may, in an EP, refer to this information previously given to avoid duplicating the same information in the EP. However it should be noted that although information may have been sufficient or adequate for its original purpose, NOPSEMA may not necessarily accept the same information as sufficient or adequate for the purpose of the EP. Titleholders should ensure that the relevance of any referenced information to the EP is clearly explained within the submission. NOPSEMA will assess the referenced information as though it is part of the EP submission.

3.1 Description of the activity

Applicable regulations
Regulation 4 – Definitions (activity, petroleum activity)
Subregulation 9(7) – Form of an environment plan
Subregulation 10A(a), (f) and (h) – Criteria for acceptance of environment plan
Paragraphs 13(1)(a)-(d) – Description of the activity

Regulatory purpose

- To provide information important to the context of the EP by identifying and describing all activities at an appropriate level of detail, particularly those activities relevant to environmental impact and risk.

Core concepts

- An EP can be submitted for multiple activities, stages of activities or locations (subregulation 9(7)). The description of the activity must clearly define the scope of the EP.
- The EP must contain a comprehensive activity description. This must include the location/s, general details and layout of any facility, an outline of operational details, proposed timetables and any additional information relevant to consideration of environmental impacts and risks (subregulation 13(1)).
- Only activities that are described in the EP are assessed and accepted. If an activity or component of an activity is not described in an EP, then it is not part of the EP acceptance.

Considerations

- A comprehensive description of the activity and its full scope facilitates an appropriate description of the affected environment and allows for the sources of impacts and risks to be appropriately detailed and evaluated.
- The description of the activity helps to define the nature and scale of the activity and should focus on those aspects that have potential to result in environmental impacts and risks.
- The level of detail provided for different aspects of the activity may vary. While all aspects of the activity that have potential to interact with the environment must be included within the description, the level of detail should be appropriate to inform the impact and risk identification and evaluation.
- The location description should be specific so that stakeholders may clearly understand their interaction with the activity and to enable proximity to any values and sensitivities to be understood.
- Seasonal timing and the duration of the activity are key characteristics that are important for informing the evaluation of impacts and risks, particularly in relation to matters protected under Part 3 of the EPBC Act, such as listed migratory species.
- The description of the activity provided by the titleholder in the EP is presumed to be complete. NOPSEMA does not test the completeness or accuracy of the titleholder's activity description during the EP assessment process unless other information contained within the submission contradicts the description, or indicates an incomplete description. NOPSEMA may also test the activity description if it appears that the activity itself may not meet specific requirements of the OPGGS Act.
- NOPSEMA will not accept an EP the involves the activity or any part of the activity, other than arrangements for environmental monitoring or responding to an emergency, being undertaken in any part of a declared World Heritage property (subregulation 10A(f)).

3.2 Description of the environment

Applicable regulations
Regulation 4 - Definitions (environment)
Subregulations 10A(a) and 10A(f) – Criteria for acceptance of environment plan
Subregulations 13(2) and 13(3) – Description of the environment

Regulatory purpose

- To provide information important to the context of the EP by identifying and describing the existing environment that may be affected by the activity.

Core concepts

- The EP must describe the existing environment that may be affected by the activity.
- The 'environment' means:
  - ecosystems and their constituent parts including people and communities;
  - natural and physical resources;
  - the qualities and characteristics of locations, places and areas;
  - the heritage value of places;
  - the social, economic and cultural features of the above.
- The EP must describe the particular relevant values and sensitivities of the existing environment.
- Relevant values and sensitivities must include (although are not limited to) matters protected under Part 3 of the EPBC Act that will or may be affected by the activity:
  - the world heritage values of a declared World Heritage property;
  - the national heritage values of a National Heritage place;

- the ecological character of a declared Ramsar wetland;
- the presence of a listed threatened species or listed threatened ecological community;
- the presence of a listed migratory species;
- the values and sensitivities that exist in, or in relation to, the Commonwealth marine area or Commonwealth land.

Considerations

- The description of the existing environment must be appropriate to the nature and scale of the activity. The scope and detail of information provided on the existing environment should:
  - be adequate to support the evaluation of environmental impacts and risks;
  - encompass the area the activity takes place in and also areas that may be affected directly or indirectly, including under potential emergency conditions or by emergency response arrangements;
  - take into account the size, type, timing, duration, complexity and intensity of the activity;
  - where relevant, provide a baseline to detect any changes to the environment that may arise from the activity.
- When describing those aspects of the environment that are matters protected under Part 3 of the EPBC Act, information prepared by the Department of Environment (DoE) regarding these matters must be considered. Relevant information sources and information discovery tools include, but are not limited to[3]:
  - The protected matters search tool,
  - Threatened species recovery plans, threat abatement plans and species conservation advices,
  - Plans of management for World Heritage properties, Commonwealth marine reserves or National Heritage places,
  - EPBC Act-related guidelines,
  - Ramsar wetland ecological character descriptions,
  - Statements of outstanding universal value for World Heritage properties,
  - Marine bioregional plans,
  - The conservation values atlas, and
  - Species and threats database.
- The level of information required to adequately describe relevant matters protected under Part 3 of the EPBC Act should reflect the nature and scale of the activity and its impacts and risks, with content informed by relevant information published by the DoE.
- Consideration should also be given to describing those features of the environment that may affect the activity or impacts from the activity (e.g. ocean currents, prevailing winds). Any gaps identified in information relevant to the existing environment may need to be addressed with appropriate sources of information, additional surveys or studies.
- Environmental information that is not specifically from the activity location (e.g. it may be from a similar environment elsewhere) may be provided if the relevance of the information is demonstrated.

[3] A list of information that may be relevant, and hyperlinks to relevant documents, is provided in Attachment A to assist titleholders in identifying and accessing relevant information. This list is not exhaustive and while information was current at the time of publishing, it may be superseded as new information becomes available. It remains the titleholders' responsibility to conduct their own due diligence in determining the full suite of relevant information regarding protected matters that will or may affect their specific activity.

3.3 Describe the requirements

Applicable regulations
Subregulation 13(4) - Requirements Subregulation 10A(a) and (h) – Criteria for acceptance of environment plan

Regulatory purpose

- To provide information important to the context of the EP by identifying the laws, other approvals and conditions, standards or other environmental requirements that apply to the activity and are relevant to the activity's environmental management.

Core concepts

- The EP must describe the legislative and other requirements that apply to the activity and are relevant to the environmental management of the activity.
- The EP must demonstrate how these requirements will be met.
- Requirements include other approvals, legislative requirements or conditions that may apply to the specific activity and influence the way in which an activity is managed by the titleholder.

Considerations

- The description of requirements should provide details of which requirements are relevant to the activity in the EP and explain specifically how they apply to the activity.
- The EP as a whole should demonstrate how each of these requirements has been met for the activity being considered.
- Requirements could include amongst other things: relevant laws, codes, standards, agreements, treaties, conventions or practices that apply to the jurisdiction that the activity takes place in.
- Relevant requirements to be addressed may also include conditions set for approval of activities under other legislation such as the EPBC Act.
- Any relevant requirements associated with EPBC Act related policies, guidelines, plans of management, recovery plans, threat abatement plans and other relevant advice issued by the DoE should be considered in preparation of an EP, noting that the Program commitments detail specific circumstances under which NOPSEMA will not accept the EP.[4]
- The description of requirements forms part of the context of the activity and may influence the definition of acceptable levels of impacts and risks for the activity.
- These requirements should be taken into account in development of environmental performance outcomes and environmental performance standards.
- Requirements that are not relevant to the environmental management of the activity do not need to be included.

[4] Details of the program commitments are available at http://www.industry.gov.au/resource/UpstreamPetroleum/OffshorePetroleumEnvironment/Pages/StreamliningOffshorePetroleumEnvironmentalApprovals.aspx

3.4 Evaluation of environmental impacts and risks

Applicable regulations
Regulation 4 – Definitions (environmental impact, control measure)
Subregulation 10A(b) and (c) – Criteria for acceptance of environment plan
Subregulations 13(5) and 13(6) – Evaluation of environmental impacts and risks

Regulatory purpose

- To detail and evaluate all environmental impacts and risks arising directly or indirectly from the activity including their sources, potential events, likelihood and consequences and also estimate the magnitude of impacts and risks.
- To document the facts and reasons that support decisions about the selection of control measures to allow independent judgement by NOPSEMA.
- To demonstrate that with the selected control measures in place that environmental impacts and risks will be reduced to 'acceptable levels' and to as low as reasonably practicable.

Core concepts

- 'Environmental impact' means any change to the environment, whether adverse or beneficial, that wholly or partially results from an activity of a titleholder.
- A reasonable basis for the identification and evaluation of the environmental impacts and risks must be provided through a robust risk assessment method that is applied consistently and addresses all components of the activity description.
- All impacts and risks to the environment resulting from all aspects of the activity need to be detailed and evaluated. The extent of the details and evaluation provided should be considered in regard to the significance and uncertainty associated with the impact or risk.
- The details and evaluation should contemplate likelihood and consequence as separate constituents of risk to be treated independently. Selection of control measures should show how both likelihood and consequence will be reduced.
- Control measures that will be used to reduce the impacts and risks of the activity must be detailed in the EP. Control measures are defined as 'a system, an item of equipment, a person or a procedure that is used as a basis for managing environmental impacts and risks' (regulation 4).
- Titleholders need to provide sufficient justification and supporting information in the EP in order for NOPSEMA to be reasonably satisfied that the control measures adopted for implementation manage environmental impacts and risks to ALARP and to an acceptable level.
- Titleholders must clearly demonstrate that all impacts or risks, particularly for those matters protected under Part 3 of the EPBC Act, are acceptable.
- The EP must include an evaluation of all the impacts and risks against the defined acceptable levels to decide whether an impact and risk will be 'acceptable' or 'unacceptable'. This process is analogous to "Risk Evaluation" as per AS/NZS ISO 31000.

Considerations

- Identification of environmental impacts and risks should be undertaken in a systematic manner using a robust risk identification process. Internationally recognised risk assessment processes are appropriate methods to apply when identifying and evaluating impacts and risks.
- Impact and risk identification should involve careful consideration of all aspects of the activity that have potential to interact with the environment. These sources of impact and risk must then be detailed and evaluated within the EP.

- Control measures introduced, including those associated with potential emergency conditions, may result in additional impacts and risks. These impacts and risks should be detailed and evaluated in the same manner as impacts and risks from the activity.
- Impact and risk identification should include consideration of potential cumulative impacts for the activity.
- 'Acceptable level' is the level of impact and risk to the environment that may be considered broadly acceptable with regard to all relevant considerations including, but not limited to:
  - principles of ecologically sustainable development (ESD)
  - other requirements (including laws, policies, standards, conventions)
  - internal context (e.g. consistent with titleholder policy, culture and company standards)
  - external context (the environment and stakeholder expectations)
- The 'acceptable level' of impact or risk for matters protected under Part 3 of the EPBC Act should be informed by having regard to information published on the DoE web site including relevant policies, guidelines, threatened species recovery plans, plans of management, management principles and other documents that are important for defining 'acceptable levels'.[5]
- If there is no management plan in place for a World Heritage property, National Heritage Place, Commonwealth marine reserve, Commonwealth heritage place or Ramsar wetland, then titleholders must demonstrate that their activity (and its environmental management) is not inconsistent with Australian World heritage, Australian IUCN reserve, National Heritage, Commonwealth heritage or Australian Ramsar management principles, as defined in the EPBC Regulations 2000.
- Guidance given in AS/NZS ISO 31000 and HB 203:2012 for defining risk criteria may be considered when defining acceptable levels.
- The evaluation should consider the likelihood and consequence of the impacts and risks using a consistent method and compare these to pre-determined acceptable levels.
- Evaluation of impacts and risks may be undertaken quantitatively or qualitatively.
- Where confidence in the available information is low, additional studies may be required to inform the impact and risk evaluation or to test assumptions made. Some examples of these studies may include baseline studies, receptor impact studies and predictive modelling of emissions and discharges.
- The evaluation of the impacts and risks should include consideration of the existing control measures in place and an evaluation to determine if a risk requires further treatment (e.g. elimination, prevention, reduction and mitigation) to meet the acceptable level.
- Impacts and risks generally fall within the following categories:
  - those that are unacceptable in any circumstances or at any level, or exceed thresholds set by legislation or organisational policy (also known as intolerable risks).
  - those that require further consideration in order to decide whether and how to treat them and are acceptable under certain circumstances (also known as tolerable risks).
  - those that are at an acceptable level.
- Demonstrating that the environmental impacts and risks of the activity will be of an acceptable level includes recording the results of the evaluation, providing a reasonable basis for the statements made by the titleholder, clearly outlining supporting evidence and documenting this in the EP.
- The key element of ALARP is the construct of reasonable practicability; the weighing up of the magnitude of the risk against the cost of reduction. A risk reduction measure can be considered as being reasonably practicable if the costs to implement it are not grossly disproportionate to the reduction in risk achieved.

[5] Further information relevant to the consideration of environmental impacts and risks in relation to matters protected under Part 3 of the EPBC Act are available in Attachment A

- The particular approach used in providing the required demonstration of ALARP and 'acceptable' within an EP is at the discretion of the titleholder.

  ALARP is specific to the context of the activity and its impacts and risks, which means that what is ALARP in one circumstance, may not be ALARP in another. To demonstrate that impacts and risks are reduced to ALARP, a variety of approaches may be used. A common approach is to identify the available options that were considered and clearly identify which control measures will be implemented and which control measures, although available, were considered not 'reasonably practicable' (i.e. grossly disproportionate). Regardless of the approach chosen by the titleholder, any statements made to demonstrate that impacts and risks are ALARP should be adequately justified.

3.5 Environmental performance outcomes and standards

Applicable regulations
Regulation 4 - Definitions (environmental performance, environmental performance outcome, environmental performance standard and recordable incident)
Subregulation 10A(d) – Criteria for acceptance of environment plan
Subregulation 13(7) – Environmental performance outcomes and standards and measurement criteria

Regulatory purpose

- To provide appropriate environmental performance outcomes against which the titleholder's performance in protecting the environment can be measured during the activity.
- To provide appropriate environmental performance standards for the control measures that will be implemented as a basis for managing the environmental impacts and risks.
- To provide measurement criteria that will be used to determine whether each environmental performance outcome and environmental performance standard is being met during the activity.

Core concepts

- An environmental performance outcome is a measurable level of performance required for the management of environmental aspects of an activity to ensure that the environmental impacts and risks will be of an acceptable level. Environmental performance outcomes should ensure that ongoing environmental performance will meet, or be better than, the acceptable levels defined in the EP.
- Environmental performance standard means a statement of performance required of a control measure.
- A titleholder's performance in protecting the environment is assessed, in part, by measuring against the environmental performance outcomes and standards.
- The environmental performance outcomes should be relevant to all the environmental features that may be impacted or are potentially at risk from the activity.
- Environmental performance standards should be set at a level that ensures control measures consistently perform to reduce impact or risk to ALARP and to an acceptable level.
- Environmental performance outcomes and environmental performance standards should be specific and measurable so that environmental performance can be demonstrated.
- Environmental performance outcomes and environmental performance standards must have appropriate measurement criteria which define how environmental performance will be measured and determine whether the outcomes and standards have been met during the activity.
- Environmental performance outcomes and environmental performance standards will set the level at which an incident becomes a 'recordable incident' (i.e. a breach of an environmental performance outcome or environmental performance standard) and will also be used as a basis for environmental performance reporting required by Regulation 26C.

Considerations

- Environmental performance outcomes should be consistent with the titleholder's environment policy.
- For activities that are 'offshore projects' as previously discussed in Section 1.3.1, the environmental performance outcomes in the EP should be consistent with the environmental performance outcomes set for the project within the accepted OPP.
- Environmental performance outcomes must relate to the management of aspects of the activity but should also be relevant to the environmental features that may be impacted.
- Where the EP identifies potential impact or risk, including to matters protected under Part 3 of the EPBC Act, titleholders should ensure that environmental performance outcomes reflect the 'acceptable level' defined in the impact/risk evaluation (see Section 3.4 above).
- Any control measure that is required to reduce an impact or risk to an acceptable level or ALARP will require an environmental performance standard. The setting of environmental performance standards should focus on what needs to be done to ensure a control measure is implemented and continues to operate effectively as described and required by the EP.
- An environmental performance standard may relate to multiple control measures or conversely, multiple environmental performance standards may be applied to a single control measure.
- Environmental performance standards would likely describe the desired effectiveness of a control measure in terms of its functionality, availability, reliability, survivability, independence and compatibility.
- Environmental performance outcomes, environmental performance standards and their associated measurement criteria will generally achieve the purpose of demonstrating environmental performance if they fulfil the intent of the 'S.M.A.R.T' criteria commonly used in business and applied in this context:
  - specific: well defined and not open to wide interpretation.
  - measurable: can be measured, and where possible, in a quantitative manner.
  - achievable: can be met, i.e. are realistic.
  - relevant: relate to the potential environmental impacts and risks of the activity.
  - time-based: include a time component (where relevant).
- The purpose of measurement criteria is to provide evidence to demonstrate that the environmental performance standard required of the control measure has been met and evidence that the environmental performance outcome has been achieved.
- Each environmental performance outcome or environmental performance standard may require more than one measurement criterion to appropriately measure environmental performance. Environmental performance outcomes and environmental performance standards may have common measurement criteria but it must be clear how each environmental performance outcome and each environmental performance standard will be measured.
- Appropriate measurement criteria should outline the characteristics, data outputs, accuracy and/or calibration requirements, as required, of the method used to achieve the measurements.
- The EP should define how measurement criteria will be monitored during normal operations and under emergency conditions with sufficient detail to demonstrate that the measurements can be taken and are appropriate to demonstrate environmental performance against environmental performance outcomes and standards.
- In cases where the effectiveness of a control measure is dependent on a measurement criterion, such as the use of an instrument or specific scientific technique, it may be appropriate for these to have their own environmental performance standards.

- Where the level of environmental protection afforded by control measures is uncertain, consideration should be given to the inclusion of measurement criteria that validate the effectiveness of controls in protecting the receiving environment.

3.6 Implementation strategy

Applicable regulations
Subregulation 10A(e) – Criteria for acceptance of environment plan Regulation 14 – Implementation Strategy for the environment plan

Regulatory purpose

- To describe the specific measures and arrangements that will be implemented for the duration of the activity to ensure that:
  - all of the environmental impacts and risks of the activity will be continually identified and reduced to a level that is ALARP;
  - control measures detailed in the EP are effective in reducing the environmental impacts and risks of the activity to ALARP and acceptable levels;
  - environmental performance outcomes and standards set out in the EP are met;
  - arrangements are in place to respond to, and monitor impacts of, oil pollution emergencies; and
  - stakeholder consultation is maintained through the activity as appropriate.

Core concepts

- An EP must contain an implementation strategy for the activity (subregulation 14(1)).
- The implementation strategy must comply with the Act, the regulations and any other environmental legislation applying to the activity (subregulation 14(10)).
- The implementation strategy should have a sound basis in the assessment of impacts and risks and should describe how the control measures identified will be implemented to achieve environmental performance outcomes and standards.
- The level of detail within the implementation strategy should be commensurate with the nature and scale of the activity being conducted and relevant to the impacts and risks to be managed.
- As previously discussed in Section 1.4, further guidance on environmental management systems (EMS) is available within AS/NZS ISO 14001. This standard identifies the elements of an EMS which align closely to the specific requirements of the implementation strategy in the Environment Regulations.
- The implementation strategy content requirements in regulation 14 address four key themes:
  - A description of the EMS for the activity which includes elements specified in subregulations 14(3), 14(4) and 14(5).
  - Arrangements for monitoring, review and reporting of the titleholder's environmental performance and implementation strategy (subregulations 14(2), 14(6) and 14(7)).
  - Preparedness for oil pollution emergencies through an OPEP and appropriate arrangements for environmental monitoring (subregulations 14(8) to 14(8E).
  - Arrangements for ongoing consultation with relevant authorities, persons and organisations (subregulation 14(9)).

The structure of this section of this guidance notes varies from previous sections to allow the core concepts and considerations to be discussed for these four key themes listed above.

3.6.1 Environmental management system

Core concepts

- The 'environmental management system' is defined in regulation 4. It includes the responsibilities, practices, processes and resources used to manage the environmental aspects of an activity.
- An implementation strategy in an EP must contain a description of the EMS for the activity.
- The description of the EMS must detail the specific measures that will be implemented (subregulation 14(3)) to ensure that, for the duration of the activity:
  - the environmental impacts and risks of the activity continue to be identified and reduced to a level that is ALARP;
  - control measures detailed in the EP are effective in reducing the environmental impacts and risks of the activity to ALARP and acceptable levels; and
  - environmental performance outcomes and standards set out in the EP are being met.
- The implementation strategy must set out a clear chain of command, setting out the roles and responsibilities of personnel in relation to the implementation, management and review of the EP including during emergencies or potential emergencies (subregulation 14(4)).
- Subregulation 14(5) requires the implementation strategy to include measures to ensure that each employee or contractor working on or in connection with the activity is aware of his or her responsibilities in relation to the EP including during emergencies or potential emergencies and has the appropriate competencies and training.

Considerations

- The 'specific measures' described in the EMS are different from the 'control measures' identified through the risk evaluation process. In the context of the implementation strategy, the specific measures should describe the components of the EMS that will define how the control measures will be implemented and how their performance will be monitored and managed.
- Clear definition of roles and responsibilities is required to ensure effective and consistent implementation of all the environmental management commitments set out in the EP. In addition, clear understanding of the authorities and accountabilities of personnel is required to ensure that each person has the authority, resources and support to fulfil their role. Although many individuals may have assigned tasks under the EP, a specific management representative should have overall responsibility for ensuring that the in-force EP is implemented in an effective and consistent manner.
- The EP should describe how awareness, training and competency will be maintained for the duration of the activity, for all personnel and contractors with responsibilities under the EP. However, particular emphasis should be placed on describing training and competency for those persons who are responsible for implementing critical control measures for environmental impacts and risks in order to demonstrate that those control measures can be effectively implemented.
- Management review of environmental performance and of the implementation strategy should occur at planned intervals to ensure that the EMS is effective, adequate resources are available for implementing the EP and to identify and address any necessary changes to the management of environmental impacts and risks for the activity.
- The EMS review cycle should evaluate the effectiveness of the EMS as a whole in delivering the environmental performance outcomes and environmental performance standards and addressing any opportunities for improvement to the implementation strategy for the activity or the titleholder's EMS.

3.6.2 Monitoring and reporting of environmental performance and implementation strategy

Core concepts

- The implementation strategy must state when the titleholder will report to the Regulator in relation to environmental performance for the activity, at least once per year for the duration of the activity (subregulation 14(2)). Regulation 26C of the Environment Regulations requires the report to be sufficient to enable NOPSEMA to determine whether the environmental performance outcomes and standards in the EP have been met.
- The implementation strategy must provide for sufficient monitoring, recording, audit, management of non-conformance and review of the titleholder's environmental performance and the implementation strategy, to ensure that environmental performance outcomes and standards in the EP are being met (subregulation 14(6)).
- The implementation strategy must provide for sufficient monitoring of, and maintaining a quantitative record of, emissions and discharges (whether occurring during normal operations or otherwise) (subregulation 14(7)).

Considerations

- The EP should describe how compliance with the EP will be evaluated and recorded. This is to ensure that where non-conformance or potential non-conformance with the EP is identified, arrangements are in place to correct these, to prevent recurrence of similar non-conformance in the future, and to provide for subsequent review of the effectiveness of actions taken.
- The implementation strategy requires monitoring in two contexts; subregulation 14(6) addresses monitoring of the environmental performance and the effectiveness of the implementation strategy, as distinct from subregulation 14(7) which requires quantitative monitoring and recording of emissions and discharges. Further guidance on monitoring in the context of environmental performance evaluation is given in AS/NZS ISO 14031:2000 Environmental management – Environmental Performance Evaluation – Guidelines.
- Provisions for monitoring, recording, audit and management of non-conformance should function to identify 'reportable incidents' as defined in regulation 4, identify recordable incidents (breaches of environmental performance outcomes and environmental performance standards), review overall effectiveness of the implementation strategy and to fulfil the reporting requirements in Part 3 of the Environment Regulations.
- Provisions for monitoring and recording of emissions and discharges should be quantitative and accurate, and enable the titleholder and NOPSEMA to assess whether relevant environmental performance outcomes and standards in the EP are being met.
- Arrangements should be in place to maintain records in a way that makes retrieval reasonably practicable. Regulations 27 and 28 of the Environment Regulations detail the requirements for storage and availability of records. These requirements should be considered in development of the implementation strategy.
- The frequency and type of the monitoring should be appropriate to the nature and scale of the impacts and risks of the activity, with consideration given to the level of confidence in the cause-effect relationship for each source of risk. Where there is less confidence, it would be appropriate to implement more robust monitoring measures. For example, the type of monitoring chosen may range from monitoring the procedural controls, to end-of-pipe measurements, through to field-based monitoring of impacts to receptors.
- Where technical equipment is used for monitoring emissions and discharges, titleholders should ensure that the accuracy of that equipment can be demonstrated through appropriate calibration of equipment, verification practices and use of relevant technical standards and procedures for measurement.

3.6.3 Oil Pollution Emergency Plans and post-spill monitoring

Core concepts

- The implementation strategy must contain, and provide for the updating of, an OPEP (subregulation 14(8)).
- The specific requirements of an OPEP must include adequate arrangements for responding to and monitoring oil pollution as detailed in subregulation 14(8AA).
- Subregulation 14(8E) requires that the implementation strategy must include information to demonstrate that the arrangements in the OPEP are consistent with the national system for oil pollution preparedness and response.
- Subregulations 14(8A), 14(8B) and 14(8C) provide the requirements for testing the response arrangements in the OPEP.
- Subregulation 14(8D) requires that the implementation strategy provides for monitoring of the impacts to the environment from oil pollution and also from the response activities undertaken.
- Monitoring arrangements must be sufficient to inform any remediation activities (subregulation 14(8D(b)).

Considerations

- Arrangements should detail the interface with National, State and industry response plans and third party response service providers. The National Marine Oil Spill Contingency Plan (National Plan) is managed by the Australian Maritime Safety Authority (AMSA) and can be accessed from the AMSA website at **www.amsa.gov.au**
- Any response strategies described and the arrangements for implementing those strategies must be appropriate to the nature and scale of the risk of oil pollution for the activity.
- The arrangements included in the OPEP should:
  - be comprehensive and commensurate with the level of risk of oil pollution for the activity;
  - be adaptable and scalable;
  - be realistic, achievable and time bound;
  - provide for sufficient resources and personnel to implement and maintain a response for the duration of an incident;
  - clearly detail the roles and responsibilities of all relevant individuals and parties in all phases of the response.
- Strength of arrangements should match the criticality, timeliness and availability of the controls and resources required.
- Mechanisms should be in place to continually assess the ongoing suitability and effectiveness of response strategies relative to pre-determined protection priorities.
- Titleholders should make the case that the testing arrangements are appropriate to the response arrangements and to the nature and scale of the risk of oil pollution for the activity.
- Testing arrangements should:
  - address matters such as the effectiveness, achievability and timeliness of response and the availability and adequacy of resources (personnel and equipment) for the duration of the expected response;
  - be realistic, encompass all relevant responders and key personnel in their assigned roles with consideration given to reliance on external providers and key stakeholders;
  - be prioritised commensurate with the criticality and complexity of controls;
  - include testing of specialised response equipment and systems particularly where these are used infrequently;

- describe the scope and form of tests and demonstrate why they are appropriate for the response arrangements and nature and scale of the oil pollution risks;
- contain an appropriate range of tests to demonstrate that the titleholder is adequately prepared to respond to emergencies and may include, for example, training, exercises, drills and audits.

- Any relationships or interactions between testing and training arrangements should be described.
- Testing arrangements should include a feedback loop to identify gaps and implement improvements.
- Environmental monitoring in the event of a spill serves multiple purposes and should be sufficient to:
  - assess the impacts to the environment from the spill and response activities;
  - assess the efficacy of response; and
  - inform remediation activities that may be required.
- The EP should include a reasoned case for the proposed environmental monitoring, whether limited or extensive. Consideration should be given to using operational monitoring to inform decisions about the need for, as well as the extent and duration of impact monitoring where relevant to the nature and scale of oil pollution risks from the activity.
- The level of detail required to demonstrate that environmental monitoring provisions are appropriate may be different depending on risk. For activities that include higher consequence spill scenarios, greater justification may be required to demonstrate that monitoring provisions detailed in the EP are appropriate for assessing the impacts on the environment from the spill.
- For lower consequence spill scenarios, determination of environmental impacts could be undertaken without the need for extensive, long-term in-field monitoring.
- Taking into account nature and scale, environmental monitoring described in the EP should be:
  - appropriately scoped, and include methods fit for determining environmental impacts, (as well as recovery);
  - technically and logistically deliverable and defensible;
  - sufficiently flexible to account for uncertainty inherent in unplanned events; and
  - accompanied by clear commitments in relation to readiness and implementation to demonstrate that monitoring will be achievable and effective.
- Section 572C of the OPGGS Act applies in the event of an escape of petroleum to require a titleholder, among other things, to clean up the escaped petroleum, carry out environmental monitoring of the impact of the escape on the environment and remediate any resulting damage to the environment. Therefore monitoring arrangements must be sufficient to inform any remediation activities. The records produced during environmental monitoring will provide a means to inform decisions about the need for, and scope of, environmental remediation.
- If a spill may have potential impacts to matters protected under Part 3 of the EPBC Act, the monitoring priorities and arrangements should include those values and sensitivities such that impacts can be detected and understood to inform any future remediation that may be required.
- Further guidance on OPEPs and environmental monitoring in the event of an oil spill, can be accessed via the NOPSEMA webpage **http://www.nopsema.gov.au/environmental-management/environmental-resources/**

3.6.4 Ongoing consultation

Core concepts

- The implementation strategy in an EP must provide for appropriate consultation with relevant authorities of the Commonwealth, a State or Territory and other relevant interested persons or organisations.

Considerations

- Regulation 11A identifies the types of authorities, persons and organisations that may be considered to be 'a relevant person' under the Environment Regulations.
- Titleholders should consider the need to establish, implement and maintain procedures for managing external communications with relevant persons on an ongoing basis.
- The implementation strategy should consider those relevant persons identified in preparation of the EP.
- The consultation described should be appropriate for the duration of the activity.
- For long-term activities, the implementation strategy should ensure that identification of relevant persons is periodically reviewed to ensure new relevant persons are identified and consulted.
- If, during preparation for the EP, relevant persons identified the need for ongoing consultation throughout the activity, these arrangements should be included in the implementation strategy.
- Arrangements for ongoing consultation should take into consideration the needs and information requirements of a relevant person.
- If relevant persons have been identified for interest or involvement in oil pollution emergencies, the implementation strategy should demonstrate that ongoing consultation arrangements are appropriate to ensure emergency preparedness is maintained

3.7 Contact details of Titleholder and Titleholder's liaison person

Applicable Regulations
Regulation 15 – Details of titleholder and liaison person

Regulatory purpose

- To confirm the details of the titleholder responsible for the submission and ensure the information held by NOPSEMA remains current.
- To ensure the titleholder has nominated a liaison person for the purposes of communications with stakeholders and members of the public in relation to the EP.

Core concepts

- The EP must include the name and business details of the titleholder, which may be a body corporate. Note: in the case of multiple titleholders where an Eligible Voluntary Action (EVA) is not in place, the EP must include the details of all titleholders.
- The contact details of the titleholder's nominated liaison person must also be included in an EP.
- The details of the titleholder's nominated liaison person will be published on NOPSEMA's website on submission of an EP (subregulation 9(8)).
- The EP must include arrangements for notifying NOPSEMA of a change in titleholder, a change in the titleholder's nominated liaison person or a change in the contact details for either. These arrangements must include consideration of the timeframe for notifying NOPSEMA of such a change and should be made as soon as practicable and prior to the change occurring.

Considerations

- The details of the titleholder's nominated liaison person is required to ensure that relevant persons may contact someone with the authority to communicate on behalf of the titleholder and preferably with detailed knowledge of the EP submission.
- The titleholder's nominated liaison person may receive communications from stakeholders or other interested persons and should have adequate knowledge to manage these communications effectively.
- Notification of a change in nominated liaison person, their details or the contact details for the titleholder should be made as soon as practicable, preferably before the change takes place. What constitutes suitable arrangements may vary according to the nature and scale of the activity, including the duration of the activity and the level of potential stakeholder interaction.

3.8 Other information: Corporate environmental policy

Applicable Regulations
Subregulation 16(a) – Other information in the environment plan

Regulatory purpose

- To set out the titleholder corporate policies in relation to environmental management and environmental performance.

Core concepts

- The EP must contain a statement of the titleholder's corporate environmental policy.

Considerations

- The corporate environmental policy should be used to set the context and contribute to the definition of an 'acceptable level' of impact or risk.
- The corporate environmental policy will influence the development of environmental performance outcomes of the activity.
- The corporate environmental policy may also be relevant in setting out the titleholder's approach to consultation and stakeholder engagement.

3.9 Other information: Consultation report

Applicable regulations
Subregulation 10A(g) – Criteria for acceptance of environment plan
Regulation 11A – Consultations with relevant authorities, persons and organisations, etc.
Subregulation 16(b) – Other information in the environment plan

Regulatory purpose

- To demonstrate that an appropriate level of consultation was conducted with relevant stakeholders in the course of preparing the EP and to assess and respond to any objections or claims.

Core concepts

- Titleholders must provide relevant persons with sufficient information to allow the relevant person to make an informed assessment of the possible consequences of the activity on their functions, interests or activities. Titleholders must also provide a reasonable period for the consultation.
- The EP must contain a report on all consultations between the titleholder and a relevant person and that report must include the specific requirements set out in subregulation 16(b). The EP must

demonstrate that the titleholder has carried out consultation with relevant persons in the course of preparing the EP.

- The EP must demonstrate that the measures (if any) that the titleholder has adopted, or proposes to adopt, as a result of the consultations are appropriate.

Considerations

- The context of the activity strongly influences the determination of the appropriate level of consultation and who the 'relevant persons' would be.
- A 'relevant person' includes any person whose functions, interests or activities may be affected by the activities to be carried out under the EP. This may include persons who could be affected during emergency conditions.
- The regulations specifically include Commonwealth, State and/or Northern Territory government departments or agencies to which the activity may be relevant.[6]
- The titleholder should provide a reasonable basis for determining who they consider to be 'relevant persons' and define these in the EP. While the concept of a 'relevant person' is described in the Environment Regulations (subregulation 11A(1)), the titleholder must determine in the context of nature and scale of the activity, specifically which persons may be relevant to the activity. The nature and scale of the activity will influence the number and range of stakeholders that may need to be consulted as 'relevant persons.'
- Input from stakeholders will assist the titleholder in understanding the external context relevant to their activity and assist in defining the 'acceptable levels' of environmental impact and risk.
- Consultation in preparation of an EP may help inform the titleholder about the environment, the level of impact or risk, and the appropriateness of control measures proposed.
- The information provided to relevant persons must be sufficient to allow that person to make an informed assessment of the possible consequences of the activity on their functions, interests or activities. This requires the titleholder to consider the reasons that the person may be affected and ensure the information provided to them is meaningful and relevant in that context.
- The titleholder must allow a relevant person a reasonable period for consultation. This time-period should be appropriate for the circumstances, such as the depth of consideration or response that may be required from that person and also practicalities such as their availability. The reasonable time period should consider the need for repeated engagement to ensure that any objections or claims made by stakeholders are clearly understood and can be addressed appropriately within the EP.
- Where relevant persons request written feedback from titleholders, good practice would indicate that a titleholder should provide feedback in response to any information, objection or claim of that person.
- In cases where it is appropriate to the nature and scale of an activity, titleholders could undertake consultation for a range of activities on a strategic basis. The submission for each activity would need to demonstrate that this action was appropriate and that each identified relevant person had sufficient time and information to make an informed assessment of the potential impacts of the specific activity on their functions, interests or activities.

3.10 Other information: reportable Incidents

Applicable regulations
Regulation 4 – Definitions (reportable incident)

[6] Further information on Australian Government agencies' role and relevance under the Act can be found at http://www.environment.gov.au/system/files/pages/06872cd4-b755-4ecf-a4e7-dd16145e1384/files/offshore-australian-government-guidance-roles-relevance.pdf

Applicable regulations
Subregulation 16(c) – Other information in the environment plan Regulation 26 – Notifying reportable incidents

Regulatory purpose

- To ensure the EP includes in the details of all the reportable incidents in relation to the activity.

Core concepts

- A 'reportable incident' for an activity, means an incident relating to the activity that has caused, or has the potential to cause, moderate to significant environmental damage.
- The types of incidents that would be 'reportable incidents' vary depending on the nature of the activity, the location and the particular values and sensitivities of the environment. Consequently each EP must detail the types of incidents that have potential to cause moderate to significant environmental damage if those incidents were to occur. The EP must identify these as 'reportable incidents' for that activity.

Considerations

- The potential to cause moderate to significant environmental damage may be determined from the inherent consequence level of a particular risk, assuming that all control measures that can fail, have failed, and the event has occurred.
- Reportable incidents may arise from unforeseen circumstances. The reporting arrangements in the EP should consider the need to report incidents that have not been specifically identified in the EP.
- As required by regulation 26, reportable incidents are notifiable to NOPSEMA as soon as practicable but no later than two hours after the incident or after the titleholder becomes aware of the incident. The types of incidents that are defined as 'reportable incidents' should be considered in this context. The EP should clearly distinguish between those 'reportable incidents' that are immediately reportable and the 'recordable incidents' which are reported to NOPSEMA on a monthly basis.
- Please refer to NOPSEMA's published guidance on environmental reportable incidents for further information on arrangements for reporting and the required content of incident reports.

4 Critical factors for success

As previously noted in section 2.1.1, the criteria for acceptance of an EP closely relate to the content requirements of an EP. The table below illustrates a simplified view of the associations between the criteria for acceptance and the content requirements. Prior to submitting an EP to NOPSEMA, titleholders should ensure that they have met all the content requirements of an EP and objectively consider whether the content of the EP appropriately achieves the intent of, and demonstrations required by, regulation 10A. Information in the table below is intended to provide some context to the interactions between content requirements and criteria for acceptance of the Environment Regulations, but should not be applied inflexibly, do not represent all interactions and do not represent NOPSEMA's decision making process.

Criteria for acceptance	Content requirements	Elements
10A(a)	13, 14, 16	The principle of 'nature and scale' is applicable throughout the EP.
10A(b) 10A(c)	13(1) – 13(6) 16(a) – 16(b)	Set the context (the activity, the environment) Define 'acceptable' (the requirements, the corporate policy, relevant persons) Detail the impacts and risks Evaluate to nature and scale Detail the control measures - ALARP and acceptable
10A(d)	13(7)	Environmental performance outcomes Environmental performance standards Measurement criteria
10A(e)	14	Implementation strategy, including: EMS Performance monitoring, OPEP and scientific monitoring Ongoing consultation
10A(f)	13(1), 13(2), 13(3)	No activity or part of the activity….undertaken in any part of a declared World Heritage Property
10A(g)	16(b)	Consultation in preparation of the EP
10A(h)	15, 16(c)	All content of the EP must comply with the Act and the regulations.

An EP should present a strong case to NOPSEMA to demonstrate why the titleholder believes that the criteria for acceptance have been met. Prior to submitting an EP to NOPSEMA, titleholders should objectively review the EP to ensure the following critical factors have been considered:

- Does the EP clearly include all content requirements of Division 2.3?
- Does the EP demonstrate that the criteria in regulation 10A have been met?
- Is the content and level of detail appropriate for each component of the plan with consideration to the nature and scale of the impacts and risks?
- Does the EP demonstrate how the duty holder has had regard to matters protected under Part 3 of the EPBC Act?
- Is the demonstration provided through logical, reasoned, well-constructed and supported arguments?
- Does the EP demonstrate transparent decision making in setting the 'acceptable levels' and undertaking the risk evaluation, particularly in relation to the demonstration that impacts and risks are ALARP and have met the acceptable levels?
- Does the EP demonstrate a commitment to quality risk evaluation (and risk treatment) processes?

- Is evidence or appropriate referencing provided, such that NOPSEMA can reasonably determine the accuracy and reliability of information provided?
- Are the statements of performance made throughout the plan (outcomes, standards and measurement criteria) clear and enforceable and not subject to misinterpretation?

5 References & further reading

NOPSEMA Documents

- N-04000-GL0225 – Guideline – Making Submissions to NOPSEMA
- N-04000-PL0050 – Policy - Assessment
- N-04750-PL1368 – Policy - Environment Assessment Policy
- N-04750-GL1341 – Guideline - Environment Plan Levies
- N-04750-GN1448 – Environment Plan Summaries
- N-04750-GN1343 – Guidance Note - Petroleum Activities
- N-03000-GN0926 – Guideline – Notification and Reporting of Environmental Incidents
- N-04750-IP1411 - Consultation requirements under the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009
- N-04750-IP1342 – Information Paper – Oil Spill Contingency Planning
- N- 04750-IP1349 – Information Paper – Operational and Scientific Monitoring Programs

External references

AS/NZS ISO 31000:2009 Risk management – Principles and guidelines

HB 203:2012 Managing environment-related risk

AS/NZS ISO 14001:2004 Environmental management systems – Requirements with guidance for use

AS/NZS ISO 14031:2000 Environmental management – Environmental Performance Evaluation – Guidelines.

Australia's National Strategy for Ecologically Sustainable Development. Prepared by the Ecologically Sustainable Development Steering Committee, Endorsed by the Council of Australian Governments, December, 1992.

National Marine Oil Spill Contingency Plan (AMSA)

Australian Government Guidance, Australian Government agencies' roles and relevance under the Offshore Petroleum and Greenhouse Gas Storage Act 2006

Attachment A: Information relevant to consideration of protected matters

This attachment provides a summary of considerations and information relevant to matters protected under Part 3 of the EPBC Act. This is intended as a guide only and titleholders should, as a matter of course, review all available information for relevance and currency.

Table 1: Information to consider during the preparation of an EP that includes activities that may impact matters protected under the EPBC Act.

Matter protected	Titleholder considerations	Information to consider during the development of an EP
World Heritage properties	An EP that involves the activity or part of the activity, other than arrangements for environmental monitoring or for responding to an emergency, being conducted in any part of a declared World Heritage property within the meaning of the EPBC Act will not meet the acceptance criteria. Titleholders should demonstrate that the activity does not contravene a plan of management for a World Heritage property or propose unacceptable impacts to the world heritage values of a World Heritage property. If there is no plan of management for a World Heritage property, titleholders should take all reasonable steps to ensure that an EP that refers to the property is not inconsistent with the Australian World Heritage management principles.	Relevant policy documents, guidelines and statements of universal value on the DoE website. Relevant plan of management for the World heritage property or the Australian World Heritage management principles where a plan of management does not exist.
National heritage values of declared National Heritage places	Titleholders should demonstrate that the activity does not contravene a plan of management for a National Heritage place or proposes unacceptable impacts to the National heritage values of a National Heritage place. If there is no plan of management for a National Heritage place, then titleholders should take all reasonable steps to ensure that an EP that refers to the place is not inconsistent with the National Heritage management principles.	Relevant policy documents, guidelines, gazettal instruments and plans of management on the DoE website.
Wetlands of international importance	Titleholders should demonstrate that the activity does not contravene a plan of management for a Ramsar wetland or propose unacceptable impacts to the ecological character of a Ramsar wetland. If there is no plan of management for a Ramsar wetland, then titleholders should take all reasonable steps to ensure that an EP that refers to the wetland is not inconsistent with the Australian Ramsar management principles.	Relevant policy documents, guidelines, Ramsar Information Sheets, Ecological Character Descriptions and plans of management on the DoE website

Matter protected	Titleholder considerations	Information to consider during the development of an EP
Listed threatened species and ecological communities	Titleholders should demonstrate that the activity would not result in unacceptable impacts to a listed threatened species or ecological community. The titleholder should demonstrate that the EP is not inconsistent with a recovery plan or threat abatement plan for a listed threatened species or ecological community.	Relevant policy documents, recovery plans, threat abatement plans, conservation advice and guidelines on the DoE website.
Listed migratory species	Titleholders should demonstrate that the activity does not result in unacceptable impacts to a migratory species or an area of important habitat for a migratory species.	Relevant policy documents, wildlife conservation plans and guidelines on the DoE website.
Commonwealth marine environment	Titleholders should demonstrate that the activity would not result in unacceptable impacts to the environment of a Commonwealth marine area. Titleholders should have regard to any relevant bioregional plan and demonstrate that the EP is not inconsistent with a plan of management for a Commonwealth marine reserve or a Commonwealth Heritage place. If there is no plan of management for a Commonwealth marine reserve, then titleholders should demonstrate that the EP is not inconsistent with the International Union for Conservation of Nature (IUCN) reserve management principles. If there is no plan of management for a Commonwealth Heritage place, then titleholders should take all reasonable steps to ensure that the EP is not inconsistent with the Commonwealth Heritage management principles.	Relevant policy documents, gazettal instruments, bioregional plans (including the conservation atlas), wildlife conservation plans, plans of management and EPBC Act guidance documents on the DoE website.

The following list provides links to information and documents relating to matters protected that should be considered during the development of a submission to NOPSEMA. Please note that while every effort has been made to ensure the validity of the links below, NOPSEMA is not able to guarantee that they will remain valid in every case.

Table 2: References for matters protected under Part 3 of the EPBC Act.

General information	
1	EPBC Act and EPBC Regulations
	(www.comlaw.gov.au)
2	EPBC Act Policies and Guidelines including Significant Impact Guidelines 1.1 and 1.2
	(www.environment.gov.au/topics/about-us/legislation/environment-protection-and-biodiversity-conservation-act-1999/policy)

3	EPBC Act lists of heritage places, species and ecological communities and Australian RAMSAR wetlands
	(http://www.environment.gov.au/legislation/environment-protection-and-biodiversity-conservation-act/about-epbc-act/epbc-act-lists)
4	Protected matters search tool
	(www.environment.gov.au/topics/about-us/legislation/environment-protection-and-biodiversity-conservation-act-1999/protected)
5	Conservation values atlas
	(www.environment.gov.au/topics/marine/marine-bioregional-plans/conservation-values-atlas)
World heritage properties	
6	World Heritage property list and links to relevant information on each property
	(www.environment.gov.au/topics/heritage/heritage-places/world-heritage-list)
7	Australian World Heritage Management principles (Schedule 5 of the EPBC Regulations)
	(https://www.comlaw.gov.au/Details/F2014C01116)
National heritage places	
8	National heritage places list and links to relevant information on each place
	(http://www.environment.gov.au/heritage/places/national-heritage-list)
9	National heritage management principles (Schedule 5B of the EPBC Regulations)
	(https://www.comlaw.gov.au/Details/F2014C01116)
Ramsar wetlands	
10	List of wetlands of international importance (Australia's Ramsar wetlands)
	(www.environment.gov.au/cgi-bin/wetlands/)
11	Ramsar Information Sheets, Ecological Character Descriptions and Management Plans
	(www.environment.gov.au/topics/water/water-our-environment/wetlands/ramsar-convention-wetlands/ramsar-documents)
12	Australian Ramsar Management principles (Schedule 6 of the EPBC Regulations)
	http://www.comlaw.gov.au/Series/F2000B00190
Threatened species and ecological communities and migratory species	
13	Threatened flora and fauna species
	(www.environment.gov.au/topics/biodiversity/threatened-species-ecological-communities/threatened-species)
14	Threatened ecological communities
	(http://www.environment.gov.au/biodiversity/threatened/communities)

15	Specific Profile and Threats database (SPRAT)
	(www.environment.gov.au/cgi-bin/sprat/)
16	Biologically important areas of regionally significant marine species
	(http://www.environment.gov.au/marine/marine-species/bias)
17	National Marine Mammal Database
	(http://data.marinemammals.gov.au/)
18	Recovery plans adopted under the EPBC Act
	(www.environment.gov.au/cgi-bin/sprat/public)
19	Threat abatement plans
	(www.environment.gov.au/topics/biodiversity/threatened-species-ecological-communities/threat-abatement-plans/approved-threat)
20	Conservation advices
	(www.environment.gov.au/cgi-bin/sprat/public/conservationadvice.pl)
21	Wildlife Conservation plans
	(www.environment.gov.au/resource/wildlife-conservation-plan-migratory-shorebirds)
Commonwealth marine area	
22	Commonwealth Marine Reserves (including links to conservation values and relevant management plans)
	(www.environment.gov.au/topics/marine/marine-reserves)
23	Australian IUCN Reserve Management principles (Schedule 8 of the EPBC Regulations)
	(https://www.comlaw.gov.au/Details/F2014C01116)
24	Bioregional marine plans
	(www.environment.gov.au/topics/marine/marine-bioregional-plans)
25	Commonwealth Heritage Places
	(http://www.environment.gov.au/topics/heritage/heritage-places/commonwealth-heritage-list)
26	Commonwealth Heritage Management Principles
	(https://www.comlaw.gov.au/Details/F2014C01116)

NOPSEMA Attachment 4: Submission to the Senate Inquiry into the potential environmental, social and economic impacts of BP's planned exploratory oil drilling project, and any future oil or gas production in the Great Australian Bight

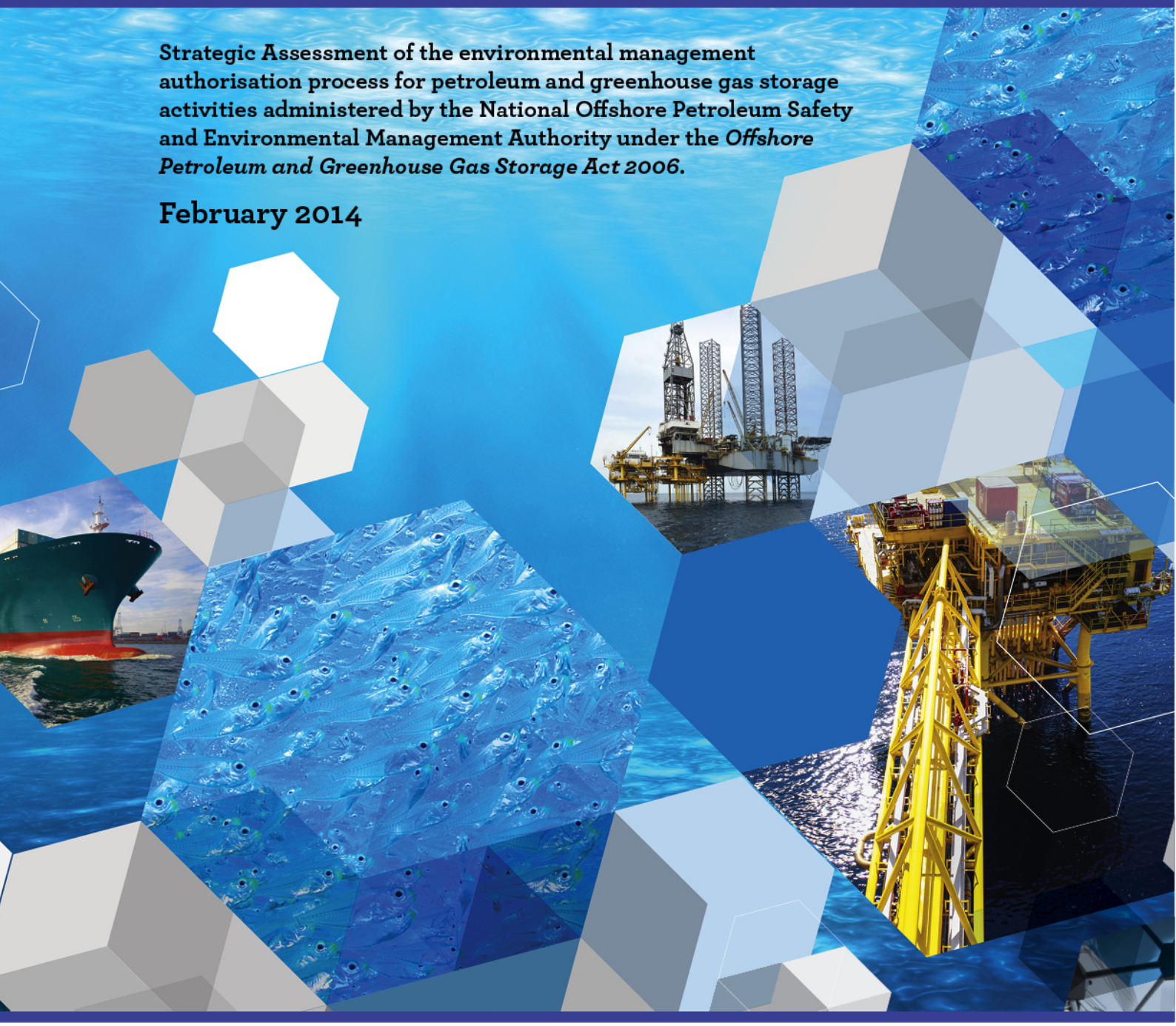
Australian Government

STREAMLINING OFFSHORE PETROLEUM ENVIRONMENTAL APPROVALS

Program Report

Strategic Assessment of the environmental management authorisation process for petroleum and greenhouse gas storage activities administered by the National Offshore Petroleum Safety and Environmental Management Authority under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006*.

February 2014



NOPSEMA Attachment 4

Program Report

CONTENTS

NOPSEMA Attachment 4

Program Report

NOPSEMA Attachment 4

Program Report

LIST OF TABLES

LIST OF FIGURES

NOPSEMA Attachment 4

Program Report

SUMMARY

The Program

The Program is a comprehensive, objective-based and systematic environmental management authorisation, compliance monitoring and enforcement regime made under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGS Act) and its subordinate Regulations. The Program is administered by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), a Commonwealth Government agency and regulator of environmental management law.

The objective of the Program is to ensure all offshore petroleum and greenhouse gas activities are carried out in a manner in which impacts on the environment are reduced to as low as reasonably practicable (ALARP) and of an acceptable level. The program covers Commonwealth waters and designated state and Northern Territory waters where environmental management functions have been conferred under legislation. Impacts on the environment include those matters protected under Part 3 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The Program provides for the protection of the environment by requiring all offshore petroleum or greenhouse gas activities authorised by the OPGGS Act to be conducted in accordance with an accepted Environment Plan consistent with the principles of ecologically sustainable development. The definition of 'environment' in the Program is consistent with that used in the EPBC Act. This enables the Program to encompass all matters protected under Part 3 of the EPBC Act.

The actions covered under the Program include all offshore petroleum and greenhouse gas activities authorised by the OPGGS Act.

Protection of the environment through Offshore Project Proposals

The Program provides for early consideration of environmental impacts and risks for longer-term, large-scale activities, by requiring proponents to submit an Offshore Project Proposal to NOPSEMA in the early developmental stages of offshore projects. This process allows NOPSEMA to make an assessment of the acceptability of these projects and to provide regulatory acceptance or refusal of project proposals.

The Program requires the Offshore Project Proposal to:

- provide information that identifies and evaluates the potential environmental impacts of the project
- define environmental performance outcomes that will ensure the impacts and risks arising from the project and its activities will be managed to an acceptable level.

The Offshore Project Proposal process has been developed to capture those large-scale offshore projects that may have an unacceptable impact on a matter protected under Part 3 of the EPBC Act and the broader environment. The process can be used for all petroleum and greenhouse gas activities and is mandatory for development projects. Titleholders may also elect to prepare and submit an Offshore Project Proposal for a petroleum or greenhouse gas storage activity that is not part of a development project and NOPSEMA guidance outlines circumstances in which this may occur. The guidance directs titleholders to consider the potential impacts on matters protected under Part 3 of the EPBC Act and outlines consultation requirements.

The Offshore Project Proposal process includes a mandatory minimum public comment period to provide stakeholders and the community with an opportunity to review and have input into the development of environmental management arrangements for offshore petroleum and greenhouse gas development projects.

NOPSEMA Attachment 4

Program Report

Conducting activities in accordance with an Environment Plan

The Program requires all titleholders to have an Environment Plan that has been accepted by NOPSEMA for any activity, prior to commencement. Titleholders must carry out activities in accordance with an accepted Environment Plan that ensures environmental impacts and risks of the activity will be reduced to ALARP and will be of an acceptable level.

Environment Plans are required to include appropriate environmental performance outcomes, environmental performance standards and measurement criteria, an appropriate implementation strategy, and monitoring, recording and reporting arrangements. The Program sets out how the titleholder must carry out the activity to remain in compliance with the accepted Environment Plan and includes monitoring and enforcement strategies to ensure compliance and for the conduct of investigations.

The Program requires the Environment Plan to:

- provide information relevant to the environmental impacts and risks of the activity
- address legislative and other controls that manage environmental features of the activity
- define the environmental performance outcomes and set the environmental performance standards against which performance of the titleholder in protecting the environment is to be measured
- demonstrate adequate consultation with relevant persons
- describe the requirements that are relevant to the environmental management of the activity.

These requirements allow the Program to consider all relevant legislation, policy and guidance, including those established under the EPBC Act regime.

Guidance materials

The Program includes a range of guidance materials, which assist with explaining the Program requirements, as updated from time to time. These are available publicly through NOPSEMA's website and help to provide context to the Program.

Conclusion

As a result of these comprehensive requirements, the Program ensures activities undertaken in accordance with the OPGGS Act environmental management authorisation process will be conducted in a manner consistent with the principles of ecologically sustainable development and that all potential impacts on matters protected under Part 3 of the EPBC Act and the broader environment will be managed to an acceptable level.

NOPSEMA Attachment 4

Program Report

PART A: INTRODUCTION

1 Introduction

The Program Report is a submission made under Part 10 – Strategic Assessments, Section 146 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Program Report is for the strategic assessment of the Program, that is, the environmental management authorisation process for offshore petroleum and greenhouse gas activities administered by NOPSEMA.[1] In conjunction with the Strategic Assessment Report (provided separately), this Program Report provides the basis for the Minister for the Environment to consider endorsing the Program under the EPBC Act.

The Program is described in Part B and includes the commitments and undertakings by NOPSEMA to ensure the adequate protection of EPBC Act Part 3 protected matters.

1.1 Background

Offshore petroleum and greenhouse gas storage activities ('activities') that have, will have or are likely to have a significant impact on matters protected under Part 3 of the EPBC Act require assessment and approval under the EPBC Act, which is administered by the Commonwealth Department of the Environment (DoE). All activities in Commonwealth waters also require assessment and authorisation under the OPGGS Act and the OPGGS(E) Regulations, which give powers and function to NOPSEMA, including the environmental management of offshore petroleum and greenhouse gas activities Commonwealth waters.

Significant economic and social benefits will be derived from streamlining the relationship between these regimes by maximising regulatory efficiency while maintaining strong environmental safeguards for matters protected under Part 3 of the EPBC Act.

1.2 Purpose of the Program Report

The objective of this Program Report is to demonstrate how the Program will ensure activities are conducted in a manner consistent with the principles of ecologically sustainable development and will not result in unacceptable impacts to matters protected under Part 3 of the EPBC Act.

Specifically this report will:

- describe the Program that constitutes the "policy, plan or program" pursuant to Part 10 – Strategic Assessments, Section 146 of the EPBC Act
- outline the commitments and undertakings of NOPSEMA to ensure adequate protection of Part 3 protected matters
- provide the basis for the Minister for the Environment to consider endorsing the Program under Section 146 of the EPBC Act
- provide the basis for the Minister for the Environment to consider approving the taking of an action or class of actions in accordance with the endorsed Program.

[1] under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGS Act) and Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (OPGGS(E) Regulations)

1.3 Structure of the Program Report

The report is structured in four parts:

- Part A introduces the Program
- Part B describes the Program that constitutes the "policy, plan or program" pursuant to section 146 of the EPBC Act. This includes the commitments and undertakings by NOPSEMA to ensure the adequate protection of matters protected under Part 3 of the EPBC Act
- Part C details additional information that helps to clarify the functions of the Program with respect of Part 3 of the EPBC Act. It should be noted that the Strategic Assessment Report (provided separately) is a detailed evaluation of the Program against EPBC Act requirements, and describes an assessment of how the implementation of the Program will ensure the appropriate level of consideration and management of impacts on matters protected under Part 3 of the EPBC Act
- Part D provides an overview of the Program evaluation, reporting and monitoring measures that will be in place to ensure the Program delivers ongoing consideration and management of impacts on matters protected under Part 3 of the EPBC Act.

1.4 Terminology

In this document, unless the contrary intention appears, words defined in the OPGGS Act and OPGGS(E) Regulations have the meaning given in the Act and those Regulations.

1.5 Program components

The description of the Program in this report has been prepared to assist the Minister for the Environment to assess the Program and consider endorsing it and approving subsequent classes of actions under Section 146 provisions of the EPBC Act. The Program is based on the OPGGS Act and OPGGS(E) Regulations as they will operate when EPBC Act Section 146 approvals are in place.

The environmental management authorisation process is embodied in the OPGGS Act, OPGGS(E) Regulations and NOPSEMA's non-legislative supporting policies and guidance.

1.6 Classes of actions covered under the Program

The classes of actions covered under the Program include all offshore petroleum and greenhouse gas activities authorised under the OPGGS Act.

The OPGGS Act authorises activities undertaken for, or as are necessary for, the following purposes:

- petroleum exploration
- petroleum recovery operations
- constructing or reconstructing an infrastructure facility
- constructing or reconstructing or operating a pipeline
- exploring for:
  - a potential greenhouse gas storage formation or
  - a potential greenhouse gas injection site
- carrying on operations to inject a substance into the seabed or subsoil of a Commonwealth offshore area.

Classes of actions also include any decommissioning activities in relation to the above.

1.7 Protection of matters protected under Part 3 of the EPBC Act

The Program will ensure that impacts on matters protected under Part 3 of the EPBC Act are not unacceptable. This is achieved through the following actions:

- The Program objectives are to ensure all offshore petroleum and greenhouse gas storage activities are carried out in a manner consistent with the principles of ecologically sustainable development, which is an objective of the EPBC Act.
- The Program assesses and subsequently accepts or refuses Environment Plans, which must include consideration of all relevant features of the environment, including, but not limited to, matters protected under Part 3 of the EPBC Act. This applies to the environment outside Commonwealth waters including where the impacts of the activity extend to state or Northern Territory jurisdiction or to Commonwealth land.
- The Program is an objective-based regulatory framework, which ensures activities are carried out in accordance with an Environment Plan that has appropriate environmental performance outcomes and environmental performance standards. Environmental performance outcomes and environmental performance standards must take into account all relevant information, which includes, but is not limited to, management guidance and standards relevant to matters protected under Part 3 of the EPBC Act.
- The Program ensures all impacts and risks are reduced to as low as reasonably practicable (ALARP), which depending on the circumstances, may provide protection to the environment beyond the acceptable level test. An ALARP objective allows titleholders to adopt environmental practices and technologies that are suited to individual circumstances, activities and locations, while taking into account costs and other factors to ensure a reasonable approach to environmental impact and risk improvements. The titleholder must show how impacts and risks will continue to be reduced to ALARP for the life of the activity. Demonstration of ALARP requires assessment of impacts and risks in the particular environmental context of the activity, which includes, but is not limited to, consideration of matters protected under Part 3 of the EPBC Act.
- The Program ensures all impacts and risks are of an acceptable level, which includes consideration of impact on matters protected under Part 3 of the EPBC Act.
- The Program ensures stakeholders, in particular those that are potentially affected by activities, are consulted and their input considered in the development of Environment Plans, including public notification and targeted engagement of relevant persons whose functions, interests or activities may be affected by the activity.
- The Program ensures large-scale developments are assessed and accepted or refused on a 'whole of lifecycle' basis, as well as on a 'phase by phase' basis of the development. Proponents will need to prepare and submit an Offshore Project Proposal that includes public notification and consultation, and consideration of stakeholder input into the development of the submission.
- The Program incorporates non-legislative policy and guidance, which provides advice to proponents and titleholders on recommended approaches to meeting Program requirements. This advice includes, but is not limited to, specific requirements relating to matters protected under Part 3 of the EPBC Act.
- The Program includes compliance monitoring and enforcement functions, which allow NOPSEMA to ensure titleholders comply with the Program requirements on an ongoing basis, and that the Program itself meets the requirements of the EPBC Act endorsement and approval.

NOPSEMA's administration of the Program will ensure that the Australian Government's outcomes in ensuring that matters protected under Part 3 of the EPBC Act are being protected will be met. The matters protected under Part 3 of the EPBC Act that are relevant to this strategic assessment and the Program's overarching commitment to environmental protection outcomes are outlined in the table below. Further detail of these matters and how the Program addresses them are set out at Part 8 and Appendix A.

NOPSEMA Attachment 4

Program Report

Table 1: NOPSEMA's commitment to protection of matters protected under Part 3 of the EPBC Act

PART 3 MATTER PROTECTED	OUTCOMES
World heritage values of declared World Heritage properties	The outstanding universal value of world heritage properties will be identified, protected, conserved and transmitted to future generations.
National heritage values of declared National Heritage places	The outstanding value to the nation of national heritage places will be protected, conserved and transmitted to future generations of Australians.
The ecological character of declared Ramsar wetlands	The ecological character of each Ramsar wetland will be maintained, and the conservation use of each wetland will be promoted for the benefit of humanity in a way that is compatible with maintenance of the natural properties of the ecosystem.
Listed threatened species and ecological communities	The survival and conservation status of listed threatened species and ecological communities will be promoted and enhanced, including through the conservation of critical habitat and other measures contained in any recovery plans, threat abatement plans or conservation advices.
Listed migratory species	The survival and conservation status of listed migratory species and their critical habitat will be promoted and enhanced.
The marine environment	The ecosystem functioning and integrity of Commonwealth marine areas will be maintained and protected in conformity with relevant marine bioregional plans and plans of management for relevant marine reserves.
The environment on Commonwealth land	The environment on Commonwealth land will be maintained and protected in full conformity with relevant plans of management.

PART B: THE PROGRAM

The Program comprises the environmental management authorisation process for offshore petroleum and greenhouse gas activities in accordance with the OPGGS Act and OPGGS(E) Regulations. The Program is supported by comprehensive non-legislative regulatory policy and guidance, which are amended from time to time.

This Program details the activities (classes of actions) that are subject to environmental management authorisation process of the OPGGS Act and OPGGS(E) Regulations.

This Program constitutes the "policy, plan or program" pursuant to section 146 of the EPBC Act.

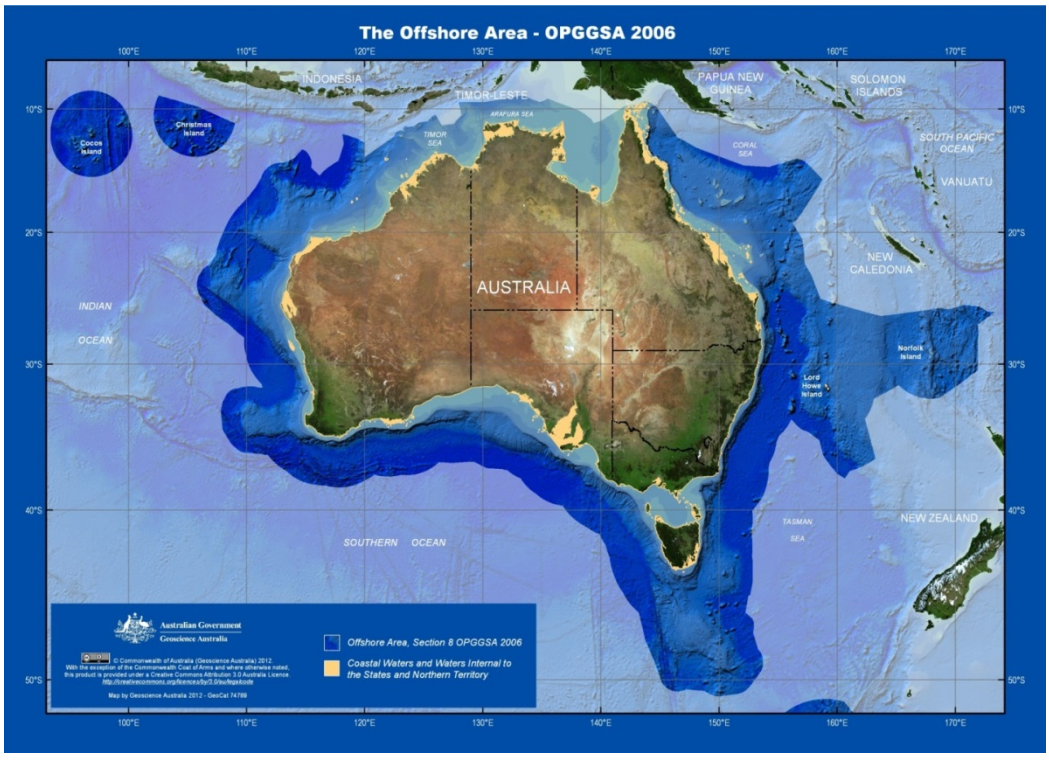
2 Offshore Petroleum and Greenhouse Gas Storage Act 2006

2.1 OPGGS Act – object and outline

The object of the OPGGS Act is to provide an effective regulatory framework for petroleum exploration and recovery, and the injection and storage of greenhouse gas substances in offshore areas.

The Program includes activities authorised by titles, permits and licences under the OPGGS Act in Commonwealth waters (those areas more than three nautical miles from the Territorial sea baseline and within the Commonwealth Petroleum Jurisdiction Boundary), as well as petroleum activities in state or Northern Territory designated coastal waters where environmental management functions have been conferred under legislation (see Figure below). The OPGGS Act is supported by regulations covering matters such as safety, diving, petroleum resource management and environmental management.

Figure 1: Map of Australia showing the offshore areas covered under the OPGGS Act



Petroleum activities are prohibited in certain marine reserves such as International Union for the Conservation of Nature categories I, II and IV zones, and would not be authorised under the OPGGS Act. Construction and maintenance of pipelines may be authorised in IUCN category IV zones.

NOPSEMA Attachment 4

Program Report

The OPGGS Act sets up a system for regulating petroleum and greenhouse gas activities in Commonwealth waters including exploration for and recovery of petroleum, construction and operation of infrastructure facilities relating to petroleum or greenhouse gas substances, construction and operation of pipelines for conveying petroleum or greenhouse gas substances, exploration for potential greenhouse gas storage formations, and injection and storage of greenhouse gas substances.

The OPGGS Act provides for the grant of a range of petroleum and greenhouse gas titles, for example a petroleum exploration permit, petroleum retention lease, petroleum production licence, infrastructure licence, pipeline licence, greenhouse gas assessment permit, greenhouse gas holding lease and greenhouse gas injection licence.

The OPGGS Act establishes NOPSEMA as the Commonwealth Statutory Agency responsible for the administration of health and safety, structural integrity, and environmental management of all offshore petroleum and greenhouse gas storage activities.

2.2 Role of NOPSEMA

NOPSEMA is the regulator of environmental management law under the Commonwealth offshore petroleum and greenhouse gas legislation, which includes the OPGGS Act and the OPGGS(E) Regulations. Specifically NOPSEMA:

- develops and implements effective monitoring and enforcement strategies to ensure compliance under environmental management law
- investigates accidents, occurrences and circumstances with regard to deficiencies in environmental management
- monitors environmental incidents and reports investigations to the responsible Commonwealth Minister and state and Northern Territory ministers
- assesses Environment Plans, including associated oil pollution emergency plans
- provides advice to persons on matters relating to environmental management
- provides information, assessments, analysis, reports, advice and recommendations to the responsible Commonwealth Minister on petroleum and greenhouse gas activities
- provides contracts for related services on a cost recovery basis for state/Northern Territory governments and foreign governments.

NOPSEMA operates on a full cost recovery basis provided for under the *Offshore Petroleum and Greenhouse Gas Storage (Regulatory Levies) Act 2003* and the Offshore Petroleum and Greenhouse Gas Storage (Regulatory Levies) Regulations 2004. Assessment and compliance of Environment Plans is funded through Environment Plan levies, collected from titleholders on submission of an Environment Plan to NOPSEMA under the OPGGS(E) Regulations, and via a fee-for-service for the assessment of Offshore Project Proposals.

2.3 Environmental management under the OPGGS Act

In addition to establishing the regulatory regime for environmental management authorisation, the OPGGS Act has other relevant powers, detailed below.

- The OPGGS Act requires that an activity in an offshore area under a permit, lease, authority or consent must be undertaken in a manner that does not interfere with:
  - navigation
  - fishing
  - conservation of the resources of the sea and seabed
  - any activities of another person being lawfully carried on by way of:
    - exploration for, recovery of or conveyance of a mineral

    - construction or operation of a pipeline
  - the enjoyment of native title rights and interests.
- The OPGGS Act requires operations to be carried out in accordance with good oilfield practice (all those things that are generally accepted as good and safe in carrying out of exploration for petroleum and petroleum recovery operations) and includes specific provisions addressing the prevention of the escape of petroleum and any mixture of water or drilling fluid with petroleum.
- The OPGGS Act requires titleholders, in the event of an escape of petroleum to eliminate or control the escape, clean up the escaped petroleum and remediate any resulting damage to the environment, and carry out environmental monitoring of the impact of the escape on the environment. If the titleholder fails to do any of these things, NOPSEMA or the responsible Commonwealth Minister may do them instead. The titleholder must reimburse NOPSEMA or the Commonwealth for the costs and expenses of any such action.
- The OPGGS Act provides for NOPSEMA (or the responsible Commonwealth Minister) to give written directions to titleholders covering all aspects of petroleum exploration and production including compliance with regulations made under the OPGGS Act. The OPGGS Act provides similar direction giving ability for greenhouse gas activities.
- The OPGGS Act further provides for remedial directions by NOPSEMA with regard to the restoration of the environment for the following matters: the removal of property, plugging or closing off of wells, conservation and protection of natural resources, and the making good of damage to the seabed or subsoil on current or former titleholders.
- The OPGGS Act requires a titleholder to maintain in good condition and repair all structures that are, and all equipment and other property that is, in the title area and used in connection with the operations authorised by the permit, lease, licence or authority.

3 OPGGS (Environment) Regulations – environmental management authorisation process

The OPGGS(E) Regulations have been made under the OPGGS Act and provide an objective-based regime for the management of environmental performance for Australian offshore petroleum exploration and production and greenhouse gas storage activities in areas of Commonwealth jurisdiction. An objective-based regulatory approach is described further in Section 3.1.

The OPGGS(E) Regulations have the objective of ensuring any activity is carried out:

- in a manner consistent with the principles of ecologically sustainable development
- in a manner in which the environmental impacts and risks of the activity will be reduced to as low as reasonably practicable
- in a manner in which the impacts and risks will be of an acceptable level.

The OPGGS(E) Regulations are comprised of five parts:

- Part 1 details the objects, definitions, other administrative elements, and requirements for Offshore Project Proposals
- Part 2 details the requirements for Environment Plans
- Part 3 describes the requirements for notification of reportable and recordable incidents, and storage and accessibility of records
- Part 4 covers various miscellaneous regulations, including the requirements for titleholders of activities, and other procedural matters
- Part 5 details transitional arrangements.

NOPSEMA Attachment 4

Program Report

Under Part 1A and Part 2, the Program comprises two environmental assessment options; an Offshore Project Proposal and associated Environment Plan(s) or, an Environment Plan. For development-type projects, the Program requires submission of an Offshore Project Proposal to NOPSEMA for assessment. The Proposal must be accepted by NOPSEMA prior to the submission of any related Environment Plan(s). Titleholders are required to submit an Environment Plan for assessment to NOPSEMA prior to commencing any offshore petroleum or greenhouse gas activity. The activity must not commence if NOPSEMA has not accepted the Environment Plan.

The Program requires proponents of an offshore project to submit an Offshore Project Proposal to NOPSEMA for assessment on a 'whole of lifecycle' basis. The Offshore Project Proposal must include details of the project, environmental impacts and risks, environmental performance outcomes and a description of potential alternatives for the project. The Offshore Project Proposal, which will include public consultation, is accepted or refused by NOPSEMA. An accepted Offshore Project Proposal must be in place prior to submission and assessment of individual Environment Plans for the component activities. All petroleum and greenhouse gas storage activities, even where they are not likely to have an impact on a matter protected under Part 3 of the EPBC Act, require an Environment Plan accepted by NOPSEMA to proceed.

Titleholders may elect to prepare and submit an Offshore Project Proposal for a petroleum or greenhouse gas storage activity that is not part of a development project. NOPSEMA guidance will outline circumstances in which a titleholder may elect to submit an Offshore Project Proposal for these activities. The guidance will refer to consideration of potential impacts on matters protected under Part 3 of the EPBC Act and outline consultation requirements under the OPGGS(E) Regulations. The options available to a titleholder for different activities are depicted in Figure 2 (below).

Both Offshore Project Proposals and Environment Plans must identify and assess the potential impacts to matters protected under Part 3 of the EPBC Act as well as the broader environment. Offshore Project Proposals are subject to public consultation, and Environment Plans must demonstrate that appropriate consultation with persons or organisations whose functions, interests or activities could be impacted by the proposed petroleum or greenhouse gas activity has been undertaken.

The OPGGS(E) Regulations outline the requirements for Environment Plans, particularly that it is an offence for a titleholder to:

- commence an activity without “an Environment Plan in force for the activity”, that is, an Environment Plan for the activity which has been accepted by NOPSEMA
- carry out an activity in a way contrary to “the Environment Plan in force for the activity”
- continue an activity if new or increased environmental risk is identified, and this new or increased risk is not provided for in the “the Environment Plan in force for the activity”.

An Environment Plan submitted to NOPSEMA for assessment must meet the acceptance criteria detailed in the OPGGS(E) Regulations for acceptance. If NOPSEMA is not reasonably satisfied that an Environment Plan meets the acceptance criteria when first submitted, NOPSEMA cannot accept the Plan and must give the titleholder a reasonable opportunity to modify and resubmit the Plan. If, after the titleholder has had a reasonable opportunity to modify and resubmit the Environment Plan, NOPSEMA is still not reasonably satisfied that the Plan meets the acceptance criteria of the OPGGS(E) Regulations, NOPSEMA must refuse to accept the Plan.

An accepted Environment Plan will establish the legally binding environment management conditions that must be met by the titleholder and against which the regulator can secure compliance. A failure to comply with an accepted Environment Plan is an offence, and also provides grounds upon which NOPSEMA can withdraw its acceptance of an Environment Plan.

NOPSEMA Attachment 4

Program Report

An Environment Plan must include:

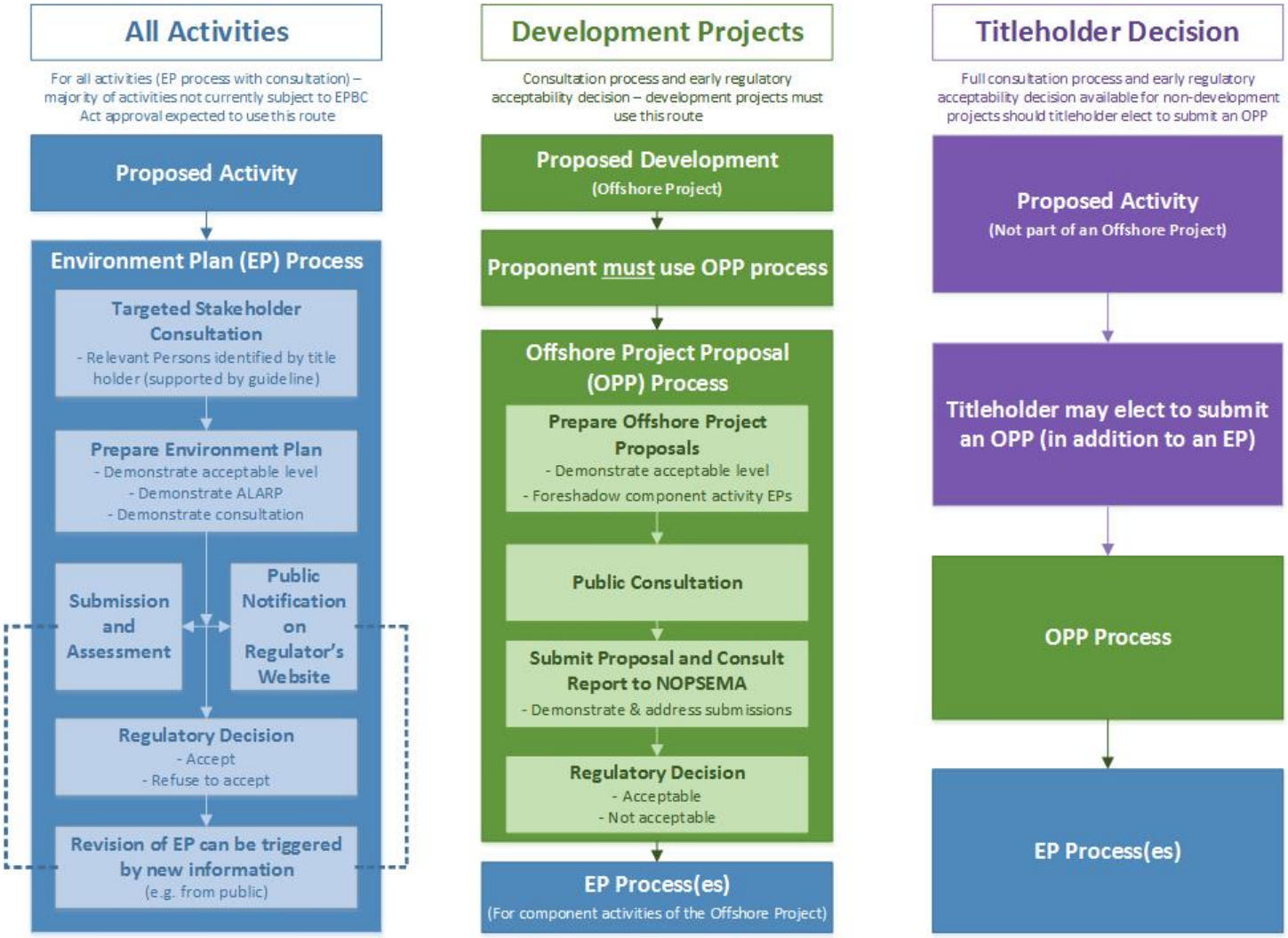
- a description of the activity
- a description of the environment that may be affected by the activity. The environment, defined broadly, includes ecosystems, natural and physical resources, and heritage values of places, and must consider EPBC Act Part 3 matters
- an assessment of the environmental impacts and risks of the activity
- proposed environmental performance outcomes, environmental performance standards and measurement criteria
- an implementation strategy for ensuring the outcomes and standards are met
- a statement of the titleholder's corporate environmental policy
- a report on consultation with relevant persons
- details of the reporting of all reportable incidents in relation to the proposed activity.

Offshore Project Proposals and Environment Plans must comply with all the requirements of the OPGGS Act and OPGGS(E) Regulations, including the commitments and undertakings in this Program for EPBC Act Part 3 matters.

NOPSEMA Attachment 4

Program Report

Figure 2: The Program's environmental assessment process



3.1 Objective-based regulation

The Program is an objective-based regulatory regime. This means that the regulation does not prescribe specific processes, standards or procedures, but rather, regulates through the achievement of environmental objectives. Proponents are able to determine how objectives are to be achieved by adopting the approach best suited to the particular circumstances, within the parameters of the OPGGS(E) Regulations, which stipulate that:

- broad environmental objectives or outcomes be established
- an Offshore Project Proposal be developed to provide an early examination of environmental impacts and risks where the proposal is related to production, or the titleholder seeks to have other activities subject to this process
- titleholders are to provide an Environment Plan that demonstrates how they will achieve those objectives by proposing management arrangements and by providing evidence of how the application of these arrangements will achieve the environmental objectives
- NOPSEMA can accept an Environment Plan only where it meets certain acceptance criteria that align with environmental objectives. Acceptance criteria include demonstrating that environmental impacts and risks of the activity are of an acceptable level and that appropriate measurable environmental performance outcomes and environmental performance standards are set.

Objective-based regulation is consistent with the principles of ecologically sustainable development and establishes a framework in which titleholders are required to set out how they propose to undertake an activity. The primary objective is to ensure that environmental impacts and risks of the activity are reduced to as low as reasonably practicable and are of an acceptable level.

Under an objective-based regime, individual titleholders adopt environmental management practices and technologies best suited to individual circumstances, activities and locations, subject to demonstrating that environmental performance outcomes and environmental performance standards will be met.

Objective-based regulation provides a legislative framework with the following benefits:

- consistent with the principles of ecologically sustainable development
- provides for assessment of all environmental impacts and risks on a project specific basis
- minimises environmental impacts and risks for approved proposals
- encourages adoption of best practice environmental management systems and continuous improvement in all aspects of a titleholder's environmental performance
- reduces industry costs by allowing timely adoption of improved practices and technologies
- reduces government costs by eliminating the need for changes to regulations to meet rapidly changing industry practices and technology
- provides transparent and accountable acceptance and compliance processes.

Comprehensive advice to support the OPGGS(E) Regulations, which outlines NOPSEMA’s administrative approach is available to assist industry in complying with the OPGGS(E) Regulations.

3.2 Key terms and definitions

3.2.1 Activity

A petroleum activity is any operations or works in an offshore area carried out for the purpose of exercising a right conferred on a petroleum titleholder under the OPGGS Act by a petroleum title, or discharging an obligation imposed on a petroleum titleholder by the OPGGS Act or a legislative instrument under the OPGGS Act.

NOPSEMA Attachment 4

Program Report

Examples of petroleum activities include:

- seismic surveys
- drilling
- construction and installation of a facility
- operation of a facility
- significant modification of a facility
- decommissioning, dismantling or removing a facility
- construction and installation of a petroleum pipeline
- operation of a petroleum pipeline
- significant modification of a petroleum pipeline
- decommissioning, dismantling or removing a petroleum pipeline.

A greenhouse gas activity is any operations or works in an offshore area carried out under a greenhouse gas title, other authority or consent under the OPGGS Act or OPGGS(E) Regulations and any activity relating to greenhouse gas exploration, injection or storage that may have an impact on the environment. Greenhouse gas activities include:

- seismic surveys
- drilling
- construction and installation of a facility
- operation of a facility
- significant modification of a facility
- decommissioning, dismantling or removing a facility
- construction and installation of a greenhouse gas pipeline
- operation of a greenhouse gas pipeline
- significant modification of a greenhouse gas pipeline
- decommissioning, dismantling or removing a greenhouse gas pipeline
- injection and storage of greenhouse gas.

3.2.2 Title and titleholder

A title is an authority granted by an instrument under the OPGGS Act for the carrying out of an offshore petroleum or greenhouse gas activity (i.e. permit, licence, authority, and lease).

The titleholder is the registered person who holds the authority for carrying out an activity (i.e. a permit or licence). Titleholder means a petroleum titleholder or greenhouse gas titleholder under the Program.

The titleholder is responsible for ensuring their activities are planned and carried out in a way that does not result in unacceptable impacts on matters protected under Part 3 of the EPBC Act.

3.2.3 Principles of ecologically sustainable development

One object of the OPGGS(E) Regulations is to ensure that any petroleum activity or greenhouse gas storage activity in an offshore area is carried out in a manner consistent with the 'principles of ecologically sustainable development', as set out in the EPBC Act. The OPGGS(E) Regulations do not define principles of ecologically sustainable development, but in the EPBC Act they encompass the following tenets:

(a) decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations

(b) if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation

(c) the principle of inter-generational equity--that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations

(d) the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making

(e) improved valuation, pricing and incentive mechanisms should be promoted

3.2.4 Environment

The OPGGS(E) Regulations define environment as ecosystems and their constituent parts, including people and communities; natural and physical resources; the qualities and characteristics of locations, places and areas; the heritage value of places; and includes the social, economic and cultural features of these matters.

Note that this definition was clarified and made consistent with the definition of environment under the EPBC Act as a result of a 2005 regulatory amendment.

The definition of environment incorporated in the Program encompasses all aspects of the environment including, but not limited to, EPBC Act Part 3 protected matters. As a result, all Program functions relating to protection of the environment apply for EPBC Act Part 3 matters.

3.2.5 Environmental performance outcomes

Environmental performance outcomes means measurable performance targets set for the management of the environmental aspects of an activity to ensure that environmental impacts and risks will be of an acceptable level. This requirement ensures that titleholders are aware that they must set clear, measurable goals for their environmental performance, which can be monitored to determine if those outcomes are being met.

In developing environmental performance outcomes, titleholders must consider the existing environment which includes, but is not limited to, EPBC Act Part 3 protected matters. Titleholders must also address legislative and other controls that manage environmental features of the activity, which includes, but is not limited to, management guidance and standards relevant to EPBC Act Part 3 protected matters.

3.2.6 Environmental performance standards and control measures

An environmental performance standard is a statement of performance required of a control measure. A control measure is a system, an item of equipment, a person or a procedure that is used as a basis for managing environmental risk for the duration of the activity.

As with environmental performance outcomes, when developing environmental performance standards and control measures, titleholders must consider the existing environment which includes, but is not limited to, EPBC Act Part 3 matters. Titleholders must also address legislative and other controls that manage environmental features of the activity, which include, but are not limited to, management guidance and standards relevant to EPBC Act Part 3 matters.

4 Offshore Project Proposal

The Program requires proponents of an offshore project to submit an Offshore Project Proposal to NOPSEMA for assessment. An accepted Offshore Project Proposal must be in place prior to submission and assessment of Environment Plans for the individual component activities.

NOPSEMA Attachment 4

Program Report

An offshore petroleum or greenhouse gas project[2] consists of one or more of the following:

- construction of facilities or pipelines
- operation of facilities or pipelines
- recovery of petroleum other than on an appraisal basis
- injection of greenhouse gas
- permanent storage of greenhouse gas.

The purpose of an Offshore Project Proposal is to:

- provide the public with an opportunity to review and provide input during the development of environmental management strategies for offshore petroleum or greenhouse gas development projects
- provide the proponent with the opportunity to develop a comprehensive list of relevant persons for consultation during the subsequent Environment Plan process
- allow NOPSEMA to make an assessment of the acceptability of proposed offshore petroleum or greenhouse gas development projects.

4.1 Offshore Project Proposal – submission

A proponent proposing to undertake an offshore petroleum or greenhouse gas project must submit an Offshore Project Proposal to NOPSEMA for public comment and assessment. To be accepted, Offshore Project Proposals must comply with all the regulatory requirements of the Offshore Project Proposal process, including the public consultation components.

4.2 Offshore Project Proposal – content

The Program specifies the following content requirements for an Offshore Project Proposal:

- details of the offshore project proponent
- a summary of the project, including:
  - a description of each of the activities that will be carried out for the project
  - the location or locations of the activities
  - a description of the facilities proposed to be used to carry out the activities
  - proposed timetables for carrying out the activities
- description of the existing environment that may be affected by the project
- details of the particular relevant values and sensitivities of that environment, including relevant matters protected under Part 3 of the EPBC Act
- details of the environmental impacts and risks for the project
- an evaluation of all the impacts and risks
- environmental performance outcomes for the activities that will be carried out for the project
- description of the legislative and other requirements that apply to the project and are relevant to the environmental management of the project
- description of feasible alternatives to the activities that will be carried out for the project.

[2] The OPGGS(E) Regulations identify the activities that require an Offshore Project Proposal. The OPGGS(E) Regulations will include greenhouse gas injection and permanent storage activities in this definition prior to approval of that class of action (or those classes of actions) by the Minister for the Environment in accordance with the Program.

NOPSEMA Attachment 4

Program Report

4.3 Offshore Project Proposal – public consultation

Under the Program, NOPSEMA will determine that the Offshore Project Proposal is suitable for public comment if the proposal:

- appropriately identifies and evaluates the environmental impacts and risks for the project
- includes information sufficient to enable persons to make an informed assessment of whether the environmental impacts and risks of the project will be appropriately managed
- contains environmental performance outcomes that are consistent with the principles of ecologically sustainable development and are relevant to the identified environmental impacts and risks for the project

In the Offshore Project Proposal process, formal consultation for a statutory minimum of four weeks occurs during the public comment period and relevant documentation is made available on NOPSEMA's website. NOPSEMA advice material indicates that proponents, as part of good industry practice, should also undertake early consultation with stakeholders in the preparation of an Offshore Project Proposal and in the lead up to the mandatory public comment period. This consultation should inform the identification of environmental sensitivities, impacts and risks and the development of environmental performance outcomes for the project.

4.4 Offshore Project Proposal – revision

Following the period of public comment, the proponent must revise the Offshore Project Proposal to include:

- a summary of all public comments received
- an assessment of the merits of any objection or claim about adverse impacts of the project
- a statement of the proponent's response to any objection or claim, including a description of what changes, if any, have been made to the project.

The revision is then submitted to NOPSEMA for assessment.

4.5 Offshore Project Proposal – assessment and acceptance process

The Program stipulates that the following regulatory requirements be met for an Offshore Project Proposal to be accepted:

- the Offshore Project Proposal meets the content requirements of the OPGGS(E) Regulations and contains sufficient information to allow the public to make meaningful comment
- issues raised during the public comment period have been adequately addressed
- the Offshore Project Proposal meets the acceptance criteria of the OPGGS(E) Regulations.

NOPSEMA must accept the Offshore Project Proposal if it:

- adequately addresses comments given during the period for public comment; and
- is appropriate for the nature and scale of the project; and
- appropriately identifies and evaluates the environmental impacts and risks for the project; and
- does not involve an activity or part of an activity being conducted in any part of a declared World Heritage property within the meaning of the EPBC Act; and
- contains appropriate environmental performance outcomes.

If on resubmission, the Offshore Project Proposal does not meet the criteria specified above, NOPSEMA may request further written information about any matters to be included in the Offshore Project Proposal. If after the submission of

further written information, the acceptance criteria are still not met, NOPSEMA must refuse to accept the Offshore Project Proposal.

Upon acceptance of the revised Offshore Project Proposal it is published on NOPSEMA's website. Should NOPSEMA refuse to accept the Offshore Project Proposal, a notification and a statement of the refusal is published.

4.5.1 Appropriate to the nature and scale of the project

All aspects of the Offshore Project Proposal must be appropriate to the nature and scale of the project, while meeting all the requirements of the OPGGS(E) Regulations. General requirements for an Offshore Project Proposal are relative to the sensitivity of the receiving environment and also to the project's size, complexity, environmental impacts and risks.

The Offshore Project Proposal must describe the existing environment that may be affected by the project, including details of the particular relevant values and sensitivities (if any) of that environment, including other relevant activities, and potential cumulative impacts and risks over the short and longer term.

4.5.2 Identification and evaluation of impacts and risk

The Offshore Project Proposal must describe and evaluate the environmental impacts and risks for the project. This requires identification of the relevant environmental values and sensitivities, which, under the Program, includes, but is not limited to, EPBC Act Part 3 matters. The evaluation must include all of the impacts and risks arising directly or indirectly from all future activities and potential emergency conditions.

4.5.3 Appropriate environmental performance outcomes

The Offshore Project Proposal defines the environmental performance outcomes to be achieved to protect the environment and to ensure that the impacts and risks arising from the project and activities to be undertaken as part of the project will be managed to an acceptable level.

4.5.4 Activity not proposed to take place in a declared World Heritage property

The Offshore Project Proposal cannot propose an activity, or part of an activity, that is to be undertaken within a declared World Heritage property within the meaning of the EPBC Act.

4.5.5 Adequately addresses public comments

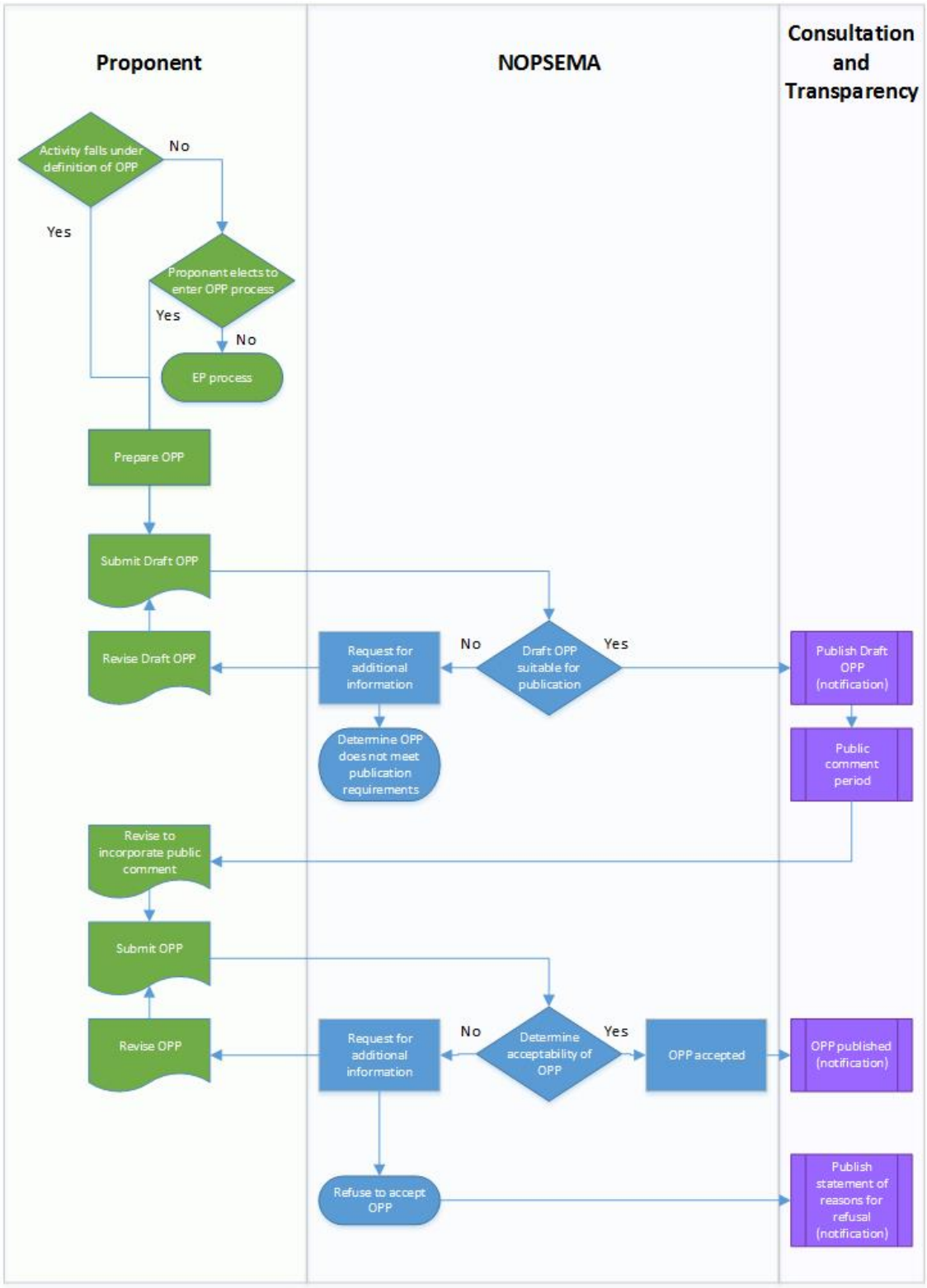
In the course of preparing the Offshore Project Proposal, the proponent must publish the Offshore Project Proposal for public comment for a minimum of four weeks. The revised Offshore Project Proposal must demonstrate that all public submissions have been adequately addressed, and that any appropriate management or other measure resulting from the public comment has been considered and adopted.

If an Offshore Project Proposal is submitted to NOPSEMA that does not meet the acceptance criteria for an Offshore Project Proposal, NOPSEMA must refuse to accept the Offshore Project Proposal. Unless there is an accepted Offshore Project Proposal for a project, a titleholder cannot submit an Environment Plan for the related activities to NOPSEMA for assessment and those activities cannot commence.

NOPSEMA Attachment 4

Program Report

Figure 3: The Program's environmental assessment process for Offshore Project Proposals



5 Environment Plan

5.1 Environment Plan – acceptance requirements

The OPGGS(E) Regulations are consistent with system-based approaches such as those described in international standards (e.g. International Organisation for Standardisation (ISO) and Standards Australia/Standards New Zealand (AS/NZS) standards), and key processes of these systems are embodied in the regulatory requirements.

NOPSEMA must accept an Environment Plan if it is reasonably satisfied that the Environment Plan:

- is appropriate for the nature and scale of the activity or proposed use; and
- demonstrates that the titleholder has carried out the required consultation and details any measures that the titleholder proposes to adopt because of the consultation; and
- demonstrates that the environmental impact and risks of the activity will be reduced to as low as reasonably practicable; and
- demonstrates that the environmental impact and risks of the activity will be of an acceptable level; and
- provides for appropriate environmental performance outcomes, environmental performance standards and measurement criteria; and
- includes an appropriate implementation strategy and monitoring, recording and reporting arrangements; and
- does not involve the activity or part of the activity, other than arrangements for responding to oil pollution or monitoring the effects of oil pollution, being conducted in any part of a declared World Heritage property within the meaning of the EPBC Act.

An Environment Plan must comply with all the requirements of the OPGGS Act and OPGGS(E) Regulations, including the commitments and undertakings in this Program for EPBC Act Part 3 matters.

5.1.1 Appropriate to nature and scale of the activity

All aspects of the Environment Plan must be appropriate to the nature and scale of the activity or proposed use, while meeting all the requirements of the OPGGS(E) Regulations. General requirements for an Environment Plan are relative to the sensitivity of the receiving environment and also to the activity's size, complexity, and environmental impacts and risks inherent to the specific activity.

The Environment Plan must evaluate all impacts and risks of the activity in the context of the environment in which the activity is to take place. This includes other relevant activities and potential cumulative impacts and risks over the short and longer term. A higher expectation in terms of the general scope, depth, detail, comprehensiveness, information support, analysis, justification and evidence provided is applied to a large and complex activity with a high potential for environmental impact and risk, and predictive uncertainty, than for a small and straightforward activity in an area of low environmental sensitivity and where there may be a high degree of confidence in impact prediction.

5.1.2 Consultation

In the course of preparing the Environment Plan, or a revision of an Environment Plan, the titleholder for an activity must consult with relevant persons including a person or organisation whose functions, interests or activities may be affected by the activities to be carried out under the Environment Plan, or any other person or organisation that the titleholder considers relevant. The Environment Plan must demonstrate that consultation processes are in place and that the titleholder, having undertaken appropriate consultation in preparation of the Environment Plan, has adopted any appropriate management measures resulting from the consultation. The Environment Plan, through the implementation strategy, must provide for appropriate ongoing consultation for the life of the activity.

5.1.3 Impacts and risks of the activity will be ALARP and acceptable

The Environment Plan evaluates and demonstrates that impacts and risks are of an acceptable level and ALARP. Demonstrating acceptability is achieved by evaluating environmental impacts and risks (including direct and indirect impacts from operational and potential emergency conditions) against acceptable levels that are defined and justified by the titleholder. Demonstrating that environmental impacts and risks are ALARP requires the provision of evidence that the impacts and risks have been modified to a level that is ALARP.

Demonstrating that the environmental impacts and risks of an activity will be reduced to ALARP and will be of an acceptable level requires the titleholder to evaluate all impacts and risks of the activity in the context of the environment in which the activity is to take place. This includes other relevant activities and potential cumulative impacts and risks over the short and longer term.

5.1.4 Appropriate environmental performance outcomes, environmental performance standards and measurement criteria

The Environment Plan defines the environmental performance outcomes and sets the environmental performance standards against which the environmental performance of the titleholder, in protecting the environment, is to be measured during the operational phase. The Environment Plan must also provide for appropriate measurement criteria that will allow the titleholder to determine if the performance outcomes and performance standards have been met.

5.1.5 Appropriate implementation strategy, and monitoring, recording and reporting arrangements

The Environment Plan includes an implementation strategy that provides a systematic approach to ensure the environmental performance outcomes and environmental performance standards of the plan are implemented, and continuously monitored. The implementation strategy must describe the environmental management system that will be in place to ensure that impacts and risks will be continuously reduced to ALARP, and that requirements are met as set out in the OPGGS(E) Regulations, including the effectiveness of control measures, monitoring, recording and oil pollution emergency response planning.

The implementation strategy must provide for appropriate ongoing consultation with relevant authorities of the Commonwealth, a state or territory, and other relevant interested persons or organisations.

5.1.6 Activity not to take place in a declared World Heritage property

The Environment Plan cannot propose an activity, or part of an activity, that is to be undertaken within a declared World Heritage property within the meaning of the EPBC Act. An Environment Plan may be accepted (should it meet all the other acceptance requirements) if it is for an activity that is proposed to occur outside of a World Heritage property but where the titleholder considers it appropriate to propose arrangements for environmental monitoring or responding to an emergency, that may be necessary to protect the values of a World Heritage property.

5.2 Environment Plan – contents

An Environment Plan must include the matters described below.

5.2.1 Description of the activity

The Environment Plan must contain a comprehensive description of the activity. The Environment Plan must identify and describe all activities relevant to the environmental impacts and risks of the activity.

5.2.2 Description of the environment

The Environment Plan must describe the existing environment that may be affected by the activity, as well as any relevant cultural, social and economic aspects of the environment that may be affected and include details of the particular relevant values and sensitivities of that environment.

The Program defines the environment in a manner consistent with the EPBC Act, including not limited to EPBC Act Part 3 protected matters. Titleholders must describe the particular relevant values and sensitivities of the environment explicitly including the identification of any relevant matters protected under Part 3 of the EPBC Act.

5.2.3 Description of requirements

The Environment Plan must describe the requirements that apply to the activity, the environmental management of the activity and the context of the activity. These requirements influence the assessment and management of the activity, and the development of environmental performance outcomes and environmental performance standards.

Requirements that may be relevant to the activity include, among other things, relevant laws, codes, standards, agreements, treaties, conventions or practices that apply to the jurisdiction in which the activity will take place, or other jurisdictions.

In addressing these requirements, titleholders must consider, among other things, policies, guidance, standards and other information sources relevant to EPBC Act Part 3 protected matters.

5.2.4 Identification and evaluation of environmental impacts and risks

The Environment Plan must include details of the environmental impacts and risks for the activity and an evaluation of all the impacts and risks. This must include an evaluation of all the impacts and risks arising directly or indirectly from all operations of the activity and potential emergency conditions.

The titleholder must identify and analyse all of the activity's environmental impacts and risks by detailing and documenting their nature and severity, including their sources, potential events, and potential consequences and also estimate the magnitude and duration of impacts and risks.

Identifying and evaluating environmental impacts and risks for the activity requires identification of the relevant environmental values and sensitivities, which under the Program includes but is not limited to EPBC Act Part 3 matters.

5.2.5 Environmental performance outcomes and standards

The Environment Plan must include environmental performance outcomes, environmental performance standards and measurement criteria that address legislative and other controls that manage environmental features of the activity. It must also define the outcomes and set the standards against which the titleholder's performance in protecting the environment is to be measured. These must include measurement criteria for determining whether the outcomes and standards have been met.

In developing environmental performance outcomes and standards, titleholders must consider the existing environment and environmental impacts and risks which include, but are not limited to, consideration of EPBC Act Part 3 matters and the predicted effectiveness of management measures. Titleholders must also address legislative and other controls that manage environmental features of the activity, which include but are not limited to, management guidance and standards relevant to EPBC Act Part 3 matters.

5.3 Review of Environment Plans

A titleholder must submit a proposed revision of an Environment Plan to NOPSEMA when:

NOPSEMA Attachment 4

Program Report

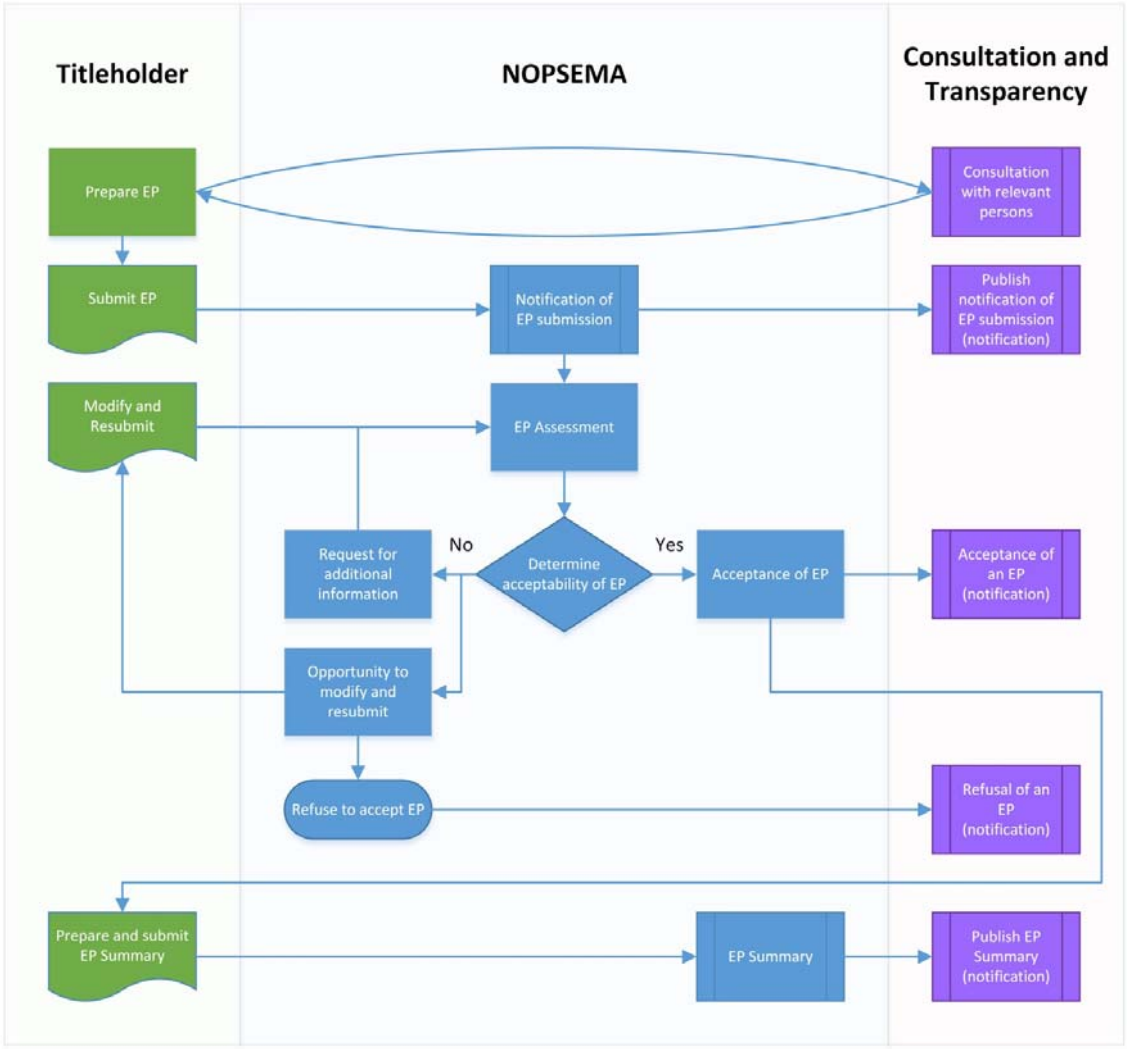
- a new activity, significant modification or new stage of an activity is proposed to commence, which is not provided for in the Environment Plan in force
- NOPSEMA formally requests a revised Environment Plan from a titleholder, for a particular reason
- an accepted Environment Plan has been in place for five years
- there is a change in the titleholder for the activity that will result in a change in the manner in which the environmental impacts and risks for the activity are managed
- there is the occurrence of any significant new, or series of new, environmental impacts or risks, or a significant increase in an existing environmental impact or risk, not provided for in the Environment Plan in force for the activity.

Proposed revisions to an Environment Plan submitted to NOPSEMA under these circumstances will be assessed by NOPSEMA, in accordance with the OPGGS(E) Regulations. In addition, the provisions of the Environment Plan in force for the activity existing immediately before any proposed revision was submitted remain in force, until such time that the proposed revision has been accepted by NOPSEMA.

5.4 NOPSEMA Environment Plan assessment and decision process

An overview of the Environment Plan process is provided in the figure below.

Figure 4: The Program's environmental management assessment process for Environment Plans



5.5 Notification of submission and assessment decision

When NOPSEMA receives an Environment Plan submission, it will publish the following information its website:

- date of the submission
- name of the titleholder making the submission
- type or types of activities to which the submission relates
- location of the activity or activities to which the submission relates
- contact details of the titleholders nominated liaison for the submission.

The information on the website will be updated as soon as practicable with the status of NOPSEMA's assessment including whether it has decided to accept or refuse to accept the submission.

5.6 NOPSEMA decision

NOPSEMA will notify the titleholder of a decision on its assessment of the Environment Plan within 30 days, commencing the day after the Environment Plan is submitted.

NOPSEMA will make one of the following decisions:

- accept the Environment Plan
- refuse to accept the Environment Plan
- unable to make a decision on the Environment Plan within the 30-day time limit (a revised timeframe will be set)
- request further written information from the titleholder about any matter contained within the Environment Plan.

5.6.1 Acceptance of the Environment Plan

If NOPSEMA is reasonably satisfied that the Environment Plan meets the acceptance criteria of the OPGGS(E) Regulations, then NOPSEMA must accept the plan. Acceptance criteria are the key element of the objective-based regime as they set the outcomes that must be achieved before an activity can proceed.

Environment Plan acceptance criteria and content requirements are provided in the OPGGS(E) Regulations and are outlined in this document. NOPSEMA provides guidance on interpretation of these criteria and content requirements and NOPSEMA's approach to the assessment and acceptance process.

NOPSEMA assesses the adequacy of the Environment Plan based on the content of the submission against the acceptance criteria. In the first instance, the Environment Plan is assessed in general terms, to determine if it is appropriate to the activity and its surrounding environment, and complies with all criteria and content requirements for each stage of the activity to which the Environment Plan applies.

NOPSEMA then conducts a detailed assessment by considering the extent to which the Environment Plan adequately addresses the criteria, content and appropriateness requirements with respect to key areas that focus on the components of the activity that pose the highest potential environmental risk. The scope of this part of the assessment is informed by any relevant prior assessments, inspections and investigations. In addition, factors are considered such as levels of risk, uncertainty, use of innovative technology and the timing and geographical location of particular activities and whether appropriate consultation has occurred.

NOPSEMA may also take into consideration any other information that is relevant, such as environmental data.

5.6.2 Reasonable opportunity to modify and resubmit

If NOPSEMA is not reasonably satisfied that an Environment Plan meets the acceptance criteria when first submitted, NOPSEMA cannot accept the Environment Plan and must give the titleholder a reasonable opportunity to modify and resubmit the plan. NOPSEMA provides the opportunity to modify and resubmit an Environment Plan based on the circumstances in which the resubmission is being made. Opportunities to modify and resubmit are provided as a written notification.

Upon resubmission of a modified Environment Plan to NOPSEMA, an additional 30-day period (commencing the day after resubmission of the Environment Plan) applies to decision-making for the resubmitted plan.

5.6.3 Refusal to accept the Environment Plan

If, after the titleholder has had a reasonable opportunity to modify and resubmit the Environment Plan, NOPSEMA is still not reasonably satisfied that the Environment Plan meets the acceptance criteria of the OPGGS(E) Regulations, NOPSEMA must refuse to accept the plan.

5.6.4 Unable to make a decision

NOPSEMA may notify a titleholder that it is unable to make a decision within the 30-day period commencing the day after the submission of the Environment Plan, and set out a proposed timetable in which to complete the assessment.

NOPSEMA must provide the titleholder with reasons for being unable to make a decision within the statutory timeframe; these may include the following:

- NOPSEMA is not reasonably satisfied that the Environment Plan meets the acceptance criteria of the OPGGS(E) Regulations and the titleholder is being given an opportunity to modify and resubmit the plan.
- Extended assessment time is required due to the complexity of the Environment Plan (e.g. for complex or large activities).

5.6.5 Request for further written information

NOPSEMA may request further written information about any matter required to be included in an Environment Plan, prior to making a decision to accept or refuse to accept the plan. A request for further written information can be made at any point in NOPSEMA's assessment process. Any request for additional information must be in writing, set out the matter(s) for which additional information is requested, and set a reasonable period for provision of the information by the titleholder. If further written information is submitted as requested, that additional information will become part of the Environment Plan as if it had been included in the Environment Plan when submitted (or re-submitted if applicable) to NOPSEMA.

5.6.6 Conditional or limited acceptance

In addition to NOPSEMA's ability to accept or refuse to accept an Environment Plan, NOPSEMA may also do either or both of the following:

- accept the plan in part for a particular stage of the activity
- impose limitations or conditions applying to operations for the activity.

5.6.7 Environment Plan summary for public disclosure

Within 10 days after receiving notification that NOPSEMA has accepted an Environment Plan, the titleholder must provide a summary of the information in the plan written in a style accessible to the public. NOPSEMA reviews this

summary and either confirms to the titleholder that the content and style is satisfactory, or requests modification of the summary. The summary is published on NOPSEMA's website.

The Environment Plan summary must include the following:

- location of the activity
- description of the receiving environment
- description of the activity
- details of environmental impacts and risks
- summary of the control measures
- summary of the proposed arrangements for on-going monitoring of the titleholder's environmental performance
- summary of proposed oil pollution emergency response arrangements
- details of consultation already undertaken, and plans for ongoing consultation
- contact details of the titleholder's nominated liaison personnel for the activity.

Environment Plan summaries are placed on the NOPSEMA website for public access as soon as practicable after a version that satisfies NOPSEMA has been provided by the titleholder.

6 Post-acceptance compliance and enforcement

6.1 Environmental management compliance and enforcement

NOPSEMA has a legislated function to develop effective monitoring and enforcement strategies to ensure compliance by titleholders with their obligations under the Program.

The following legislated functions are provided under the Program:

- develop and implement effective monitoring and enforcement strategies to ensure compliance by persons with their obligations under environmental management law
- investigate accidents, occurrences and circumstances that involve, or may involve, deficiencies in environmental management in connection with operations in Commonwealth waters
- advise persons, either on NOPSEMA's own initiative or by request, on matters relating to environmental management.

6.2 NOPSEMA compliance monitoring of activities

NOPSEMA conducts inspections to assist in meeting legislative requirements in relation to environmental management, including effective monitoring and enforcement. Monitoring and enforcement is an activity that NOPSEMA prioritises equally with assessment of Environment Plan submissions.

NOPSEMA applies the following principles to its inspection activities, which represent leading practice regulation:

- Inspections focus on titleholder activities with the activity considered holistically such that all relevant structures, vessels, aircraft, buildings or places used in connection with an activity are considered in the planning process.
- Inspections are independent of titleholder inspections, audits and other related activities.
- The scope of an inspection is planned in advance, with, where necessary, deviation from an inspection brief during an inspection as a result of observations during the inspection.
- Instances of non-compliance with environmental management law evidenced through the inspection process are documented and provided to the titleholder following the completion of the inspection.

NOPSEMA Attachment 4

Program Report

NOPSEMA identifies and schedules inspections using a risk-based methodology that considers the following factors:

- environmental impacts and risks associated with activities
- previous environmental performance of the activity and/or titleholder, informed by inspections, incident history and other environmental performance factors
- industry trends in environmental recordable/reportable incident notifications
- duration of the activity
- the nature and scale of the activity.

In addition, titleholders are required to provide at least annual compliance reports including reports on audits of performance and management systems. NOPSEMA has the power to undertake, or direct the undertaking of, audits of performance or systems where they are not satisfied with the titleholder's reports.

Under the Program NOPSEMA will share relevant information with the Department of the Environment to facilitate any compliance actions under either the OPGGS Act or the EPBC Act. NOPSEMA will also report to the Minister for Industry, the Minister for the Environment and relevant state and territory ministers on compliance investigations under the Program that relate to EPBC protected matters. Incidents in relation to a petroleum or greenhouse gas storage activity that have resulted, or are likely to result, in serious or irreversible damage to protected matters will be, as soon as practicable, reported to the Minister for Industry and the Minister for the Environment.

6.3 NOPSEMA enforcement process

NOPSEMA has a wide range of response options that are graduated and are chosen to be proportionate to the risks presented by health and safety issues or non-compliances. These can be considered as either promotion of compliance or enforcement and are applied to environmental management activities.

These response options include:

- **Warning Letter:** Non-statutory enforcement tool that warns titleholders of the consequences of continuing non-compliance
- **Request to revise Environment Plan:** Administrative compliance tool that requires the titleholder to prepare and submit a revised Environment Plan. The current Environment Plan remains in force, and the titleholder can continue to undertake the activity, during this process
- **Direction:** Statutory enforcement tool under the Program that requires the titleholder to take action (or not take action). Failure to comply with a direction is a strict liability offence with associated penalty provisions under the Program. This option is most appropriate in situations where there is an immediate threat to the environment, or to prevent an incident or major environmental consequences, or address an unacceptable emissions or discharges
- **Withdrawal of acceptance of Environment Plan:** Administrative compliance tool that means the titleholder must cease conducting the activity. It is an offence under the Program to conduct an activity without an accepted Environment Plan in force for that activity. There are penalty provisions associated with this offence.

In the cases where the magnitude and risks presented by non-compliance are significant, or other enforcement measures have failed to secure compliance, compliance enforcement can extend to withdrawal of acceptance of an Environment Plan. Withdrawal of acceptance of an Environment Plan is a significant enforcement tool and the OPGGS(E) Regulations state that NOPSEMA must provide at least 30 days notice that it intends to withdraw acceptance of an Environment Plan. NOPSEMA is able to provide a copy of that notice to any person. NOPSEMA must specify a date on which the titleholder (and other persons) may provide a submission in relation to the notice, and must take such information provided to it into account before it withdraws acceptance of an Environment Plan. This provides for adequate transparency, natural justice and procedural fairness in the compliance enforcement activity in relation to meeting environmental objectives under the Program.

7 NOPSEMA's regulatory policies and guidelines

NOPSEMA has developed a series of documents to inform and assist titleholders to interpret and meet the requirements of the Program. These documents are subject to change, are updated from time-to-time, and additional documents are developed as the need is identified.

The list of guidance material on NOPSEMA's website relevant to the Program is provided below:

- assessment policy
- Environment Plan assessment policy
- environmental management inspection policy
- compliance and enforcement policy
- making assessment submissions to NOPSEMA guidelines
- Environment Plan content requirements guidance note
- regulator interpretation—petroleum activity guidance note
- oil pollution emergency planning guidance note
- notification and reporting of environmental incidents guidance note
- operational scientific monitoring programs.

Further guidance material that outlines particular Program requirements for EPBC Act Part 3 protected matters will be developed within six months of Program endorsement, and updated from time-to-time to reflect relevant changes to the Part 3 protected matters.

8 Program commitments

The Program will ensure that activities carried out do not have unacceptable impacts on the following matters protected under Part 3 of the EPBC Act:

- the World heritage values of a declared World Heritage property
- National heritage values of a declared National Heritage place
- the ecological character of a declared Ramsar wetland
- listed threatened species and ecological communities
- a listed migratory species
- the environment in a Commonwealth marine area
- the environment on Commonwealth land

The specific Program commitments that ensure this undertaking is met are provided below.

NOPSEMA Attachment 4

Program Report

Table 2: Program commitments relating to EPBC Act Part 3 protected matters

PART 3 MATTER	VALUES	PROGRAM COMMITMENT
World heritage properties	The outstanding universal value of world heritage properties will be identified, protected, conserved and transmitted to future generations.	• NOPSEMA will not accept an Environment Plan that involves the activity or part of the activity, other than arrangements for environmental monitoring or for responding to an emergency, being conducted in any part of a declared World Heritage property within the meaning of the EPBC Act. • NOPSEMA will not accept an Environment Plan that proposes activities that will contravene a plan of management for a World Heritage property or proposes unacceptable impacts to the world heritage values of a World Heritage property. • If there is no plan of management for a World Heritage property, then NOPSEMA will take all reasonable steps to ensure that any accepted Environment Plan that refers to the property is not inconsistent with the Australian World Heritage management principles. • NOPSEMA will develop guidance (that will be updated from time to time) that titleholders should have regard to in the preparation of their Environment Plans. The guidance will: - make reference to consideration of the protection of the values of World Heritage properties - include references to relevant guidance documents to be considered by titleholders in preparing Environment Plans such as Statements of Outstanding Universal Value, plans of management and EPBC Act guidance documents. • In undertaking assessments, NOPSEMA will have regard to relevant policy documents, guidelines, Statements of Outstanding Universal Value and plans of management on the DoE website.
National heritage places	The outstanding value to the nation of national heritage places will be protected, conserved and transmitted to future generations of Australians.	• NOPSEMA will not accept an Environment Plan that proposes activities that will contravene a plan of management for a National Heritage place or proposes unacceptable impacts to the National heritage values of a National Heritage place. • If there is no plan of management for a National Heritage place, then NOPSEMA will take all reasonable steps to ensure that any accepted Environment Plan that refers to the place is not inconsistent with the National Heritage management principles. • NOPSEMA will develop guidance (that will be updated from time to time) that titleholders should have regard to in the preparation of their Environment Plans. The guidance will: - make reference to consideration of the protection of the values of National Heritage places - include references to relevant guidance documents to be considered by titleholders in preparing Environment Plans such as gazettal instruments and EPBC Act guidance documents. • In undertaking assessments, NOPSEMA will have regard to relevant policy documents, guidelines, gazettal instruments and plans of management on the DoE website.

NOPSEMA Attachment 4

Program Report

PART 3 MATTER	VALUES	PROGRAM COMMITMENT
Wetlands of international importance	The ecological character of each Ramsar wetland will be maintained, and the conservation use of each wetland is promoted for the benefit of humanity in a way that is compatible with maintenance of the natural properties of the ecosystem.	• NOPSEMA will not accept an Environment Plan that proposes activities that will contravene a plan of management for a Ramsar wetland or proposes unacceptable impacts to the ecological character of a Ramsar wetland. • If there is no plan of management for a Ramsar wetland, then NOPSEMA will take all reasonable steps to ensure that any accepted Environment Plan that refers to the wetland is not inconsistent with the Australian Ramsar management principles. • NOPSEMA will develop guidance (that will be updated from time to time) that titleholders should have regard to in the preparation of their Environment Plans. The guidance will: - make reference to consideration of the protection of the ecological character of the Ramsar wetland - include references to relevant guidance documents to be considered by titleholders in preparing Environment Plans such as Ramsar Information Sheets, Ecological Character Descriptions and EPBC Act guidance documents. • In undertaking assessments, NOPSEMA will have regard to relevant policy documents, guidelines, Ramsar Information Sheets, Ecological Character Descriptions and plans of management on the DoE website.
Listed threatened species and ecological communities	The survival and conservation status of listed threatened species and ecological communities will be promoted and enhanced, including through the conservation of critical habitat and other measures contained in any recovery plans, threat abatement plans or conservation advices	• NOPSEMA will not accept an Environment Plan that proposes activities that will result in unacceptable impacts to a listed threatened species or ecological community. • NOPSEMA will not accept an Environment Plan that is inconsistent with a recovery plan or threat abatement plan for a listed threatened species or ecological community. • NOPSEMA will have regard to any approved conservation advice in relation to a threatened species or ecological community before accepting an Environment Plan. • NOPSEMA will develop guidance (that will be updated from time to time) that titleholders should have regard to in the preparation of their Environment Plans. The guidance will: - make reference to consideration of the listing category and protection of the listed threatened species or ecological community - include references to relevant guidance documents to be considered by titleholders in preparing Environment Plans such as recovery plans, threat abatement plans, conservation advice and EPBC Act guidance documents. • In undertaking assessments, NOPSEMA will have regard to relevant policy documents, recovery plans, threat abatement plans, conservation advice and guidelines on the DoE website.

NOPSEMA Attachment 4

Program Report

PART 3 MATTER	VALUES	PROGRAM COMMITMENT
Listed migratory species	The survival and conservation status of listed migratory species and their critical habitat will be promoted and enhanced.	• NOPSEMA will not accept an Environment Plan that proposes activities that will result in unacceptable impacts to a migratory species or an area of important habitat for a migratory species. • NOPSEMA will develop guidance (that will be updated from time to time) that titleholders should have regard to in the preparation of their Environment Plans. The guidance will: - make reference to consideration and protection of the listed migratory species - include references to relevant guidance documents to be considered by titleholders in preparing Environment Plans such as wildlife conservation plans, and EPBC Act guidance documents. • In undertaking assessments, NOPSEMA will have regard to relevant policy documents, wildlife conservation plans and guidelines on the DoE website.
Commonwealth marine area	The environment of Commonwealth marine areas will be maintained and protected in conformity with relevant marine bioregional plans and plans of management for relevant Commonwealth reserves.	• NOPSEMA will not accept an Environment Plan that proposes activities that will result in unacceptable impacts to the environment of a Commonwealth marine area. • NOPSEMA will have regard to any relevant bioregional plan and not act inconsistently with a plan of management for a Commonwealth reserve or a Commonwealth Heritage place in deciding whether or not to accept an Environment Plan. • If there is no plan of management for a Commonwealth reserve, then NOPSEMA will ensure that acceptance of an Environment Plan is not inconsistent with the IUCN reserve management principles. • If there is no plan of management for a Commonwealth Heritage place, then NOPSEMA will take all reasonable steps to ensure that any accepted Environment Plan that refers to the place is not inconsistent with the Commonwealth Heritage management principles. • NOPSEMA will develop guidance (that will be updated from time to time) that titleholders should have regard to in the preparation of their Environment Plans. The guidance will: - make reference to consideration of the environment of the Commonwealth marine area - include references to relevant guidance documents to be considered by titleholders in preparing Environment Plans such as gazettal instruments, bioregional plans, wildlife conservation plans, plans of management and EPBC Act guidance documents. • In undertaking assessments, NOPSEMA will have regard to relevant policy documents, gazettal instruments, bioregional plans, wildlife conservation plans, plans of management and EPBC Act guidance documents on the DoE website.

NOPSEMA Attachment 4

Program Report

PART 3 MATTER	VALUES	PROGRAM COMMITMENT
Commonwealth land	The environment on Commonwealth land will be maintained and protected in conformity with relevant plans of management.	• NOPSEMA will not accept an Environment Plan that proposes activities that will result in unacceptable impacts to the environment on Commonwealth land. • NOPSEMA will have regard to any bioregional plan and not act inconsistently with a plan of management for a Commonwealth reserve or a Commonwealth Heritage place in deciding whether or not to accept an Environment Plan. • If there is no plan of management for a Commonwealth Heritage place, then NOPSEMA will take all reasonable steps to ensure that any accepted Environment Plan is not inconsistent with the Commonwealth Heritage management principles. • If there is no plan of management for a Commonwealth reserve, then NOPSEMA will ensure that acceptance of an Environment Plan is not inconsistent with the IUCN reserve management principles. • NOPSEMA will develop guidance (that will be updated from time to time) that titleholders should have regard to in the preparation of their Environment Plans. The guidance will: - make reference to consideration of the environment of the Commonwealth land - include references to relevant guidance documents to be considered by titleholders in preparing Environment Plans such as gazettal instruments, bioregional plans, plans of management and EPBC Act guidance documents. • In undertaking assessments, NOPSEMA will have regard to relevant policy documents, gazettal instruments, bioregional plans, plans of management and guidance documents on the DoE website.

In addition, the following commitments are made to ensure that the implementation and administration of the Program deliver on the commitment to ensure that activities carried out under the Program do not have unacceptable impacts on protected matters under Part 3 of the EPBC Act (see Table 3):

NOPSEMA Attachment 4

Program Report

Table 3: Program commitments relating to administration of the Program

PROGRAM COMMITMENT	BY WHOM	WHEN
Agree and enter into administrative arrangements with DoE for the transfer of relevant information regarding the administration of the Program.	NOPSEMA DoE	Within 6 months of Program endorsement
Prepare amendments to NOPSEMA's existing advice documents to reflect consideration of matters protected under Part 3 of the EPBC Act.	NOPSEMA	Following Program endorsement, for implementation when approval of classes of actions is in place
Develop specific advice document(s) that titleholders should consider in the preparation of their Offshore Project Proposals and Environment Plans, to make reference to consideration of the protected matters under Part 3 of the EPBC Act. This advice should include references to relevant guidance documents to be considered by titleholders in preparing Offshore Project Proposals and Environment Plans such as EPBC Act guidance documents.	NOPSEMA DoE	Within 6 months of Program endorsement

PART C: HOW THE PROGRAM CONSIDERS EPBC ACT PART 3 REQUIREMENTS

This section provides an overview of how the Program meets the relevant EPBC Act requirements. A Strategic Assessment Report (provided separately) has been prepared to assess how the implementation of the Program will ensure the appropriate level of consideration and management of impacts on matters protected under Part 3 of the EPBC Act.

9 EPBC Act

9.1 EPBC Act objects

Section 3 of the EPBC Act describes the objects of the Act:

(1) The objects of this Act are:

(a) to provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance;

(b) to promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources;

(c) to promote the conservation of biodiversity;

(ca) to provide for the protection and conservation of heritage;

(d) to promote a cooperative approach to the protection and management of the environment involving governments, the community, land holders and indigenous peoples;

(e) to assist in the cooperative implementation of Australia's international environmental responsibilities;

(f) to recognise the role of indigenous people in the conservation and ecologically sustainable use of Australia's biodiversity; and

(g) to promote the use of indigenous peoples' knowledge of biodiversity with the involvement of, and in cooperation with, the owners of the knowledge.

9.2 EPBC Act Part 3 protected matters

The Strategic Assessment is an assessment of the adequacy of the Program to identify and manage impacts on matters protected under Part 3 of the EPBC Act.

Part 3 of the EPBC Act is concerned with requirements for the protection of particular environmental aspects at the national scale. It comprises two Divisions, which deal with a range of matters. Division 1 describes requirements relating to matters of national environmental significance and Division 2 describes protection of the environment under the Commonwealth's jurisdiction and the broader environment, from proposals involving the Commonwealth.

Under the EPBC Act, actions that have, will have or are likely to have a significant impact on matters of national environmental significance require approval from the Minister for the Environment. The Minister will decide whether assessment and approval is required under the EPBC Act.

The matters protected under Part 3 of the EPBC Act relevant to this Program are:

- World heritage values of declared World Heritage properties
- National heritage values of declared National Heritage places
- The ecological character of declared Ramsar wetlands
- Listed threatened species and ecological communities
- Listed migratory species
- The marine environment
- The environment on Commonwealth land.

10 Program implementation and EPBC Act Part 3

In implementing the Program, NOPSEMA assesses Offshore Project Proposals and Environment Plans against the requirements of the Program, including the OPGGS(E) Regulations acceptance criteria and content requirements. NOPSEMA is obliged to take into account all relevant considerations in exercising its decision-making power. All considerations are to be weighed and considered in the context of the submission as a whole.

NOPSEMA's assessment involves competent assessment teams and specialists evaluating submissions with reference to all relevant internal and external sources of information, for example applicable legislation, publicly available scientific reports, international standards, other relevant standards, government management plans and guidelines.

Each Environment Plan submission is subject to an assessment approach comprising two components, a general assessment and a detailed topic assessment. The general assessment is undertaken to determine that the Environment Plan is appropriate to the activity and its surrounding environment and complies with all items required by the OPGGS(E) Regulations for each stage of the activity to which the Environment Plan applies.

The detailed topic assessment is also conducted of one or more key topic areas of the Environment Plan. This is undertaken by considering the extent the Environment Plan adequately addresses the content and appropriateness requirements of an applicable selection of the OPGGS(E) Regulations with respect to the topic area. Topic areas will generally be focused on the components of the activity that pose the highest potential environmental risk. The scope of this component of the assessment is, where appropriate, informed by relevant external information, and prior assessments, inspections and investigations. In addition, consideration of factors such as (but not limited to) key sensitivities, levels of risk, uncertainty, use of innovative technology, and the timing and geographical location of particular activities inform the selection of the key topics to be examined in the assessment.

Through this process, relevant information including standards, guidance and management plans are considered and incorporated into assessment functions.

10.1 Program consideration and management of impacts on EPBC Act Part 3 matters

An overview of how the Program components ensure the appropriate level of consideration and management of impacts on matters protected under Part 3 of the EPBC Act is provided below.

NOPSEMA Attachment 4

Program Report

Table 4: Program consideration and management of impacts on EPBC Act Part 3 matters

PROGRAM ASPECT	DESCRIPTION	EPBC ACT PART 3
General		
Program objectives	Regulatory objectives are that activities are carried out in a manner consistent with the principles of ecologically sustainable development.	Consistent with EPBC Act.
Jurisdiction	Commonwealth waters, as well as designated coastal waters where environmental management functions have been conferred under legislation.	Appropriate jurisdictional coverage.
Objective-based regulation	Consistent with principles of ecologically sustainable development; provides for assessment of all environmental impacts and risks on a project specific basis.	Consistent with EPBC Act and captures EPBC Act Part 3 protected matters.
Definition of activity	All activities conducted under an instrument of the OPGGS Act.	Activities that have, will have or are likely to have a significant impact on a Part 3 protected matter will require the submission and acceptance of an Environment Plan.
Definition of environment	Environment means ecosystems and their constituent parts, including people and communities; natural and physical resources; the qualities and characteristics of locations, places and areas; and the heritage value of places including the social, economic and cultural features of these matters.	Consistent with EPBC Act and includes all Part 3 matters.
Offshore projects	Titleholders must submit an Offshore Project Proposal in the early stages of a large-scale development for assessment and acceptance or refusal on a 'whole of lifecycle' basis. The Program specifies public notification and consultation requirements.	Development, project consultation, assessment, acceptance or refusal process consistent with EPBC Act.
Environment Plan	Titleholder cannot carry out an activity without an Environment Plan in place. An Environment Plan is the legally binding environment management conditions that must be met by the titleholder and against which the regulator can secure compliance.	Appropriate compliance functions. Provides sufficient documentation to enable assessment of impacts on EPBC Act Part 3 matters.
Acceptance or refusal of Offshore Project Proposal and Environment Plan	Offshore project proposals and Environment Plans must be accepted if they meet criteria and content requirements specified in the Program. If NOPSEMA is not reasonably satisfied that these have been met then the Offshore Project Proposal or Environment Plan will be refused.	Appropriate assessment, and acceptance / refusal function. Ability to refuse an Offshore Project Proposal or Environment Plan on grounds of unacceptable impacts to EPBC Act Part 3 matters.

NOPSEMA Attachment 4

Program Report

PROGRAM ASPECT	DESCRIPTION	EPBC ACT PART 3
Non-legislative policy and guidance	Explain NOPSEMA's approach to regulating the requirements of the Program.	Includes, but not limited to, specific requirements relating to all EPBC Act Part 3 matters to meet Program commitments.
Compliance monitoring and enforcement functions	Ensure titleholders meet the Program requirements on an ongoing basis.	Ensures the Program itself meets the requirements of the EPBC Act endorsement and approval.
OPGGS(E) Regulations Environment Plan acceptance criteria		
Nature and Scale	Environment Plan content is relative to the sensitivity of the receiving environment and also to the activity's size, complexity, and environmental impacts and risks inherent to the specific activity.	Ensures EPBC Act Part 3 matters are considered in the preparation of the Environment Plan.
As low as reasonably practicable (ALARP)	Allows proponents to adopt environmental practices and technologies best suited to individual circumstances, activities and locations. The proponent must show how impacts and risks will continue to be reduced to ALARP for the life of the activity.	Demonstration of ALARP requires assessment of impacts and risks in the particular environmental context of the activity, which includes, but is not limited to, consideration of all EPBC Act Part 3 matters.
Acceptable level	Titleholders must demonstrate that the environmental impacts and risks of the activity will be of an acceptable level.	Includes, but is not limited to, an evaluation of whether an activity has, will have or is likely to have unacceptable impacts on all EPBC Act Part 3 matters.
Performance outcomes and performance standards	Activities are carried out in accordance with an Environment Plan that has appropriate environmental performance outcomes and performance standards.	The setting of environmental performance outcomes and performance standards must take into account all relevant information, which includes, but is not limited to, management guidance and standards relevant to all EPBC Act Part 3 matters.
Implementation Strategy	The Environment Plan includes an appropriate implementation strategy that provides a systematic approach to ensure the environmental performance outcomes and environmental performance standards of the plan are implemented and monitored on an ongoing basis.	Ensures EPBC Act Part 3 matters are protected on an ongoing basis.
Activity not in a World Heritage Property	Does not involve the activity or part of the activity, other than arrangements for environmental monitoring or for responding to an emergency, being conducted in any part of a declared World Heritage property within the meaning of the EPBC Act.	Ensures the outstanding universal values of World Heritage Properties are protected on an ongoing basis.

NOPSEMA Attachment 4

Program Report

PROGRAM ASPECT	DESCRIPTION	EPBC ACT PART 3
Consultation	The titleholder must consult relevant stakeholders in preparing an Environment Plan. The Program specifies public notification and consultation requirements.	Consistent with EPBC Act.

10.2 Program implementation and ensuring EPBC Act Part 3 matters protection

The Program will be implemented to meet the objective of ensuring activities undertaken in the offshore area are conducted in a manner consistent with the principles of ecologically sustainable development and will not result in unacceptable impacts to matters protected under Part 3 of the EPBC Act.

The ways in which the Program ensures impacts on matters protected under Part 3 of the EPBC Act are detailed in Appendix A. Future listings for relevant matters protected under Part 3 of the EPBC Act will have the same level of protection under the Program as existing listed protected matters.

NOPSEMA will develop guidance (that will be updated from time to time) that proponents and titleholders should consider in the preparation of their Offshore Project Proposals and Environment Plans. The guidance will:

- make specific reference to consideration of the protection of the values of matters protected under Part 3 of the EPBC Act
- include references to relevant guidance documents to be considered, such as EPBC Act significance guidance documents, relevant policy statements, plans of management, recovery plans and on-line databases.

In undertaking Offshore Project Proposal and Environment Plan assessments, NOPSEMA will consider relevant policy documents, guidelines, and plans of management on the DoE website (see below).

10.3 Policies and guidance

Both NOPSEMA and the Department of the Environment prepare and publish a range of policies, guidance material and other information sources in relation to their respective regulatory functions.

10.3.1 NOPSEMA policies and guidance

NOPSEMA develops advice documents to inform and assist titleholders to interpret and meet the requirements of the Program.

These documents have been developed under NOPSEMA's legislated function to advise persons, either on its own initiative, or on request, on matters relating to offshore petroleum environmental management and are updated from time to time.

There are four broad categories of advice documents:

- **Policies:** outline the objectives of the Program and provide guiding principles on how NOPSEMA administers the requirements of the Program
- **Guidelines:** provide titleholders with specific details on the approach, expectations or criteria that NOPSEMA sets in applying its regulatory discretion
- **Guidance notes:** advise industry on what is explicitly required by the Program, discuss good practice and suggest possible approaches for environmental management
- **Information papers:** provide general information, consistent with the Program as a means to foster industry best practice

NOPSEMA Attachment 4

Program Report

Table 5 (below) outlines how advice documents will ensure titleholders meet the Program's commitments to EPBC Act Part 3 protected matters when preparing Environment Plans and will continue to meet these requirements when undertaking activities in accordance with an accepted Environment Plan.

Table 5: Program advice documents

DOCUMENT	DESCRIPTION OF CONTENT
Policies	
NOPSEMA Assessment Policy	Provides overarching NOPSEMA information on the assessment policy for activities regulated by NOPSEMA (including those not covered by the Program such as safety cases).
Environment Plan Assessment Policy	Provides detail on NOPSEMA's overarching assessment policy to assist titleholders to understand NOPSEMSA's approach to assessing Environment Plans submitted under the Program.
Environmental Management Inspection Policy	Provides information on the conduct of inspections under the Program for accepted Environment Plans
Compliance and Enforcement Policy	Provides an overview of the legislative framework within which NOPSEMA operates and how the compliance and enforcement strategy is applied to activities regulated under the Program (including those not covered by the Program such as safety cases).
Guidelines	
Making assessment submissions to NOPSEMA Guideline	Provides overarching information on assessment submissions to assist with timely assessments for activities regulated by NOPSEMA (including those not covered by the Program such as safety cases).
Guidance notes	
Environment Plan Content Requirements Guidance Note	Provides assistance in regulatory interpretation of the Program to assist titleholders in preparing Environment Plans.
Petroleum Activity Guidance Note	Provides assistance in the regulatory interpretation of what constitutes a petroleum activity under the Program.
Oil Pollution Emergency Response Guidance Note	Provides assistance in the regulatory interpretation of what is required to be included in an oil pollution emergency response under the Program.
Notification and Reporting of Environmental Incidents Guidance Note	Provides overarching information on the reporting of environmental incidents connected with activities regulated by NOPSEMA (including those not covered by the Program such as safety cases).
Information papers	
Operational Scientific Monitoring Programs	Provides general advice to assist titleholders in planning and implementing operational scientific monitoring programs.

NOPSEMA Attachment 4

Program Report

NOPSEMA will update relevant existing advice documents to reflect consideration of matters protected under Part 3 of the EPBC Act, to be in place at the time of endorsement and approval of actions.

In addition to existing documents, NOPSEMA will develop specific advice (that will be updated from time to time) that titleholders should consider in the preparation of their Environment Plans. The guidance will:

- refer to consideration of the protected matters under Part 3 of the EPBC Act
- include references to relevant guidance documents to be considered by titleholders in preparing Environment Plans such as EPBC Act guidance documents, Plans of Management, recovery plans and other publications.

10.3.2 Department of the Environment - EPBC Act plans policies and guidance

DoE develops a range of plans developed under the EPBC Act, policy approaches and guidance documents to inform and assist proponents to meet statutory obligations with respect to the protection of matters under Part 3 of the EPBC Act. This information includes, but is not limited to:

- **Plans of Management:** including for World and National Heritage places, Ramsar wetlands, Commonwealth reserves and Commonwealth Heritage places.
- **Recovery Plans:** for listed threatened species and ecological communities
- **Policy Statements:** including significance impact guidelines and industry specific guidelines
- **Other material:** including management principles, online databases, factsheets and other publications.

In preparing industry guidance material and in undertaking Offshore Project Proposal and Environment Plan assessments, NOPSEMA will consider these relevant policy documents, guidelines, plans of management and other online data sources available on the DoE website.

A comprehensive suite of requirements and guidance ensures that NOPSEMA will not accept an Environment Plan that will have an unacceptable impact on a protected matter under Part 3 of the EPBC Act comprising:

- legislative requirements of the OPGGS Act and OPGGS(E) Regulations
- policy and guidance documents prepared and published by NOPSEMA
- reference to other sources of information such as plans of management and recovery plans.

PART D: PROGRAM EVALUATION, REPORTING AND MONITORING

11 Program evaluation, reporting and monitoring

In order to measure the performance of the Program against the Program objectives, a framework for evaluating, reporting and monitoring the Program will be developed. Reviews will be conducted against Terms of Reference and the results provided to DoE. The review framework will include:

- a review of the Program after 12 months of operation, to be submitted within 18 months of Program endorsement
- a review of the Program every five years for the life of the Program to assess progress in achieving the objectives of the Program
- an annual report detailing all relevant decisions made under the Program.

11.1 Program evaluation

There will be a review of the Program after 12 months of operation, to be submitted within 18 months of endorsement and within every five years thereafter. The purpose of the reviews will be to assess the performance of the Program against Program objectives including ensuring that impacts on matters protected under Part 3 of the EPBC Act are not unacceptable. As an input to the first Program review, a sample of all decisions made by NOPSEMA will be subject to a detailed evaluation to ensure appropriate consideration of matters protected under Part 3.

The review findings will be provided to the Minister for Industry and the Minister for the Environment within six months of the review's commencement. The review will enable NOPSEMA to determine if refinements to management arrangements and standards are required to ensure the Program's commitments and objectives to EPBC protected matters are being delivered by the Program.

11.2 Program reporting

NOPSEMA will provide an annual report on the Program, highlighting the decisions made under the Program, the findings of compliance inspections, environmental incidents reported by titleholders and any investigations underway for the previous year.

The report will be provided to the Minister for Industry and Minister for the Environment and published on the NOPSEMA website.

11.3 Administrative arrangements

Administrative arrangements will be established between NOPSEMA and the Minister for the Environment to ensure that information relating to the Program can be provided in the most effective and efficient way. Arrangements will be in place within six months of endorsement and approval.

The arrangements will provide a mechanism for continuous improvement through learning from the outcomes of assessment decisions, any relevant reviews, updates to relevant policies, guidelines, recovery plans and any other relevant new information that relates to the protection of matters protected under Part 3 of the EPBC Act.

To ensure all elements of a multi-jurisdictional project's impacts on Part 3 EPBC Act matters are considered, and that consistent and compatible decision outcomes by regulators are made, NOPSEMA will work with state and territory resource agencies and the Department of the Environment (where relevant – for example where state/territory bilateral agreements under the EPBC Act are not finalised) to establish administrative arrangements with each relevant jurisdiction.

NOPSEMA Attachment 4

Program Report

APPENDIX A

Table 6: Program implementation measures ensuring EPBC Act Part 3 matters protection

PROGRAM COMMITMENTS	RESPONSIBILITIES	MECHANISMS
World Heritage Properties: • NOPSEMA will not accept an Environment Plan that involves the activity or part of the activity, other than arrangements for environmental monitoring or responding to an emergency, being undertaken in any part of a declared World Heritage property within the meaning of the EPBC Act. • NOPSEMA will not accept an Environment Plan that proposes activities that will contravene a plan of management for a World Heritage property or proposes unacceptable impacts to the world heritage values of a World Heritage property. • If there is no plan of management for a World Heritage property, then NOPSEMA will take all reasonable steps to ensure that any accepted Environment Plan that refers to the property is not inconsistent with the Australian World Heritage management principles. • NOPSEMA will develop guidance (that will be updated from time to time) that titleholders should have regard to in the preparation of their Environment Plans. The guidance will: - make reference to consideration of the protection of the values of World Heritage properties	Titleholder responsibilities: • The OPGGS(E) Regulations require that a titleholder's Environment Plan must: - not propose an activity that wholly or in part (other than arrangements for environmental monitoring or responding to an emergency) is to be conducted in any part of a World Heritage property - describe the existing environment that may be affected by the activity and include details of the particular relevant values and sensitivities of that environment. In the event that a proposed activity is likely to affect a World Heritage property, a detailed description of the outstanding universal value(s) of that property is required to be included - detail all of the environmental impacts and risks of the activity. This includes all potential impacts on relevant environmental values including those associated with World Heritage properties. The OPGGS(E) Regulations define environmental impact as "*any change to the environment, whether adverse or beneficial, that wholly or partially results from an activity of a titleholder*" and as such direct, indirect and facilitated impacts on the values of World Heritage properties are appropriately captured through the Environment Plan process - evaluate all of the environmental impacts and risks of the activity including those that may arise under potential emergency conditions. This requirement ensures that the interaction between the titleholder's activity and the receiving environment is analysed appropriately such that control measures to avoid or mitigate those potential impacts can be put in place and detailed in an Environment Plan	Mechanisms to ensure titleholder's responsibilities are met: • Regulations 10A, 13 and 14 of the OPGGS(E) Regulations will ensure these responsibilities are met. • NOPSEMA prepares and publishes guidance on the content requirements of Environment Plans, which provides further detailed interpretation of the requirements of the OPGGS(E) Regulations with respect to the identification and management of impacts to the environment. NOPSEMA will update this guidance on approval of classes of actions to ensure that, where relevant, titleholders give specific consideration to World Heritage management obligations, principles and management plans to ensure that activities proposed in their Environment Plans are not inconsistent with these requirements. • NOPSEMA will issue further guidance that directs titleholders to consider relevant policies, documents and other material issued by DoE in the preparation of Environment Plans to ensure that management of impacts to the values of World Heritage properties is appropriately taken into account.

NOPSEMA Attachment 4

Program Report

PROGRAM COMMITMENTS	RESPONSIBILITIES	MECHANISMS
- include references to relevant guidance documents to be considered by titleholders in preparing Environment Plans such as Statements of Outstanding Universal Value, plans of management and EPBC Act guidance documents. • In undertaking assessments, NOPSEMA will have regard to relevant policy documents, guidelines, Statements of Outstanding Universal Value and plans of management on the DoE website.	- include environmental performance outcomes, environmental performance standards and measurement criteria. Environmental performance outcomes are defined as "*measurable performance targets set for the management of the environmental aspects of an activity to ensure that environmental impacts and risks will be of an acceptable level*". Environmental performance standards relate directly to control measures used to reduce impacts and risks to acceptable levels and provide statements of performance required of these control measures. This allows the titleholder to determine whether control measures applied will be effective in eliminating and mitigating environmental impacts to the values of World Heritage properties. Measurement criteria allow a titleholder to determine whether environmental performance outcomes and standards have been met and thereby to determine whether impacts to the values of World Heritage properties are being managed to the defined acceptable levels - demonstrate that the environmental impacts and risks of the activity will be of an acceptable level and reduced to as low as reasonably practicable (ALARP). In order to meet this requirement a titleholder must include information to demonstrate that all practicable measures that can be taken to reduce impacts to the values of World Heritage properties will be taken. It is implicit in this requirement that impacts to the values of World Heritage properties cannot be unacceptable - describe the legislative and other requirements that apply to the activity and that are relevant to the environmental management of the activity. Sections 318 and 321 of the EPBC Act set out the requirements for section 316 plans for the management of listed World Heritage properties. If these	

NOPSEMA Attachment 4

Program Report

PROGRAM COMMITMENTS	RESPONSIBILITIES	MECHANISMS
	requirements are relevant to the activities of a petroleum titleholder the Environment Plan must describe the requirements and provide appropriate control measures to ensure that these requirements will be met. If no section 316 plan of management exists, section 318 refers to consideration of the Australian World Heritage management principles (Schedule 5, EPBC Regulations). - Any Commonwealth legislative requirement under the EPBC Act or any other Act that is relevant to the environmental management of a titleholder's activity is similarly captured through the requirements of the OPGGS(E) Regulations • By placing the above obligations on titleholders the OPGGS(E) Regulations facilitate protection of the outstanding universal values of World Heritage properties and ensure that those values persist.	
	NOPSEMA Responsibilities: • With particular reference to World Heritage properties, Section 318 of the EPBC Act requires that a Commonwealth agency must not authorise any person to do anything that may contravene a plan made under Section 316 for management of a World Heritage property. If there is no section 316 plan, a Commonwealth agency must take all reasonable steps to ensure that acts relating to the property are not inconsistent with the Australian World Heritage management principles (Schedule 5, EPBC Regulations). These responsibilities ensure that Australia's obligations under the World Heritage Convention and the Australian World Heritage management principles are met. • The OPGGS(E) Regulations contain clear acceptance criteria against which NOPSEMA must assess all Environment Plans. NOPSEMA must not accept an Environment Plan that does not meet these criteria. In particular NOPSEMA will not accept an Environment Plan that involves the activity or part of the activity, other than arrangements for	Mechanisms to ensure NOPSEMA's responsibilities are met: • Section 318 of the EPBC Act requires that a Commonwealth agency must not authorise any person to do anything that may contravene a plan made under Section 316 for management of a World Heritage property. If no plan made under Section 316 exists, a Commonwealth agency must take all reasonable steps to ensure that acts relating to a property are not inconsistent with the Australian World Heritage management principles (Schedule 5, EPBC Regulations). As a Commonwealth statutory authority, NOPSEMA must comply with this requirement. • Regulation 10A(f) of the OPGGS(E) Regulations ensure that NOPSEMA will not accept an Environment Plan that

NOPSEMA Attachment 4

Program Report

PROGRAM COMMITMENTS	RESPONSIBILITIES	MECHANISMS
	environmental monitoring or responding to an emergency, being undertaken in any part of a declared World Heritage property within the meaning of the EPBC Act. • As described above, the OPGGS(E) Regulations require Environment Plans to describe all of the legislative and other requirements that apply to the activity. If these requirements are not adequately described and addressed by an Environment Plan the requirements of the OPGGS(E) Regulations will not be met and NOPSEMA will be unable to accept the Environment Plan.	involves the activity or part of the activity, other than environmental monitoring or responding to an emergency, being undertaken in any part of a declared World Heritage property within the meaning of the EPBC Act. • The Environment Plan content requirements of the OPGGS(E) Regulations [regulations 13 and 14] ensure that potential impacts to the values of World Heritage properties are appropriately identified, evaluated and mitigated to levels that are acceptable and ALARP. NOPSEMA must not accept an Environment Plan if the requirements of the OPGGS(E) Regulations have not been met [regulation 10A)]. • On approval of classes of actions NOPSEMA will ensure that assessment policies and procedures are updated to make it explicit that decisions made by NOPSEMA must not be inconsistent with World Heritage management obligations, principles and management plans and that these must be taken into account when determining the acceptability of an Environment Plan where impacts to the values of World Heritage properties may arise.
National Heritage places: • NOPSEMA will not accept an Environment Plan that proposes activities that will contravene a plan of management for a National Heritage place or proposes unacceptable impacts to the National heritage values of a National Heritage place. • If there is no plan of management for a National Heritage place, then	Titleholder Responsibilities: • The OPGGS(E) Regulations require a titleholder's Environment Plan to include: - a comprehensive description of the environment that may be affected by the activity including relevant values and sensitivities of National Heritage places - details of all the environmental impacts and risks of the activity including those to the values of National Heritage places	Mechanisms to ensure titleholder's responsibilities are met: • Regulations 10A, 13 and 14 of the OPGGS(E) Regulations will ensure these responsibilities are met. • NOPSEMA prepares and publishes guidance on the content requirements of Environment Plans, which provides further detailed interpretation of the requirements of the OPGGS(E)

NOPSEMA Attachment 4

Program Report

PROGRAM COMMITMENTS	RESPONSIBILITIES	MECHANISMS
NOPSEMA will take all reasonable steps to ensure that any accepted Environment Plan that refers to the place is not inconsistent with the National Heritage management principles. • NOPSEMA will develop guidance (that will be updated from time to time) that titleholders should have regard to in the preparation of their Environment Plans. The guidance will: - make reference to consideration of the protection of the values of National Heritage places - include references to relevant guidance documents to be considered by titleholders in preparing Environment Plans such as gazettal instruments and EPBC Act guidance documents. • In undertaking assessments, NOPSEMA will have regard to relevant policy documents, guidelines, gazettal instruments and plans of management on the DoE website.	- an evaluation of all the environmental impacts and risks of the activity including those to the values of National Heritage places. This includes the selection and application of appropriate control measures to reduce potential impacts and risks to acceptable levels - environmental performance outcomes, environmental performance standards and measurement criteria against which the performance of the titleholder in protecting the environment, including the values of National Heritage places is to be measured - a clear demonstration that the environmental impacts and risks of the activity will be reduced to acceptable levels and ALARP - a description of the legislative and other requirements that apply to the activity and that are relevant to the environmental management of the activity. Sections 324U and 324X of the EPBC Act set out the requirements for Section 324S plans for the management of listed National Heritage places. If no Section 324S plan exists, Section 324U refers to consideration of the National Heritage management principles (Schedule 5B, EPBC Regulations). If these requirements are relevant to the activities of a petroleum titleholder the Environment Plan must describe the requirements and provide appropriate control measures to ensure that these requirements will be met • By placing the above obligations on titleholders the OPGGS(E) Regulations facilitate protection of the values of National Heritage places and ensure that those values persist.	Regulations with respect to the identification and management of impacts to the environment. NOPSEMA will update this guidance on approval of classes of actions to ensure that, where relevant, titleholders give specific consideration to National Heritage management obligations, principles and management plans to ensure that activities proposed in their Environment Plans are not inconsistent with these requirements. • NOPSEMA will issue further guidance that directs titleholders to consider relevant policies, documents and other material issued by DoE in the preparation of Environment Plans to ensure that management of impacts to the values of National Heritage places is appropriately taken into account.
	NOPSEMA Responsibilities: • With particular reference to National Heritage places, Section 324U of the EPBC Act requires that a Commonwealth agency must not authorise any person to	Mechanisms to ensure NOPSEMA's responsibilities are met: • Section 324U of the EPBC Act requires that a Commonwealth agency must

NOPSEMA Attachment 4

Program Report

PROGRAM COMMITMENTS	RESPONSIBILITIES	MECHANISMS
	do anything that may contravene a plan made under Section 324S for management of a National Heritage place. If there is no section 324S plan, a Commonwealth agency must take all reasonable steps to ensure that acts relating to the property are not inconsistent with the National Heritage management principles (Schedule 5B, EPBC Regulations). • The OPGGS(E) Regulations contain clear acceptance criteria against which NOPSEMA must assess all Environment Plans. NOPSEMA must not accept an Environment Plan that does not meet these criteria. In particular NOPSEMA is unable to accept an Environment Plan that does not demonstrate that impacts to the values of National Heritage places will be reduced to an acceptable level. • The OPGGS(E) Regulations require Environment Plans to describe all of the legislative and other requirements that apply to the activity. If these requirements are not adequately described and addressed by an Environment Plan the requirements of the OPGGS(E) Regulations will not be met and NOPSEMA will be unable to accept the Environment Plan. • The requirements of the OPGGS(E) Regulations will ensure that no Environment Plan can be accepted that proposes unacceptable impacts to the values of a National Heritage place.	not authorise any person to do anything that may contravene a plan made under Section 324S for management of a National Heritage place. If no plan made under Section 324S exists, a Commonwealth agency must take all reasonable steps to ensure that acts relating to a property are not inconsistent with the National Heritage management principles (Schedule 5B, EPBC Regulations). As a Commonwealth statutory authority, NOPSEMA must comply with this requirement. • The Environment Plan content requirements of the OPGGS(E) Regulations [regulations 13 and 14] ensure that potential impacts to the value of National Heritage places are appropriately identified, evaluated and mitigated to levels that are of an acceptable level and ALARP. NOPSEMA must not accept an Environment Plan if the requirements of the OPGGS(E) Regulations have not been met [sub-regulation 10A]. • On approval of classes of actions NOPSEMA will ensure that assessment policies and procedures are updated to make it explicit that decisions made by NOPSEMA must be consistent with National Heritage management obligations, principles and management plans, and that these must be taken into account when determining the acceptability of an Environment Plan where impacts to the values of National Heritage places may arise.
Wetlands of International importance (Ramsar wetlands)	Titleholder Responsibilities: • The OPGGS(E) Regulations require a	Mechanisms to ensure titleholder's responsibilities are met:

NOPSEMA Attachment 4

Program Report

PROGRAM COMMITMENTS	RESPONSIBILITIES	MECHANISMS
• NOPSEMA will not accept an Environment Plan that proposes activities that will contravene a plan of management for a Ramsar wetland or proposes unacceptable impacts to the ecological character of a Ramsar wetland. • If there is no plan of management for a Ramsar wetland, then NOPSEMA will take all reasonable steps to ensure that any accepted Environment Plan that refers to the wetland is not inconsistent with the Australian Ramsar management principles. • NOPSEMA will develop guidance (that will be updated from time to time) that titleholders should have regard to in the preparation of their Environment Plans. The guidance will: - make reference to consideration of the protection of the ecological character of the Ramsar wetland - include references to relevant guidance documents to be considered by titleholders in preparing Environment Plans such as Ramsar Information Sheets, Ecological Character Descriptions and EPBC Act guidance documents. • In undertaking assessments, NOPSEMA will have regard to relevant policy documents, guidelines, Ramsar Information Sheets, Ecological Character Descriptions and plans of management on the DoE website.	titleholders Environment Plan to include: - A comprehensive description of the environment that may be affected by the activity including relevant values and sensitivities which includes Ramsar wetlands where relevant - details of all the environmental impacts and risks of the activity including those to the ecological character of Ramsar wetlands - an evaluation of all the environmental impacts and risks of the activity including those to the ecological character of Ramsar wetlands; includes the selection and application of appropriate control measures to reduce potential impacts and risks to acceptable levels - environmental performance outcomes, environmental performance standards and measurement criteria against which the performance of the titleholder in protecting the environment, including the ecological character of Ramsar wetlands, is to be measured - a clear demonstration that the environmental impacts and risks of the activity will be reduced to acceptable levels and ALARP - a description of the legislative and other requirements that apply to the activity and that are relevant to the environmental management of the activity. Sections 330 and 333 of the EPBC Act set out the requirements for plans for the management of Ramsar wetlands. If these requirements are relevant to the activities of a petroleum titleholder, the Environment Plan must describe the requirements and provide appropriate control measures to ensure that these requirements will be met. If no Section 328 plan exists, Section 330 (2) refers to consideration of the Ramsar Management Principles (Schedule 6 of the EPBC Regulations) • By placing the above obligations on titleholders the OPGGS(E) Regulations facilitate protection of the ecological	• Regulations 10A, 13 and 14 of the OPGGS(E) Regulations will ensure these responsibilities are met. • NOPSEMA prepares and publishes guidance on the content requirements of Environment Plans that provides further detailed interpretation of the requirements of the OPGGS(E) Regulations with respect to the identification and management of impacts to the environment. NOPSEMA will update this guidance on approval of classes of actions to ensure that, where relevant, titleholders give specific consideration to Ramsar wetland management obligations, principles and management plans to ensure that activities proposed in their Environment Plans are not inconsistent with these requirements. • NOPSEMA will issue further guidance that directs titleholders to consider relevant policies, documents and other material issued by DoE in the preparation of Environment Plans to ensure that management of impacts to the ecological character of Ramsar wetlands is appropriately taken into account.

NOPSEMA Attachment 4

Program Report

PROGRAM COMMITMENTS	RESPONSIBILITIES	MECHANISMS
	character of Ramsar wetlands.	
	NOPSEMA Responsibilities: • With particular reference to Ramsar wetlands Section 330 of the EPBC Act requires that a Commonwealth agency must not authorise any person to do anything that may contravene a plan made under Section 328 for management of a Ramsar wetland. If there is no Section 328 plan, a Commonwealth agency must take all reasonable steps to ensure that acts relating to the wetland are not inconsistent with the Australian Ramsar Management Principles (Schedule 6, EPBC Regulations). • The OPGGS(E) Regulations contain clear acceptance criteria against which NOPSEMA must assess all Environment Plans. NOPSEMA must not accept an Environment Plan that does not meet these criteria. In particular NOPSEMA is unable to accept an Environment Plan that does not demonstrate that impacts to Ramsar wetlands will be reduced to an acceptable level. • The OPGGS(E) Regulations require Environment Plans to describe all of the legislative and other requirements that apply to the activity. If these requirements are not adequately described and addressed by an Environment Plan the requirements of the OPGGS(E) Regulations will not be met and NOPSEMA will be unable to accept the Environment Plan. • The requirements of the OPGGS(E) Regulations will ensure that no Environment Plan can be accepted that proposes unacceptable impacts to a Ramsar wetland.	Mechanisms to ensure NOPSEMA's responsibilities are met: • Section 330 of the EPBC Act requires that a Commonwealth agency must not authorise any person to do anything that may contravene a plan made under Section 328 for management of a Ramsar wetland. If no plan made under Section 328 exists, a Commonwealth agency must take all reasonable steps to ensure that acts relating to a Ramsar wetland are not inconsistent with the Ramsar Management Principles (Schedule 6, EPBC Regulations. As a Commonwealth statutory authority, NOPSEMA must comply with this requirement. • The Environment Plan content requirements of the OPGGS(E) Regulations [regulations 13 and 14] ensure that potential impacts to Ramsar wetlands are appropriately identified, evaluated and mitigated to levels that are of an acceptable level and ALARP. NOPSEMA must not accept an Environment Plan if the requirements of the OPGGS(E) Regulations have not been met [sub-regulation 10A]. • On approval of classes of actions NOPSEMA will ensure that assessment policies and procedures are updated to make it explicit that decisions made by NOPSEMA must not be inconsistent with Ramsar management obligations, principles and management plans and that these must be taken into account when determining the acceptability of an Environment Plan where impacts to Ramsar wetlands may arise.

NOPSEMA Attachment 4

Program Report

PROGRAM COMMITMENTS	RESPONSIBILITIES	MECHANISMS
Listed threatened species and ecological communities • NOPSEMA will not accept an Environment Plan that proposes activities that will result in unacceptable impacts to a listed threatened species or ecological community. • NOPSEMA will not accept an Environment Plan that is inconsistent with a recovery plan or threat abatement plan for a listed threatened species or ecological community. • NOPSEMA will have regard to any approved conservation advice in relation to a threatened species or ecological community before accepting and Environment Plan. • NOPSEMA will develop guidance (that will be updated from time to time) that titleholders should consider in the preparation of their Environment Plans. The guidance will: - refer to consideration of the listing category and protection of the listed threatened species or ecological community - include references to relevant guidance documents to be considered by titleholders in preparing Environment Plans such as recovery plans, Threat Abatement Plans, Conservation Advice and EPBC Act guidance documents. • In undertaking assessments, NOPSEMA will have regard to relevant policy	Titleholder Responsibilities: - The OPGGS(E) Regulations require a titleholder's Environment Plan to include: - a comprehensive description, including relevant values and sensitivities, of listed threatened species and ecological communities, where relevant, that may be affected by the activity details of all the environmental impacts and risks of the activity including those to listed threatened species and ecological communities - an evaluation of all the environmental impacts and risks of the activity including those to listed threatened species and ecological communities; includes the selection and application of appropriate control measures to reduce potential impacts and risks to acceptable levels - environmental performance outcomes, environmental performance standards and measurement criteria against which the performance of the titleholder in protecting the environment, including listed threatened species and ecological communities, is to be measured. - a clear demonstration that the environmental impacts and risks of the activity will be reduced to acceptable levels and ALARP. - A description of the legislative and other requirements that apply to the activity and that are relevant to the environmental management of the activity. Section 268 of the EPBC Act requires consideration of relevant recovery plans and threat abatement plans. - These requirements ensure that an Environment Plan that proposes unacceptable impacts to listed threatened species and ecological communities cannot meet the criteria for acceptance.	Mechanisms to ensure titleholder's responsibilities are met: • Regulations 10A, 13 and 14 of the OPGGS(E) Regulations will ensure these responsibilities are met. • NOPSEMA prepares and publishes guidance on the content requirements of Environment Plans, which provides further detailed interpretation of the requirements of the OPGGS(E) Regulations with respect to the identification and management of impacts to the environment. NOPSEMA will update this guidance on approval of classes of actions to ensure that, where relevant, titleholders give specific consideration to management of impacts on listed threatened species and ecological communities. The guidance will direct titleholders to have regard to recovery plans, threat abatement plans, conservation advice and EPBC Act guidance documents to ensure that activities proposed in their Environment Plans are not inconsistent with these. • NOPSEMA will issue further guidance that directs titleholders to consider relevant policies, documents and other material issued by DoE in the preparation of Environment Plans to ensure that management of impacts to listed threatened species and ecological communities are appropriately taken into account.
	NOPSEMA Responsibilities:	Mechanisms to ensure NOPSEMA's

NOPSEMA Attachment 4

Program Report

PROGRAM COMMITMENTS	RESPONSIBILITIES	MECHANISMS
documents, Recovery Plans, Threat Abatement Plans, Conservation Advice and guidelines and plans of management on the DoE website.	• Section 268 of the EPBC Act requires that a Commonwealth agency must not take any action that contravenes a recovery plan or a threat abatement plan. • The OPGGS(E) Regulations contain clear acceptance criteria against which NOPSEMA must assess all Environment Plans. NOPSEMA must not accept an Environment Plan that does not meet these criteria. In particular NOPSEMA is unable to accept an Environment Plan that does not demonstrate that impacts to listed threatened species and ecological communities will be reduced to an acceptable level. • Plans for the protection and recovery of listed threatened species and ecological communities are in place to ensure that their survival, conservation status and critical habitat will be maintained and protected. These plans will assist NOPSEMA's determination of acceptable levels of impact and risk.	responsibilities are met: • The Environment Plan content requirements of the OPGGS(E) Regulations [regulations 13 and 14] ensure that potential impacts to listed threatened species and ecological communities are appropriately identified, evaluated and mitigated to levels that are acceptable and ALARP. NOPSEMA must not accept an Environment Plan if the requirements of the OPGGS(E) Regulations have not been met [Sub-regulation 10A]. • On approval of classes of actions NOPSEMA will ensure that assessment policies and procedures are updated to make it explicit that decisions made by NOPSEMA must not be inconsistent with relevant recovery plans, threat abatement plans and wildlife conservation plans, and that these must be taken into account when determining the acceptability of an Environment Plan where impacts to listed threatened species and ecological communities may arise.
Listed migratory species • NOPSEMA will not accept an Environment Plan that proposes activities that will result in unacceptable impacts to a migratory species or an area of important habitat for a migratory species. • NOPSEMA will develop guidance (that will be updated from time to time) that titleholders should consider in the preparation of their Environment Plans. The guidance will: - refer to consideration	Titleholder Responsibilities: - The OPGGS(E) Regulations require a titleholder's Environment Plan to include: - A comprehensive description of the environment that may be affected by the activity including relevant values and sensitivities which includes listed migratory species where relevant - details of all the environmental impacts and risks of the activity including those to listed migratory species - an evaluation of all the environmental impacts and risks of the activity including those to listed migratory species; includes the	Mechanisms to ensure titleholder's responsibilities are met: • Regulations 10A, 13 and 14 of the OPGGS(E) Regulations will ensure these responsibilities are met • NOPSEMA prepares and publishes guidance on the content requirements of Environment Plans, which provides further detailed interpretation of the requirements of the OPGGS(E) Regulations with respect to the identification and management of impacts to the environment. NOPSEMA will update this guidance on

NOPSEMA Attachment 4

Program Report

PROGRAM COMMITMENTS	RESPONSIBILITIES	MECHANISMS
of the protection of listed migratory species and area of important habitat for listed migratory species - include references to relevant guidance documents to be considered by titleholders in preparing Environment Plans such as wildlife conservation plans and EPBC Act guidance documents. • In undertaking assessments, NOPSEMA will have regard to relevant policy documents, wildlife conservation plans, guidelines and plans of management on the DoE website.	selection and application of appropriate control measures to reduce potential impacts and risks to acceptable levels - environmental performance outcomes, environmental performance standards and measurement criteria against which the performance of the titleholder in protecting the environment, including listed migratory species, is to be measured - a clear demonstration that the environmental impacts and risks of the activity will be reduced to acceptable levels and ALARP. A description of the legislative and other requirements that apply to the activity and that are relevant to the environmental management of the activity. Section 286 of the EPBC Act requires consideration of relevant wildlife conservation plans. • These requirements ensure that an Environment Plan that proposes unacceptable impacts to listed migratory species cannot meet the criteria for acceptance.	approval of classes of actions to ensure that, where relevant, titleholders give specific consideration to management of impacts on listed migratory species. The guidance will direct titleholders to have regard to relevant wildlife conservation plans and EPBC Act guidance documents to ensure that activities proposed in their Environment Plans are not inconsistent with these. • NOPSEMA will issue further guidance that directs titleholders to consider relevant policies, documents and other material issued by DoE in the preparation of Environment Plans to ensure that potential impacts to listed migratory species are appropriately managed.
	NOPSEMA Responsibilities: • Section 286 of the EPBC Act requires that a Commonwealth agency must take all reasonable steps to act in accordance with a wildlife conservation plan. • The OPGGS(E) Regulations contain clear acceptance criteria against which NOPSEMA must assess all Environment Plans. NOPSEMA must not accept an Environment Plan that does not meet these criteria. In particular NOPSEMA is unable to accept an Environment Plan that does not demonstrate that impacts to listed migratory species will be reduced to an acceptable level. • Where plans for the protection and recovery of listed threatened species and ecological communities are in place to ensure that the survival and conservation status of migratory species and their critical habitat will be maintained and protected, these will assist NOPSEMA's determination of acceptable levels of	Mechanisms to ensure NOPSEMA's responsibilities are met: • The Environment Plan content requirements of the OPGGS(E) Regulations [regulations 13 and 14] ensure that potential impacts to listed migratory species are appropriately identified, evaluated and mitigated to levels that are acceptable and ALARP. NOPSEMA must not accept an Environment Plan if the requirements of the OPGGS(E) Regulations have not been met [sub-regulation 10A]. • On approval of classes of actions NOPSEMA will ensure that assessment policies and procedures are updated to make it explicit that decisions made by NOPSEMA must not be inconsistent with relevant

NOPSEMA Attachment 4

Program Report

PROGRAM COMMITMENTS	RESPONSIBILITIES	MECHANISMS
	impact and risk.	recovery plans, threat abatement plans and wildlife conservation plans, and that these must be taken into account when determining the acceptability of an Environment Plan where impacts to listed migratory species may arise.
Commonwealth Marine Area • NOPSEMA will not accept an Environment Plan that proposes activities that will result in unacceptable impacts to the environment of a Commonwealth marine area. • NOPSEMA will have regard to any relevant bioregional plan and not act inconsistently with a plan of management for a Commonwealth reserve or a Commonwealth Heritage place in deciding whether or not to accept an Environment Plan. • If there is no plan of management for a Commonwealth reserve, then NOPSEMA will ensure that acceptance of an Environment Plan is not inconsistent with the IUCN reserve management principles. • If there is no plan of management for a Commonwealth Heritage place, then NOPSEMA will take all reasonable steps to ensure that any accepted Environment Plan that refers to the place is not inconsistent with the Commonwealth Heritage management principles. NOPSEMA will develop guidance (that will be updated from time to time) that titleholders should	Titleholder Responsibilities: • As previously discussed the OPGGS(E) Regulations require a titleholder's Environment Plan to include: - A comprehensive description of the environment that may be affected by the activity including relevant values and sensitivities - details of all the environmental impacts and risks of the activity - an evaluation of all the environmental impacts and risks of the activity. This includes the selection and application of appropriate control measures to reduce potential impacts and risks to acceptable levels - environmental performance outcomes, environmental performance standards and measurement criteria against which the performance of the titleholder in protecting the environment is to be measured - a clear demonstration that the environmental impacts and risks of the activity will be reduced to acceptable levels and ALARP - a description of the legislative and other requirements that apply to the activity and that are relevant to the environmental management of the activity. Sections 341T and 341V of the EPBC Act set out the requirements for Section 341S plans of management for Commonwealth Heritage places. If no plan made under Section 341S exists, section 341V refers to consideration of the Commonwealth Heritage management principles (Schedule 7B, EPBC Regulations). Sections 354 and	Mechanisms to ensure titleholder's responsibilities are met: • Regulations 10A, 13 and 14 of the OPGGS(E) Regulations will ensure these responsibilities are met. • NOPSEMA prepares and publishes guidance on the content requirements of Environment Plans, which provides further detailed interpretation of the requirements of the OPGGS(E) Regulations with respect to the identification and management of impacts to the environment. NOPSEMA will update this guidance where appropriate to ensure that potential impacts to the environment are appropriately captured. • NOPSEMA will issue further guidance that directs titleholders to consider relevant policies, documents and other material issued by DoE in the preparation of Environment Plans to ensure that these are taken into account and that potential impacts to the environment are appropriately managed.

NOPSEMA Attachment 4

Program Report

PROGRAM COMMITMENTS	RESPONSIBILITIES	MECHANISMS
have regard to in the preparation of their Environment Plans. The guidance will: - make reference to consideration of the environment of the Commonwealth marine area - include references to relevant guidance documents to be considered by titleholders in preparing Environment Plans such as gazettal instruments, bioregional plans, wildlife conservation plans, plans of management and EPBC Act guidance documents. • In undertaking assessments, NOPSEMA will have regard to relevant policy documents, gazettal instruments, bioregional plans, wildlife conservation plans, plans of management and EPBC Act guidance documents on the DoE website.	362 of the EPBC Act set out the requirements for plans of management for Commonwealth reserves. If no plan exists, section 357 refers to consideration of the Australian IUCN reserve management principles (Schedule 8, EPBC Regulations). Section 286 of the EPBC Act sets out the requirements for wildlife conservation plans. • These requirements ensure that an Environment Plan that proposes unacceptable impacts to the environment cannot meet the criteria for acceptance.	
	NOPSEMA Responsibilities: • Section 341V of the EPBC Act requires that a Commonwealth agency must not authorise any person to do anything that may contravene a plan made under Section 341S for management of a Commonwealth Heritage place. If there is no section 341S plan, a Commonwealth agency must take all reasonable steps to ensure that acts relating to the property are not inconsistent with the Commonwealth Heritage management principles (Schedule 7B, EPBC Regulations). • Section 362 of the EPBC Act requires that a Commonwealth agency must not perform its functions or exercise its powers inconsistently with a management plan that is in operation for a reserve. If there is no plan in operation, Section 357 requires a Commonwealth agency to not exercise its powers or perform its functions inconsistently with the Australian IUCN reserve management principles (Schedule 8, EPBC Regulations) or a management plan previously in operation. • Section 286 of the EPBC Act requires that a Commonwealth agency must take all reasonable steps to act in accordance with a wildlife conservation plan. • The OPGGS(E) Regulations contain clear acceptance criteria against which NOPSEMA must assess all Environment Plans. NOPSEMA must not accept an Environment Plan that does not meet these criteria. In particular NOPSEMA is	Mechanisms to ensure NOPSEMA's responsibilities are met: • The Environment Plan content requirements of the OPGGS(E) Regulations [regulations 13 and 14] ensure that potential impacts to the environment are appropriately identified, evaluated and mitigated to levels that are acceptable and ALARP. NOPSEMA must not accept an Environment Plan if the requirements of the OPGGS(E) Regulations have not been met [sub-regulation 10A].

NOPSEMA Attachment 4

Program Report

PROGRAM COMMITMENTS	RESPONSIBILITIES	MECHANISMS
	unable to accept an Environment Plan that does not demonstrate that impacts to the environment will be reduced to an acceptable level.	
Commonwealth Land • NOPSEMA will not accept an Environment Plan that proposes activities that will result in unacceptable impacts to the environment on Commonwealth land. • NOPSEMA will have regard to any bioregional plan and not act inconsistently with a plan of management for a Commonwealth reserve or a Commonwealth Heritage place in deciding whether or not to accept an Environment Plan. • If there is no plan of management for a Commonwealth Heritage place, then NOPSEMA will take all reasonable steps to ensure that any accepted Environment Plan is not inconsistent with the Commonwealth Heritage management principles. • If there is no plan of management for a Commonwealth reserve, then NOPSEMA will ensure that acceptance of an Environment Plan is not inconsistent with the IUCN reserve management principles. • NOPSEMA will develop guidance (that will be updated from time to time) that titleholders should have regard to in the preparation of their Environment Plans. The guidance will: - make reference to consideration of the environment of the	Titleholder Responsibilities: • As previously discussed the OPGGS(E) Regulations require a titleholder's Environment Plan to include: - A comprehensive description of the environment that may be affected by the activity including relevant values and sensitivities - Details of all the environmental impacts and risks of the activity - An evaluation of all the environmental impacts and risks of the activity. This includes the selection and application of appropriate control measures to reduce potential impacts and risks to acceptable levels - Environmental performance outcomes, environmental performance standards and measurement criteria against which the performance of the titleholder in protecting the environment is to be measured - A clear demonstration that the environmental impacts and risks of the activity will be reduced to acceptable levels and ALARP - A description of the legislative and other requirements that apply to the activity and that are relevant to the environmental management of the activity. Sections 341T and 341V of the EPBC Act set out the requirements for Section 341S plans of management for Commonwealth Heritage places. If no plan made under Section 341S exists, section 341V refers to consideration of the Commonwealth Heritage management principles (Schedule 7B, EPBC Regulations). . Sections 354 and 362 of the EPBC Act set out the requirements for plans of management for Commonwealth reserves. If no plan exists, section	Mechanisms to ensure titleholder's responsibilities are met: • Regulations 10A, 13 and 14 of the OPGGS(E) Regulations will ensure these responsibilities are met. • NOPSEMA prepares and publishes guidance on the content requirements of Environment Plans, which provides further detailed interpretation of the requirements of the OPGGS(E) Regulations with respect to the identification and management of impacts to the environment. NOPSEMA will update this guidance where appropriate to ensure that potential impacts to the environment are appropriately captured. • NOPSEMA will issue further guidance that directs titleholders to consider relevant policies, documents and other material issued by DoE in the preparation of Environment Plans to ensure that these are taken into account and that potential impacts to the environment are appropriately managed.

NOPSEMA Attachment 4

Program Report

PROGRAM COMMITMENTS	RESPONSIBILITIES	MECHANISMS
Commonwealth land - include references to relevant guidance documents to be considered by titleholders in preparing Environment Plans such as gazettal instruments, bioregional plans, plans of management and EPBC Act guidance documents. • In undertaking assessments, NOPSEMA will have regard to relevant policy documents, gazettal instruments, bioregional plans, plans of management and guidance documents on the DoE website.	357 refers to consideration of the Australian IUCN reserve management principles (Schedule 8, EPBC Regulations). • These requirements ensure that an Environment Plan that proposes unacceptable impacts to the environment cannot meet the criteria for acceptance.	
	NOPSEMA Responsibilities: • Section 341V of the EPBC Act requires that a Commonwealth agency must not authorise any person to do anything that may contravene a plan made under Section 341S for management of a Commonwealth Heritage place. If there is no section 341S plan, a Commonwealth agency must take all reasonable steps to ensure that acts relating to the property are not inconsistent with the Commonwealth Heritage management principles (Schedule 7B, EPBC Regulations). • Section 362 of the EPBC Act requires that a Commonwealth agency must not perform its functions or exercise its powers inconsistently with a management plan that is in operation for a reserve. If there is no plan in operation, Section 357 requires a Commonwealth agency to not exercise its powers or perform its functions inconsistently with the Australian IUCN reserve management principles (Schedule 8, EPBC Regulations) or a management plan previously in operation. • The OPGGS(E) Regulations contain clear acceptance criteria against which NOPSEMA must assess all Environment Plans. NOPSEMA must not accept an Environment Plan that does not meet these criteria. In particular NOPSEMA is unable to accept an Environment Plan that does not demonstrate that impacts to the environment will be reduced to an acceptable level.	Mechanisms to ensure NOPSEMA's responsibilities are met: • The Environment Plan content requirements of the OPGGS(E) Regulations [regulations 13 and 14] ensure that potential impacts to the environment are appropriately identified, evaluated and mitigated to levels that are acceptable and ALARP. NOPSEMA must not accept an Environment Plan if the requirements of the OPGGS(E) Regulations have not been met [sub-regulation 10A].

NOPSEMA

Information paper

N-04750-IP1488 Revision No 0 September 2014

Oil pollution risk management

Oil pollution emergency plan core concepts

The Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (the Regulations) require a titleholder to have an accepted environment plan (EP) in place for any petroleum activity or greenhouse gas activity. This information paper describes key aspects of the risk management process relating to oil pollution that is necessary to produce an acceptable EP submission.

This information paper provides NOPSEMA's interpretation of the requirements, under the Regulations, for an Oil Pollution Emergency Plan (OPEP) submitted as part of an EP required for offshore petroleum and greenhouse gas storage activities in Commonwealth waters.

The EP must:

- Contain an OPEP which includes adequate arrangements for responding to and monitoring oil pollution from a petroleum activity in Commonwealth waters.
- Demonstrate that oil pollution risks from the petroleum activity have been reduced to as low as reasonably practicable (ALARP) and acceptable levels.
- Detail control measures that will be used to reduce the risks of oil pollution to ALARP and an acceptable level. These control measures will encompass all proposed oil pollution response strategies.
- Demonstrate that risks associated with control measures have been reduced to ALARP and acceptable levels.
- Set environmental performance standards for oil pollution control measures to manage and measure the effectiveness of control measure adopted.
- Include mechanisms to maintain and update the OPEP.
- Include arrangements for testing the response arrangements in the OPEP.

The OPEP must:

- Include adequate control measures and arrangements to ensure that titleholders have a sufficient capability to respond in a timely manner and for the duration of the oil pollution incident.
- Ensure titleholders have the ability to maintain responsibility for potential oil pollution incidents that may result from their activity.
- Provide for monitoring oil pollution to inform response activities and the effectiveness of control measures.
- Be commensurate with the level of oil pollution risk identified in the submission's risk assessment and should be scalable and adaptable.
- Detail when and how the titleholder might seek assistance and rely on third parties.

Table of Contents

1 Introduction

1.1 Guidance notes and information papers

To assist titleholders in interpreting and meeting the requirements of the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGS Act) and the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (the Regulations), NOPSEMA has published a number of advice documents on its website. All published advice from NOPSEMA is subject to periodic review and revision. NOPSEMA provides a website subscription service that titleholders and other stakeholders can request notifications of news and updates including revision of advice documents. Titleholders and other stakeholders may send enquiries and feedback regarding NOPSEMA advice documents to information@nopsema.gov.au.

1.2 Purpose and scope of this information paper

While this Information paper provides information that titleholders may choose to explore when addressing the requirements of the Regulations, titleholders should note that the information provided is not exhaustive and not a substitute for legal advice or detailed consideration of the OPGGS Act and Regulations.

The purpose of this Information paper is to provide specific information in relation to the content and level of detail required for an OPEP and to provide clarification around considerations that support the development of an acceptable EP submission in relation to oil pollution risks.

This information paper indicates what is explicitly required by the Regulations, discusses good practice and suggests possible approaches. A mandatory regulatory requirement is indicated in this document by the words **'must'**, while all other cases are indicated by the words 'could', 'should', 'may', etc. NOPSEMA acknowledges that what is 'good practice' and what approaches are viable will vary according to the nature of different offshore activities and their surrounding environments.

While the level of detail provided in any submission to NOPSEMA should be relative to the level of risk presented by a proposed activity and its complexity, the **considerations** provided here provide an indication of the type and range of information that may be relevant when developing an EP and OPEP.

The relative merits of oil pollution control measures, the range of possible risk assessment methodologies, and the OPEP structure are not in the scope of this document. There are a number of other references which provide further information available for titleholders to consider (see section 6).

1.3 Information paper content and structure

This information paper builds on the information provided in the EP Content Requirements Guidance Note. Where the guidance note discusses the regulatory purpose of each regulation, this document applies that regulatory purpose to oil pollution risk management.

This information paper is structured in with the following subheadings to frame the advice:

- **Core concepts** provide information on specific content requirements that must be met in relation to producing an effective OPEP.
- **Considerations** are potential relevant aspects of a particular part of the contingency planning process.

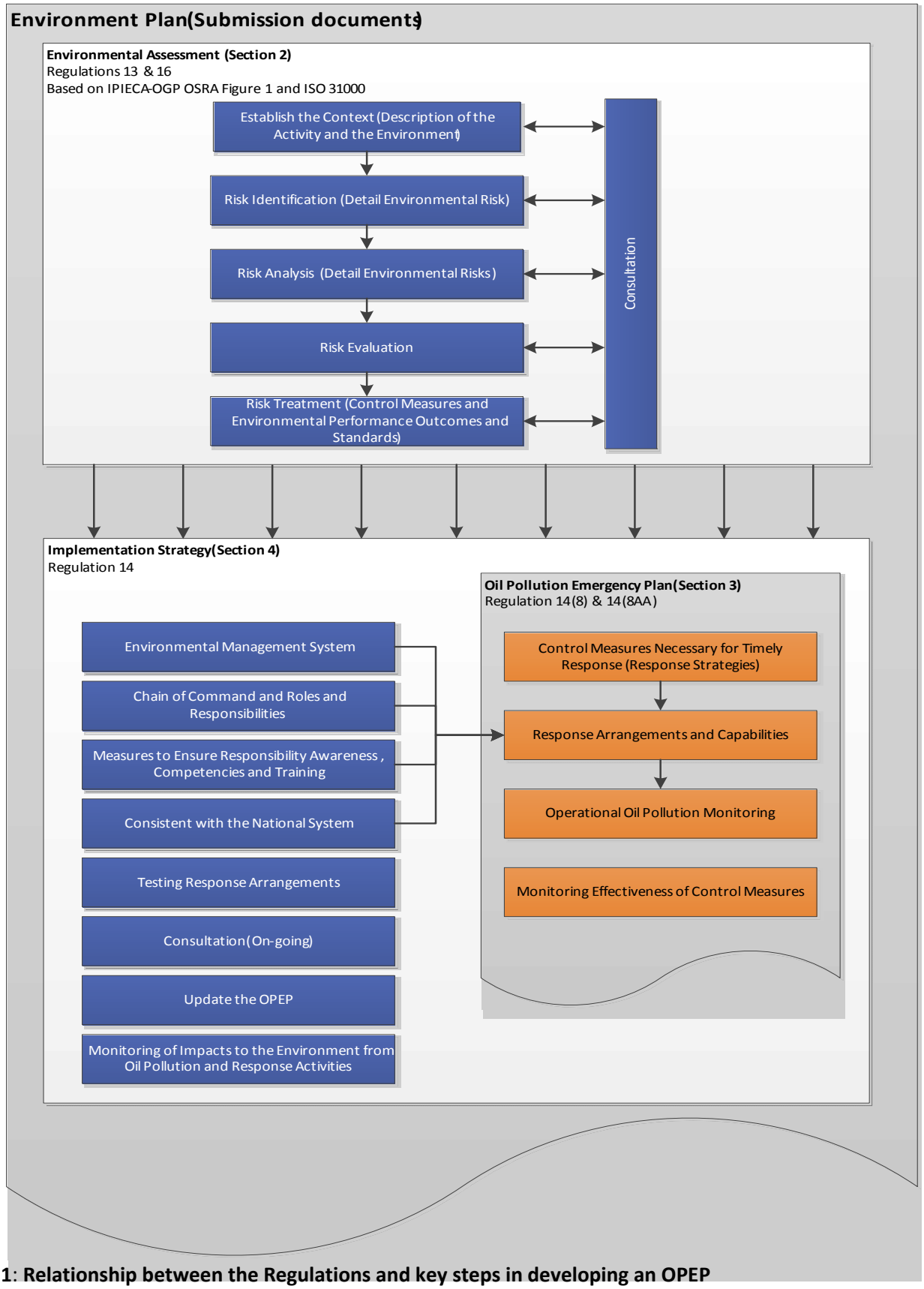


Figure 1: Relationship between the Regulations and key steps in developing an OPEP

2 Oil pollution risk assessment and management

The Regulations require that risks associated with the petroleum activity are detailed, evaluated and reduced to ALARP and acceptable levels. The Regulations, however, do not prescribe in detail how this is to be accomplished. National and international guidelines and standards on risk assessment provide a useful source of information on how risk assessment is best carried out. A good example of a risk management process can be found in the AS/NZS a 31000:2009.

Whatever approach is adopted, titleholders must provide reasoning for oil pollution risk management choices in order for NOPSEMA to be reasonably satisfied that the control measures selected as a result of the risk assessment will reduce the risks associated with the activity to ALARP and acceptable levels.

Establishing the situational context through consultation and a comprehensive description of the activity and environment is the first step in the process of managing risk.

2.1 Consultation

Applicable regulations
Subregulation 10A(g) – Criteria for acceptance of environment plan
Regulation 11A – Consultations with relevant authorities, persons and organisations, etc.
Subregulation 16(b) – Other information in the environment plan

Core concepts

- The Regulations require titleholders to undertake consultation during the preparation of an EP. Consultation provides additional context for the risk assessment process and must be addressed in the EP submission.
- The nature and scale of the activity and associated oil pollution risks will strongly influence the level and strength of consultation as well as who may be considered ‘relevant persons’.
- A ‘relevant person’ includes any person whose functions, interests or activities may be affected by either the oil pollution or the associated response activities.

Considerations

- Early engagement with relevant persons that are expected to have a role will strengthen the response arrangements through agreement of response roles and responsibilities.
- Relevant persons may have published guidance on how they might be affected by an activity and how they wish to be consulted.
- Consultation with relevant resource management agencies can facilitate the identification and classification of environmental protection priorities.
- Possible matters for discussion and consideration during consultation may include:
  - notification and mobilisation procedures and/or arrangements including but not limited to communication types, channels and timeframes
  - interface and/or integration with arrangements, plans and procedures
  - strength and reliability of any agreed arrangements

- roles and responsibilities of supporting organisations including key deliverables
- viability of response strategies to meet the defined outcomes
- availability of resources and response times, including shared resource implications
- arrangements for exercises, audits and maintenance resources and documentation
- commitment from service providers to act in compliance with the EP
- liability and cost recovery arrangements for resources deployed during an incident
- any other information that the relevant person or the titleholder believe is appropriate.

2.2 Description of the activity and the environment

Applicable regulations
Regulation 4 – Definitions
Subregulation 9(7) – Form of an environment plan
Subregulation 10A(a) and (h) – Criteria for acceptance of environment plan
Subregulation 13(1) – Description of the activity
Subregulations 13(2) and 13(3) – Description of the environment

Core concepts

- Only activities described in the EP are assessed and accepted by NOPSEMA.
- The description of the environment must address the values and sensitivities of the environment that may be affected by any oil pollution and by the implementation of response strategies.

Considerations

- The description of the activity and environment should be sufficiently detailed to ensure all risks associated with activity are identified.
- The fate and weathering of different hydrocarbon types when they are spilt into the marine environment will affect the risks associated with the release.
- The physical and chemical characteristics of identified oils and selected spill control agents, such as dispersants.
- The level of detail required relative to the environmental values and sensitivities should be commensurate to the significance of receptors, the likely effect of oil on those receptors, the significant of any effect, and their time to recover.
- Clearly identifying environmental resources at risk and protection priorities to assist in managing any trade-offs between environmental resources that may be affected, as identified later in the process.
- Natural and commercial seasonality may influence the risk to affected environmental resources and the subsequent selection of response strategies.

2.3 Detail environmental risk (risk identification and analysis)

Applicable regulations
Regulation 4 – Definitions
Subregulation 10A(b) & (c) – Criteria for acceptance of environment plan
Subregulations 13(5)(a) Details of environmental risks

The Regulations specifically require that an EP must include details of the environmental risks for the activity. In risk assessment terminology (ISO 31000) this can be thought of as the 'risk identification' and 'risk analysis' stages of an overall risk assessment.

Core concepts

- The EP must detail the oil pollution risks associated with the activity including the consequences that could occur and the likelihood of that risk being realised.
- Potential sources of oil pollution should not be ignored or discounted because of low likelihoods or the continued effectiveness of preventive control measures.

Considerations

- The identification of all potential sources and volumes of oil pollution from the petroleum activity to define the extent of the risk.
- The exploration of risks should go further than the 'obvious' hazards to potentially more complex hazardous events.
- The level of detail provided in describing possible consequences and likelihoods should reflect the nature and scale of each risk, with greater effort placed where there are greater potential consequences or higher likelihoods.
- Titleholders should provide clear explanation of the implications of any uncertainty generated in the risk assessment and any subsequent degree of conservatism applied.
- Scientific and technical information, applied properly, will improve the quality of the risk assessment.
- The type and level of detail provided will vary depending on the type, nature and scale of the activity and the associated risk. ISO 17776 provides guidelines on tools and techniques for hazard identification and risk assessment. In the context of oil pollution risk assessment information only the following is relevant:
  - the source and release location of the oil pollution (e.g. subsea/surface)
  - the hydrocarbon characteristics and properties relevant to determining risks (e.g. persistence, fate/weathering, toxicity), and evaluation of viable response strategies
  - the duration, flow rates, and volumes of oil that could be released
  - the possible extent of the oil pollution
  - the potentially affected environmental receptors, both at sea, subsurface and on shorelines.
- NOPSEMA is unlikely to accept an EP where a high consequence oil pollution scenario has been omitted, especially where related incidents have been experienced elsewhere by industry.

Oil spill modelling

There are various qualitative and quantitative methods available to assist in establishing oil pollution consequences. Typically, industry utilises computer modelling to estimate the likely fate and trajectory of oil pollution to support the determination of a level of consequence. Useful modeling outputs could include:

- potential geographical extent
- minimum time to shoreline contact
- maximum volume ashore
- maximum shoreline accumulation

These outputs can be used to outline the environment that may be affected, identify priorities for protection, and to inform response planning.

Due to modelling limitations, using conservatism in the application of the results obtained is advised. Where modelling is utilised titleholder should consider providing the inputs, process parameters, and output information to demonstrate that the results are appropriate to the situation.

Particular attention and justification should be devoted to the following:

- The relevance of the modelling used to the proposed activity, oil type, location, temporal period and site specific environmental conditions (in particular where modelling is adapted from nearby activities).
- The application of threshold values (e.g. surface thickness, entrained/dissolved hydrocarbon concentrations) to interpret and represent modelling outputs.
- Ensuring that the modelling inputs match the sources and volumes of scenarios and the persistence of residual oil in the environment.
- The use of 'probability contours' which may restrict the potential area that may be affected or underestimate potential consequences.
- The potential for oil accumulating on shorelines or in the water column over time.

2.4 Risk evaluation and risk treatment

Applicable regulations
Regulation 4 – Definitions Subregulation 10A(b) & (c) – Criteria for acceptance of environment plan Subregulations 13(5)(b) & (c) and 13(6) – Evaluation of environmental risks

The Regulations require that an EP include an evaluation of the environmental risks and detail the control measures that will reduce those risks to ALARP and acceptable levels. In risk assessment terminology this can be thought of as the 'risk evaluation' and 'risk treatment' stages of an overall risk assessment.

Core concepts

- Response strategies are considered as control measures that mitigate risk and are therefore part of the activity. This is critical to NOPSEMA facilitating pre-approval of response strategies in accordance with international best practice.
- The evaluation must show, through reasoned and supported evidence, that there are no other practical measures that could reasonably be taken to reduce risks further.

Considerations

- The evaluation should match the nature and scale of the risk being evaluated. Methods are likely to include good practice, industry standards, professional judgements, qualitative reasoning, quantitative analysis and the precautionary principle.
- An evaluation concludes the theoretical component of the risk management process by making decisions about which control measures need to be adopted to collectively reduce risks to ALARP and acceptable levels.
- Where a number of potential oil pollution scenarios are identified titleholders may choose to use representative or groups of scenarios (including for different levels of incidents) for which the relevance of controls measures can be evaluated.
- In relation to oil pollution control measures, the evaluation should:
  - assess the feasibility of known control measures for reducing oil pollution risks
  - detail selected control measures and their proposed level of effectiveness
  - explore options for improving the level of effectiveness of control measures
  - consolidate control measures without reducing the clarity of their effectiveness.
- The level of detail provided should be commensurate with the criticality of the control measure and the level of risk reduction it achieves.
- The risk evaluation should consider the identified protection priorities and take into account the effectiveness (functionality, availability, reliability, survivability, independence and compatibility) of control measures.
- Defining the required effectiveness of control measures is critical to the risk evaluation and subsequent development of environmental performance standards (EPS).
- The introduction of control measures to reduce risks associated with the oil pollution incident may introduce new or modify existing risks. Titleholders must ensure that any new or increased risks are equally considered in the risk evaluation.
- Titleholders must demonstrate that all reasonable and practical controls have been adopted and that adopting additional or alternative control measures is grossly disproportionate when comparing sacrifice to environmental benefit (see NOPSEMA Safety Guidance Note - ALARP).

Strategic and operational NEBA

Net environmental benefit analysis (NEBA) is a tool used to evaluate the suitability of an oil pollution response strategy. It typically involves identifying the various advantages and disadvantages of a given control measure in a given situation to determine whether or not its use will do more good than harm (i.e. have an overall positive environmental benefit).

Typically industry undertakes a ‘strategic’ NEBA as part of oil pollution response planning to support a demonstration of ALARP. This can be useful to provide situation-specific information on the suitability of each control measure. However, NEBA is not a tool to compare and prioritise controls as it does not provide a comparable metric across control measures or review the range of possible options or tactics that could be deployed within each control. Instead, it produces a ‘pass/fail’ result for individual response strategies. Consequently, a strategic NEBA alone may not sufficiently address all aspects required of a demonstration of ALARP.

Similarly, a commitment to conduct an 'operational' NEBA during a response is unlikely, by itself, to be sufficient to demonstrate that the implementation of the proposed response strategies will be reduced to ALARP; where suitable management controls for the response strategies are not defined. Titleholders should consider any operational limitations when selecting response strategies in the NEBA process. Limiting factors may include inaccessible areas to deploy resources, unfavourable weather conditions for selected response strategies, unforeseen events, and seasonal variations.

2.5 Environmental performance outcomes and standards

Applicable regulations
Regulation 4 - Definitions Subregulation 10A(d) – Criteria for acceptance of environment plan Subregulation 13(7) – Environmental performance outcomes and standards

Core concepts

- Performance standards enable the titleholder to measure, monitor and test the effectiveness of each control measure and take corrective action based on deviations or trends.

Considerations

- Environmental performance outcomes (EPOs) are generally the parameters against which the titleholder is assessed to ensure protection of the environment to an acceptable level.
- Environmental performance standards (EPSs) are generally the parameters against which the control measures are assessed to ensure they reduce risk to ALARP.
- Performance standards facilitate the transition from the theoretical to the practical in the risk management process. The EP must contain EPOs that relate to the environmental risks associated with both the oil pollution and any proposed response strategies.
- EPOs should offer measurable means of showing oil pollution risks, as well as any response strategies that will be of an acceptable level.
- Appropriate EPOs should enable a titleholder to answer the following questions:
  - Why are we proposing particular actions/controls to be implemented?
  - What would constitute an acceptable outcome should the chosen actions/controls be implemented?
- Appropriate EPSs would enable the titleholder to answer the questions:
  - How does the control need to perform?
  - What level of performance makes this control effective in reducing risk?
- EPSs should address all control measures that relate to response strategies, including preparedness and implementation, and contain the required level of performance. In other words, titleholders need not provide EPSs for a level of performance that doesn't reduce risk,
- EPSs provide the main link between the risk assessment and the OPEP such that titleholders should carefully consider whether the EPS is best placed in the OPEP or the EP.

- The EPS should allow the titleholder to monitor the effectiveness of each response control measure. As such, each EPS must feature a clear statement of performance.
- Measurement criteria for oil pollution response measures should address the observations and records used to support decision-making processes and not just the outcomes of response decisions.

3 The oil pollution emergency plan (OPEP)

Applicable regulations
Subregulation 10A(e) – Criteria for acceptance of environment plan Regulation 14(8) & 8(AA) – Implementation strategy must contain an OPEP

The OPEP terminology in the Regulations is consistent with Article 3 of the *International Convention on Oil Pollution Preparedness, Response and Co-operation* (OPRC). In keeping with this, the OPEP should be an operational document and as such there are elements of the oil pollution response arrangements (i.e. non-emergency response) which may be addressed within the implementation strategy which do not necessarily need to be incorporated in the OPEP itself (see Figure 1).

The principle idea is that having completed the planning process all reasonably practical steps can now be taken to ensure successful delivery of oil spill control measures when a pollution incident occurs. The control measures selected to mitigate risks form the foundation of the titleholders' strategy to protect the environment should a spill occur. Having selected the control measures and set performance standards the OPEP should focus on the arrangements to respond to and monitor oil pollution. For example, the OPEP should guide the initial actions of the oil pollution response team and provide the mechanism for a continued response effort as required.

The structure and content should be usable, functional and support effective implementation of the oil pollution response control measures during an oil pollution incident. Information that is required to inform the response decision-making process, but is not operational in nature should be contained in the EP rather than the OPEP. Only information that is required for a pollution response should be found in the OPEP.

While there can be a great variety of potential oil pollution scenarios, offshore scenarios contain parameters (e.g. location, oil type) which are either known and or can be reasonably predicted for planning purposes. As such, these parameters should be taken into account to ensure that the various elements of their response capability are fit for purpose and match the possible risk.

3.1 Oil pollution control measures

Applicable regulations
Subregulation 10A(e) – Criteria for acceptance of environment plan Subregulations 14(8AA)(a) control measures for timely response to an oil pollution emergency

Core concepts

- The information contained in the EP and subsequent risk assessment will inform the selection of oil pollution response control measures.
- Control measures can focus on preparedness and/or response aspects of oil pollution risk mitigation. Only control measures required in a response need to be included in the OPEP.

- Control measures can be technical, administrative or procedural all of which contribute to reducing consequences.

Considerations

- The OPEP is considered a critical procedural control measure.
- Technical controls physically reduce consequence, administrative controls can improve the effectiveness of technical controls, and procedural controls detail how to complete specified actions.
- Technical control measures include source control, in-situ burning, dispersants, protection booming, shoreline clean-up, wildlife response, and others.
- Administrative control measures include monitor and evaluate, waste management, management positions (incident controller), sign-offs, communications systems, testing arrangements.
- Procedural control measures include checklists, templates, operating procedures, plans and sub-plans, IAP development, NEBA process and other documents.

3.2 Response arrangements and capability

Applicable regulations
Subregulation 10A(e) – Criteria for acceptance of environment plan
Subregulations 14(8AA)(b) arrangements and capability

Core concepts

- Oil pollution preparedness and response arrangements should match the identified risk and be performance based, adaptable, scalable, executable, sustainable, and clearly identify roles and responsibilities.

Considerations

- Adequate arrangements for responding to and monitoring oil pollution should include:
  - the capability to respond in a timely manner and for the duration of the petroleum activity,
  - maintaining responsibility for the incident
  - when and how the titleholder will seek assistance from others
  - how responders will implement control measures ensuring the levels of performance required of adopted control measures will be met
  - the roles, responsibilities, and priority actions to guide an effective response.
- The strength and depth of arrangements should match the criticality of the controls measures which are influenced by:
  - timeframes for implementation
  - response locations and pre-identified protection priorities
  - scale of resources and logistics required
  - reliance on the specific control measure (i.e. the amount of risk reduction it achieves)
  - independence of the control measure (i.e. in relation to other control measures).

Response decision-making and NOPSEMA

It should be recognised that NOPSEMA does not have an operational role in oil pollution response beyond receiving timely notification and accurate follow-up reporting on the incident details and monitoring compliance with the OPPGS Act, the Regulations and the accepted EP. Therefore, response strategy decision-making processes must not include a requirement to 'seek approval' from NOPSEMA or consultation during an oil pollution response. The EP/OPEP submission process is the mechanism for acceptance of all oil pollution response control measures to be implemented during pollution incidents.

The following sub-sections provide information on some of the key elements that may be relevant when determining the content requirements of an OPEP for a particular activity. While these elements are not specifically referenced by the Regulations, the information may assist in OPEP development, depending on the specific circumstances of the activity. Each of these elements may also be considered as control measures that support risk reduction to ALARP and acceptable levels.

Further information on the scope and content of OPEPs is available in references produced by a range of government and industry bodies (see Section 6).

Initial actions and first-strike plans

Because every incident will involve a unique set of circumstances it cannot be expected that an OPEP will detail each step through every possible response action. It should, however, be possible to outline in advance many of the initial actions for timely and efficient activation of a response and implementation of the OPEP such as:

- the roles, responsibilities, and processes for initial actions/first-strike response
- incident classification, notification, and mobilisation
- initial assessment and initial actions including initiating operational monitoring
- validation of information and decisions made in the planning phase
- pre-populated templates, checklists, procedures and/or decision matrices
- the triggers, responsibilities and process for escalation and de-escalation of a response activities
- the arrangements for when and how the titleholder will seek assistance from third parties.

Interface with government and industry response plans

Oil pollution response arrangements should, where appropriate, detail the interface with other relevant oil pollution response plans. Titleholders should ensure that their response arrangements can interface with government and industry response plans and may consider using compatible terminology. Identified discrepancies or any lack of clarity in these government and industry response plans can and should be resolved during consultation when preparing an EP for submission. Crucially, when referencing other planning documents, such as an OPEP, those documents do not need to be provided in full. Rather, if used as a control measure to reduce risk, their effectiveness should be detailed through levels of performance (environmental performance standards).

Incident classification and escalation

An incident classification system should be considered to support response planning and provide information on how to categorise pollution incidents relevant to the titleholder's response capabilities. A pollution incident classification system should support a graduated scale of response based on factors relevant to the scenarios, such as oil pollution sources and volumes, resources at risk and necessity for additional response resources to combat the oil pollution.

Incident action planning

For incidents that are anticipated to extend beyond the scope of a first-strike plan the OPEP should establish a framework including the required inputs and process for transition to the project phase of the incident with an integrated process of incident action planning. An incident action plan (IAP) should have provisions such that it can be continually updated and define the response objectives and response operations for the operational period. The process for transition from first-strike plans and timing for the development and ongoing maintenance of an IAP should be described. The OPEP should clearly identify the responsibilities for developing and maintaining an IAP.

Setting response priorities

Response priorities within an OPEP should guide the strategic direction of a response and should align with pre-identified environmental sensitivities and protection priorities. As part of the on-going consultation requirements under Regulation 14(9) of the Regulations, titleholders should consider a process for communicating with relevant authorities, organisations and persons during a response. The OPEP should identify a process for validating decisions during an incident based on planned operational monitoring which will be determine the actual effectiveness of response strategies.

Response decision-making

The OPEP should identify decision-making processes to support deployment, assessment and ongoing review of the implementation of oil pollution response control measures. An operational NEBA may assist in validating planning information so that the most appropriate and efficient response strategies with the least environmental harm continue to be implemented. Where titleholders adopt a NEBA approach to guide response decision-making the OPEP should detail the methodology including responsibilities and information requirements.

If an operational NEBA is identified as a control measure that helps reduce consequence the OPEP should include detail of the effectiveness expected of the NEBA by stating the level of performance as an environmental performance standard.

Response termination

The OPEP should describe the responsibilities and process for terminating a response which may utilise termination or 'end-point' criteria. If using this approach it is useful to consider:

- the applicability of the criteria to all adopted response control measures
- the adaptability of the criteria to the range of possible oil types/scenarios and environmental sensitivities identified in the risk evaluation
- the alignment of the criteria with the oil pollution response EPOs
- diminishing returns (i.e. no further improvement to environmental outcomes is expected by continuing the response)
- consultation with relevant persons (e.g. community, third party contractors, government and non-government agencies) including the expectations and responsibilities of agencies with jurisdiction over the affected resources (e.g. state authorities)
- linkages to the outputs of operational monitoring.

3.3 Operational oil pollution monitoring

Applicable regulations
Subregulation 10A(e) – Criteria for acceptance of environment plan Subregulation 8(AA)(d) arrangements and capability in place for monitoring oil pollution to inform response activities

Core concepts

- The OPEP should describe arrangements for how timely mobilisation of personnel and equipment will occur in order to undertake effective operational oil pollution monitoring.

Considerations

- The range and scope and detail of operational monitoring arrangements and capabilities required will vary depending on the size and extent of the incident.
- The strength of operational monitoring arrangements will be dependent on the nature and scale of the incident. Titleholders should consider:
  - the flexibility of the arrangements to account for the uncertainty inherent in unplanned events, and provide information on the changing effect of oil in the environment
  - the capacity of the arrangements to address the range of information required to inform activation, implementation and termination of response activities and information management requirements
  - the ability of the monitoring to be undertaken in a timely manner consistent with the requirements determined in the risk evaluation
  - the capability of the monitoring to provide a measurable demonstration of specific end-point criteria for the purposes of terminating the response, or to trigger environmental monitoring to be undertaken in accordance with Regulation 14(8D).
- Where trajectory modelling (surface and sub-surface) is to be used to guide the location and intensity of operational monitoring during an incident, the process for applying modelling to support the monitoring should be described.

3.4 Monitoring effectiveness of control measures

Applicable regulations
Subregulation 10A(e) – Criteria for acceptance of environment plan Subregulation 8(AA)(c) – monitoring effectiveness of control measures and ensuring environmental performance standards for control measures are met

Core concepts

- Titleholders must have processes in place to monitor the effectiveness of control measures and to ensure environmental performance standards for control measures are met.

Considerations

- Realistic and practical methods for monitoring effectiveness of the control measures should be employed considering the primary activity is responding to the spill.
- Where relevant, titleholders may use information gained from operational monitoring to also monitor the effectiveness of oil pollution response control measures.
- Information gathered when monitoring the effectiveness of control measures should be used to support decisions on whether to continue, discontinue, or escalate implementation of a control measure and ensure that control measures are meeting or exceeding the required level of performance detailed in the EPS.
- The OPEP should show that the titleholder has the capacity to implement the identified monitoring.

4 Implementation strategy

While the Regulations require the implementation strategy contain an OPEP, the implementation strategy must also contain additional information that may be relevant to both routine and non-routine events. Titleholders should determine the most appropriate location in the implementation strategy and/or OPEP for placing details required by the implementation strategy. A majority of the information in the implementation strategy focuses on preparedness aspects of oil pollution risk management. As such, it may not be useful in a response and may not be relevant information to include in the OPEP.

4.1 Environmental management systems

Applicable 4egulations
Subregulation 10A(e) – Criteria for acceptance of environment plan Subregulation 14(3) – Implementation strategy must contain a description of the environmental management system for the activity

Core Concepts

- Any control measures selected to manage oil pollution risks should feature in the environmental management system (EMS).

Considerations

- The implementation strategy should provide information on the measures that relate to responsibilities, practices, processes and resources used to manage oil pollution risks.
- The EMS should be used to help ensure that the response and monitoring arrangements, including the OPEP will be adequately maintained, activated and implemented including testing arrangements.

4.2 Chain of command and roles and responsibilities

Applicable regulations
Subregulation 10A(e) – Criteria for acceptance of environment plan Subregulation 14(4) – Chain of command and roles and responsibilities

Core concept

- The chain of command should identify all levels of a titleholder's crisis and emergency response structure relative to the identified risks from the activity.
- Clearly define the roles and responsibilities of personnel involved in oil pollution preparedness and all phases of response activities.

Considerations

- The emergency management structure should clearly identify reporting lines, information flows and other linkages between the different levels of crisis or emergency response teams.
- The titleholder should have a well-understood incident response system and structure that can easily integrate with associated response plans (e.g. the National Plan, AMOSPlan).
- The structure should be scalable and flexible to support implementation of response strategies for the duration of the response.
- Where required titleholders may consider the use of liaison officers to assist in coordinating complex responses and may feature in titleholders command structures.

4.3 Ensuring responsibility awareness, competencies and training

Applicable regulations
Subregulation 10A(e) – Criteria for acceptance of environment plan Subregulation 14(5) – Measures to ensure each employee and contractor is aware of their responsibilities including during emergencies or potential emergencies

Core concepts

- Oil pollution management and response personnel should be trained and competent.
- Personnel involved in oil pollution preparedness and response must be aware of their individual responsibilities.
- Titleholder must have measures in place to ensure employees and contractors are aware of their responsibilities and have appropriate competencies and training.

Considerations

- The type, relevance and frequency of training required should be included in the implementation strategy.
- Appropriate measures need to encompass all stages of hydrocarbon risk management including preparedness, response, operational and environmental monitoring.
- Titleholders should consider the resources required to fill identified roles in the event of an oil pollution incident and ensure that arrangements are adequate to meet the needs.
- The skills, competencies and experience of personnel required to fulfil each response role may vary depending on the nature and scale of the oil pollution incident.

4.4 Consistency with the national system

Applicable regulations
Subregulation 10A(e) – Criteria for acceptance of environment plan Subregulation 14(8E) – Consistent with the national system for oil pollution preparedness and response

Core concepts

- The national system for oil pollution preparedness and response is the National Plan for Maritime Environmental Emergencies (the National Plan).

Considerations

- Response arrangements should detail the interface with national and state/territory oil pollution response agencies, contingency plans and other National Plan support arrangements.
- Other relevant information that may be included in an implementation strategy to demonstrate that response arrangements are consistent with the national system include:
  - use of response terminology consistent with the National Plan
  - details of roles and responsibilities including control agencies and support agencies consistent with the National Plan
  - detail of the interface or implementation of an incident control system consistent with the National Plan
  - incident classification, response escalation processes and response priorities consistent with the National Plan and national marine oil spill contingency plan
  - adopting pollution response reporting and assessment forms consistent with the National Plan.

Vessel based oil pollution incidents

The Australian Maritime Safety Authority (AMSA) is responsible for the control of incidents in offshore areas involving ships whenever the *Navigation Act 1912* (the Navigation Act) applies. This is regardless of whether ships are conducting an offshore petroleum activity under the OPGSS Act or not. Titleholders undertaking petroleum activities are responsible for incident control when the Navigation Act does not apply to facilities located in offshore areas.

Note: where there is any uncertainty about the control agency due to the source of the spill the titleholder should refer to the definition of a facility (see OPGGS Act Volume 3 Schedule 3, Part 1, Clause 4 & Volume 2 Part 6.8 Section 640).

Where response relies solely on the jurisdictional arrangements of the National Plan to combat marine pollution from a vessel based spill, the EP must still demonstrate that those response arrangements will be effective in reducing the risks to ALARP and to acceptable levels. Utilising National Plan arrangements does not remove the responsibility of the titleholder from implementing control measures if deemed reasonable and practical.

4.5 Testing response arrangements

Applicable regulations
Subregulation 10A(e) – Criteria for acceptance of environment plan Subregulation 14(8A)(8B)(8C) – arrangements for testing the response arrangements

Core concepts

- Tests of response arrangements are administrative control measures focused solely on the preparedness of the response arrangements.
- Testing is the fundamental mechanism for validating and verifying that the response plans and procedures are appropriate and commensurate with the identified risks.

Considerations

- The implementation strategy should contain an appropriate range of tests to ensure that the titleholder is adequately prepared to respond to emergencies without overburdening the titleholder and hence reducing the effectiveness of the tests. Types of tests can include:
  - audits and peer review
  - notification/communication exercises
  - desktop, equipment deployment, or incident management exercises
  - unannounced or 'no-notification' drill.
- The effectiveness of testing prior to a pollution incident will significantly affect the success of a response and the efficiency with which specific aspects of the OPEP are managed.
- Titleholders should ensure tests are designed in such a way that the arrangements are actually tested as opposed to just followed. Testing should ensure that the arrangements are in place and work as required.
- A testing schedule should be appropriate to the nature and scale and seek to test all the identified level of pollution incidents identified by the risk evaluation over the duration of the activity.
- When developing tests and test objectives titleholders should consider what they wish to achieve in the event of a pollution incident. Areas for consideration include:
  - timeframes for notification /mobilisation
  - competency of available responders
  - adequacy of equipment and personal (trained and untrained)
  - adequacy of deployment arrangements (logistical functions and procurement pathways)
  - ability to dissemination of information internal and externally
  - ability to interface with external stakeholders
  - management of media and public relations, complaints and claims and relations with external agencies.
- Testing can provide training, ensuring that staff maintain competencies for their appointed roles.

- Tests should be as realistic as possible and encompass relevant personnel in their assigned roles with consideration given to reliance on external providers and key stakeholders.
- Titleholders should consider prioritising testing commensurate with the criticality and complexity of controls, in particular where specialised response equipment and systems are used infrequently.
- Titleholders are required to ensure that there are mechanisms in place to examine the effectiveness of response arrangements against the objectives of testing and address subsequent recommendations.

4.6 Consultation (on-going)

Applicable regulations
Subregulation 10A(g) – Criteria for acceptance of environment plan Subregulation 14(9) – appropriate consultation

Core concepts

- On-going consultation is part of maintaining response preparedness.

Considerations

- Titleholders should consider relevant persons that require ongoing consultation and also ensure that reasonable expectations and requests for ongoing consultation are agreed.
- Relevant persons may require ongoing consultation throughout the planned activity and/or for the duration of any oil pollution response.
- Where there is a reliance on third party service providers, the ongoing consultation process may include identifying the role of those organisations in OPEP training and testing arrangements.

4.7 Updating the OPEP

Applicable regulations
Subregulation 10A(e) – Criteria for acceptance of environment plan Regulation 14(8) – Implementation strategy must provide for updating of the OPEP

Core concepts

- The implementation strategy must contain arrangements for updating and reviewing the OPEP to ensure that all relevant information is accurate and that new information or improved technology will be evaluated regularly and used to adapt and improve the management of oil pollution risks.

Considerations

- The OPEP should be regularly reviewed and updated to ensure maintenance of the response capability. Reviews should facilitate learning, identify strengths and deficiencies, recognise lessons learnt, and identify areas for improvement.
- Presenting a proposed timetable of reviews and when and what conditions prompt the updating of the OPEP supports an appropriate implementation strategy.

4.8 Monitoring of impacts to the environment

Applicable regulations
Subregulation 10A(e) – Criteria for acceptance of environment plan Regulation 14(8D) – The implementation strategy must provide for monitoring of impacts to the environment from oil pollution and response activities

The submission must propose oil spill environmental monitoring that is appropriate to the nature and scale of the environmental risks presented by spill scenarios from the activity. The range of monitoring starts from observations focused on the behaviour and fate of the spilled oil, through to sophisticated environmental effects monitoring programs designed to determine the extent, severity and duration of impact to a relevant suite of receptors.

Core concepts

- Monitoring arrangements must be commensurate with the identified risks such that more developed oil spill environmental monitoring arrangements are expected for higher levels of risk.
- Impacts to the environment from the oil itself and control measures used in the response must have appropriate oil spill environmental monitoring.
- Data proposed to be collected must be sufficient to inform decisions about the need for, and scope of, potential remediation activities.
- Environmental baselines are a key consideration for determining extent, severity and persistence of impact.

Considerations

- Environmental monitoring arrangements may not fit within an OPEP, given this information papers primary focus on emergency response. However, the provisions for environmental monitoring, like those for the OPEP, should have a basis in a comprehensive assessment of impacts and risks for spills and response measures
- Monitoring programs for determining environmental impacts and assessing recovery should have clear aims or objectives stating what is to be achieved.
- The monitoring program (including the objectives, scope, design and spatial extent of monitoring) should be flexible, adaptable and conservative to account for residual uncertainty associated with risk assessments and/or modelling results.
- Monitoring programs should account for identified variables (e.g. oil type, nature of receiving environment) and be implementable within timeframes that are specific to the circumstances of the activity.
- Any experimental design described in a submission should be robust and defensible; including a description of what baseline data will be used and/or collected to achieve the program's stated objectives (see NOPSEMA's Operational and Scientific Monitoring Programs Information Paper).
- Describing the key features of the monitoring program rather than the specific methods of gathering data is encouraged. Key features may include the form of peer review, the level of statistical rigour, and the ability to adapt monitoring to suit the circumstances of a spill.

- Initiation and termination criteria for the monitoring should be defined as clear decision points. Ambiguous language should be avoided to ensure that operational decisions relating to the monitoring arrangements can be made with confidence in the event of a spill.
- When developing initiation and termination criteria, consider the appropriateness of data proposed to be collected (during operational and/or impact monitoring phases) to ensure the effective evaluation of whether the criteria has been met.
- Environmental monitoring may occur concurrently with and/or directly after the response. In many cases, the types of environmental monitoring programs that are activated may be directly determined by the response activities implemented and/or the information collected during the response phase (refer Sections 3.3 and 3.4).
- Development of monitoring arrangements (e.g. scope, parameters to be measured, and initiation and termination points) should consider outcomes of consultation as well as relevant government policy documents, guidelines and plans of management, including those relating to matters protected under the *Environment Protection and Biodiversity Conservation Act 1999*.
- The monitoring arrangements should define roles and responsibilities and include measures to ensure awareness of these, as well as appropriate training and competencies (see sections 4.2 and 4.3).

5 Common deficiencies

NOPSEMA assesses each EP submission on its own merits. Each EP relates to a specific activity (or specific multiple activities) in a specific place and time. Furthermore, as is to be expected under an objective-based regulatory regime, titleholders take differing approaches to fulfilling their regulatory obligations. In spite of these differences, in NOPSEMA's assessment experience there are a number of common deficiencies.

5.1 General deficiencies

- The level of detail provided in the EP does not match the nature and scale of the risk presented or the criticality of the aspect being described.
- Acceptable levels of risk have not been established before trying to demonstrate that oil pollution risks are below that level.
- ALARP demonstrations that only consider extreme additional controls measures while omitting numerous plausible additional or alternative controls.
- ALARP demonstrations that only focus on implementation of physical oil pollution control measures and do not address oil pollution response preparedness arrangements (e.g. being better prepared).
- EPs that fail to detail and evaluate all sources of oil pollution, underestimate possible consequences, or do not adequately demonstrate how the level of preparedness matches the identified risk.
- Inclusion of environmental performance outcomes, standards and criteria that do not relate to identified control measures and/or will not allow environmental performance to be measured.
- ALARP arguments are written to support the status quo effectively 'reverse engineering' the risk assessment so that alternative and/or additional controls are ignored or at best poorly argued as grossly disproportionate.
- Plans that are written for 'the Regulator'. Plans should be operational and written for implementation by 'the titleholder' to ensure that the titleholder can manage their risk.

5.2 OPEP deficiencies

- Long and overly complicated OPEPs that will be difficult to use in an oil pollution emergency.
- OPEPs that incorrectly define/apportion responsibilities between the titleholder and other organisations based on publically available state/national plans.
- OPEPs that include decision-making processes that incorrectly identify a requirement to seek operational approval from NOPSEMA to implement particular response strategies during an incident.

6 Further information

For more information regarding this Information paper, contact the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA):

- Telephone: +61 (0)8 6188- 8700, or
- e-mail: information@nopsema.gov.au

Further information regarding the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009, is available at nopsema.gov.au

Further information on oil spill response and contingency planning is available from of the following sources:

- Australian Maritime Safety Authority - www.amsa.gov.au
- Australian Marine Oil Spill Centre Pty Ltd - www.amosc.com.au
- Australian Petroleum Production & Exploration Association - www.appea.com.au
- American Petroleum Institute - www.api.org
- International Maritime Organisation - www.imo.org
- International Petroleum Industry Environmental Conservation Association (IPIECA) - www.ipieca.org
- International Tanker Owners Pollution Federation (ITOPF) - www.itopf.com

7 Appendix

7.1 Acronyms

ALARP	As Low As Reasonably Practicable
AMOSPlan	Australian Industry Cooperative Oil Spill Response Arrangements
AMSA	Australian Maritime Safety Authority
AS/NZS ISO	Australian Standard/New Zealand Standard International Organisation for Standardisation
EP	Environment Plan
EPO	Environmental Performance Outcome
EPS	Environmental Performance Outcome
IAP	Incident Action Plan
IMT	Incident Management Team
National Plan	National Plan for Maritime Environmental Emergencies
NEBA	Net Environmental Benefit Assessment
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
OPGGS Act	*Offshore Petroleum and Greenhouse Gas Storage Act 2006*
OPRC	*International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990*
OPEP	Oil Pollution Emergency Plan

Information Paper

N-04700-IP1349 March 2016

Operational and scientific monitoring programs

Summary

Oil spills are an inherent risk associated with offshore petroleum activities. While these events are very unlikely, they pose a threat to the marine environment and the values it supports.

An outcome of the Montara Commission of Inquiry and the Australian Government Final Response and Implementation Plan, is the expectation that titleholders develop suitable operational and scientific monitoring programs (OSMP) and be ready to promptly implement them in the event of an oil spill.

The National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) produced this Information Paper as an output from the Australian Government's Implementation Plan for Recommendation 90 of the Montara Commission of Inquiry.

The paper provides general advice and information to assist titleholders to develop fit-for-purpose OSMPs and to demonstrate an appropriate degree of readiness to implement those programs in the event of an oil spill. Titleholders should be able to apply information presented here to prepare OSMPs that could meet the requirements of the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009.*

The OSMP is a key part of an integrated package of environmental management documentation that also includes the environment plan (EP) and the oil pollution emergency plan (OPEP). The OSMP is the principle tool for determining the extent, severity and persistence of environmental impacts from an oil spill, and allows titleholders to determine whether their environmental protection goals are met. The OSMP can also be used to test how effective the oil spill response is being in protecting the environment. Scientific monitoring in the OSMP may also have secondary aims such as to improve predictive and response capacity for future oil spills or to help direct remediation efforts.

The focus of this paper is on the design and implementation of scientific monitoring, including the collection of baseline environmental data. Advice on operational monitoring during the response phase of an oil spill can be found in existing guidance.

Table of Contents

NOPSEMA Attachment 6

Tables

Figures

Appendices

NOPSEMA Attachment 6

Abbreviations/acronyms

AIIMS	Australasian Inter-service Incident Management System
ALARP	As Low as Reasonably Practicable
AMOSC	Australian Marine Oil Spill Centre
AMOSPlan	Australian Industry Cooperative Oil Spill Response Arrangements
AMSA	Australian Maritime Safety Authority
AS/NZS ISO	Australian Standard/New Zealand Standard International Organisation for Standardisation
DIIS	Department of Industry, Innovation and Science
DoE	Department of Environment
EMBA	Environment that May be Affected
EP	Environment Plan
ERA	Environment Risk Assessment
ESD	Ecologically Sustainable Development
GGS	Greenhouse Gas Storage
IMT	Incident Management Team
MNES	Matters of National Environmental Significance
National Plan	The National Plan to Combat Pollution of the Sea by Oil and other Noxious and Hazardous Substances
NEBA	Net Environmental Benefit Assessment
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
OHS	Occupational Health and Safety
OPGGS Act	Offshore Petroleum and Greenhouse Gas Storage Act 2006
OPRC	International Convention on Oil Pollution Preparedness, Response and Co-operation
OPEP	Oil Pollution Emergency Plan
OSRICS	Oil Spill Response Incident Control System
OSTM	Oil Spill Trajectory Modelling
WAF	Water Accommodated Fraction

Context

1 Introduction

1.1 Information paper series

This Information Paper forms part of a series of documents published by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) that provide information relevant to the environmental management of offshore petroleum and greenhouse gas storage (GGS) activities in Australian Commonwealth waters, which are subject to the provisions of the Commonwealth *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGS Act) and the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (the Environment Regulations). The Information Paper series outlines aspects of good environmental management practice relevant to Australia's offshore petroleum industry.

This Information Paper provides information and general advice to assist titleholders to plan for and implement Operational and Scientific Monitoring Programs (OSMPs) for oil spills from offshore activities. It should be read in conjunction with other relevant information available on the NOPSEMA website, particularly guidance for the preparation of environment plans (EP) and oil pollution emergency plans (OPEP).

It should be noted that while there are regulatory requirements that relate to monitoring of oil and gas activities (planned and emergency conditions), it is not a Regulatory requirement, or otherwise mandatory, to apply the information or advice presented in this paper. It is expected that titleholders would provide sound justification for any approaches adopted in the EP.

1.2 Purpose of this paper

Since the uncontrolled release of hydrocarbons at the Montara oil field in the Timor Sea in 2009, the Australian Government has strengthened the regulatory requirements and expectations of industry with regard to implementation of environmental monitoring in the event of an oil spill from an offshore petroleum activity. The overarching purpose of this Information Paper is to provide information and advice to assist titleholders in meeting the Government's expectations for oil spill environmental monitoring programs.

More specifically, this Information Paper:

- sets out general principles and practical advice to assist titleholders in their planning for, and application of, fit-for-purpose OSMPs. Emphasis is on information concerning why and when an OSMP should be included in an EP submission and possible approaches to monitoring
- addresses the findings and recommendations of the Montara Commission of Inquiry, and implements the Final Australian Government Response to the Inquiry in relation to environmental monitoring for petroleum activities (see Section 2.2)
- incorporates lessons learned from recent marine oil spills, where relevant; and
- captures the information relevant to matters protected under Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act).

1.3 Scope and structure of this paper

Environmental monitoring is a key activity undertaken during any activity and particularly following an oil spill. Oil spill monitoring can be undertaken for two distinct, but closely related purposes. As an integral part of the response to an oil spill 'Type I', 'response phase' or 'operational monitoring', is used to collect information about the oil spill and associated response operations for the purposes of aiding decision-making during the response. In particular, it provides verifiable information on the extent and quantity of contamination and effectiveness of response operations (including controls), including clean-up. Operational monitoring should provide a measurable demonstration of specific end-point criteria for the purposes of terminating the response (i.e. the point at which no further environmental improvement outcomes can be achieved through continued response implementation). Operational monitoring typically ceases once all aspects of response implementation have terminated.

The other type of monitoring, which is commonly referred to as 'Type II', 'recovery phase' or 'scientific monitoring', addresses defined objectives and collects information for the purposes of determining short and long term environmental impacts (both from the spill and the response), post-spill and post-response recovery studies, remediation efforts and scientific research. Scientific monitoring may also demonstrate whether a titleholder's goals for environmental protection were met. Scientific monitoring plans should demonstrate an appropriate level of rigour and address important design considerations such as statistical power, effectiveness of monitoring techniques, quality control and data analysis to address the inherent complexities of the marine environment and challenges associated with detecting impacts attributed to an oil spill event. Scientific monitoring may continue from some time following the termination of the operational response.

This document is focussed on scientific monitoring. This focus reflects the findings of the Montara Commission of Inquiry, which found that the full environmental consequences of the blowout will never be known, due in part to the absence of solid reliable baseline data and the slow response in putting in place the monitoring plan. A focus on scientific monitoring also complements NOPSEMA's (2014) guidance on oil pollution risk management and oil spill response and monitoring guidance published by the Australian Maritime Safety Authority.

The Information Paper scope covers a range of activities from analysing the existing environment, looking at potential impacts, designing the monitoring program, planning for monitoring through to responding to the results.

The paper is structured around three main components - context, planning and application. Topics covered under each of the components are summarised in the schematic diagram in Figure . This represents a logical order of steps similar to the process that titleholders may follow when preparing an OSMP. The order presented and colour code assigned to the components below are reflected the document for ease of navigation.

As an additional feature to assist users of this document, 'break out boxes' such as the one below are used to highlight and summarise important information and general principles discussed in preceding text. Additional information and advice which may also assist understanding is included in Technical Appendices at the back of this document.

The overarching purpose of this Information Paper is to provide information to assist titleholders to develop and apply fit-for-purpose operational and scientific monitoring programs (OSMPs).

This information paper is an output from the Australian Government's Implementation Plan for Recommendation 90 of the Montara Commission of Inquiry.

The use of information presented in this paper is not mandatory, however it has been specifically designed with the intent of assisting titleholders meet the regulatory requirements relevant to monitoring the impacts on the environment from oil pollution and response activities.

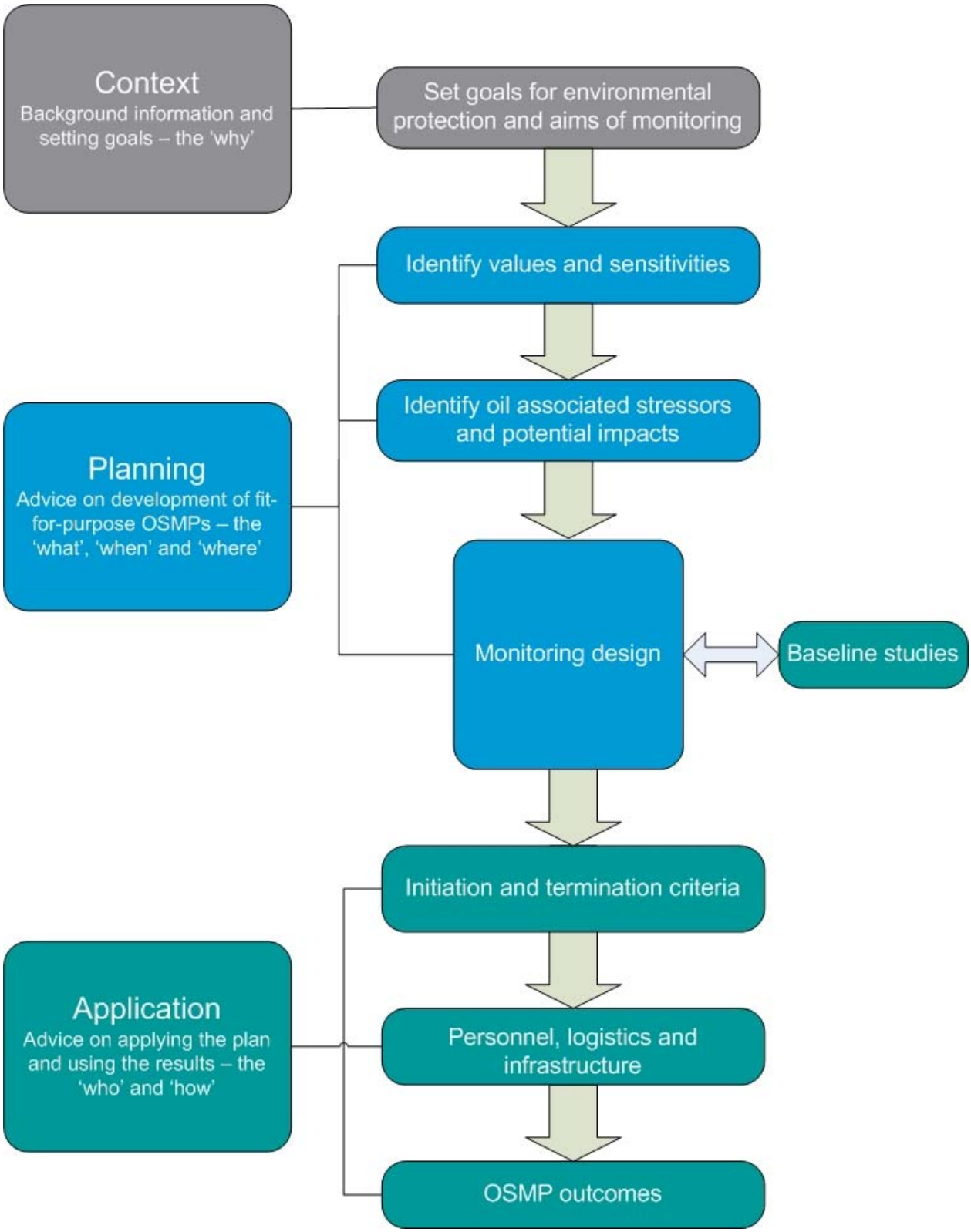


Figure 1 Document structure and OSMP design process

1.4 Legislative and other considerations

1.4.1 Offshore Petroleum and Greenhouse Gas Storage Act 2006

The *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGS Act) provides the legislative framework for all offshore petroleum exploration and production, and greenhouse gas activities in Commonwealth waters and in State waters where powers have been conferred. The OPGGS Act is supported by Regulations covering matters such as safety, well integrity and environmental management.

The OPGGS Act is an objective/performance based regime that encourages an improvement rather than compliance mentality. The regime ensures flexibility in operational matters to meet the unique nature of differing projects. Industry must demonstrate to regulators - and regulators must assess and accept or not accept – that a titleholder has reduced the risks of an activity to 'as low as reasonably practicable' (ALARP). These risks must also be acceptably low. With respect to environmental management, this approach enables titleholders to employ innovative environment protection measures tailored to specific circumstances to achieve good environmental practise and outcomes. This encourages improvements in standards over time.

1.4.2 The Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009

The Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (the Environment Regulations) have the primary objective of ensuring any petroleum activity in Commonwealth waters is consistent with the principles of ecologically sustainable development (ESD) and is carried out in activity manner by which the environmental impacts and risks will be reduced to ALARP and of an acceptable level. NOPSEMA has published further advice on its interpretation of the Environment Regulations in its Guidance Note for EP content requirements. Guidance Notes and Information Papers are available on NOPSEMA's website.

Together with the OPGGS Act, the Environment Regulations are designed to promote innovation and afford flexibility for titleholders to tailor environmental management solutions to their particular operating environment. For OSMPs, the flexibility afforded by this regime means that titleholders are able to determine the scope, design and methodologies of programs that are appropriate to nature and scale of the activity and its environmental impacts and risks. While this flexibility opens up significant opportunities for titleholders, it also presents considerable challenges, particularly in terms of understanding what would allow the Regulator to be reasonably satisfied with what is presented. An intended outcome of this Information Paper is clarity to help address this challenge.

1.4.3 Environmental Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is Australia's principal piece of environmental protection and conservation legislation. Prior to 2014, for petroleum activities which were likely to have a significant impact on matters of national environmental significance (MNES), separate approvals were also required from the Minister for the Environment.

In February 2014, NOPSEMA's environmental management authorisation process was endorsed by the Federal Minister as a Program (the Program) that meets the requirements of Part 10, section 146, of the EPBC Act. As a result, the Minister for the Environment approved a class of actions which, if undertaken in accordance with the endorsed Program, does not require separate referral, assessment and approval under the EPBC Act. The Program streamlined environmental regulation of petroleum activities by making NOPSEMA the sole regulator for these activities in Commonwealth waters. Further information regarding this process can be found on NOPSEMA's website.

The Australian Government, through the Department of the Environment (DoE), publishes EPBC Act policy statements, recovery plans, conservation advices and other advisory documents which provide guidance on the practical application of the EPBC Act, and which may be relevant to offshore activities and the development of OSMPs.

The EPBC Act also provides the foundation for the Government's bioregional marine planning initiative and the associated Commonwealth Marine Reserve (CMR) networks in Australia's offshore marine area. Bioregional planning documents and CMR information, including management plans and other information on the DoE

website is relevant to OSMPs development and implementation this provides information on the natural and social values of Australia's Commonwealth Marine Area and the management arrangements that apply.

Titleholders should be aware that international environmental conventions and agreements to which Australia is a signatory or a party to may be relevant considerations when designing an OSMP. The Bonn Convention on migratory species, the World Heritage Convention, the Ramsar Convention for the protection of internationally important wetlands and the various agreements with China (China Australia Migratory Bird Agreement - CAMBA), Japan (Japan Australia Migratory Bird Agreement - JAMBA) and the Republic of Korea (Republic of Korea Australia Migratory Bird Agreement - ROKAMBA) for the protection of birds that migrate between these countries and Australia are some examples of key international conventions and agreements that may warrant specific attention.

In all cases, titleholders should refer to the DoE website for complete and up-to-date information.

1.4.4 Other consideration for monitoring

Some examples of the types of legislative requirements and other considerations that titleholders may need to take into account include State or Northern Territory laws and existing management arrangements for designated sites and areas (e.g. marine conservation reserve management plans) and specific approval conditions placed on operations by third parties. As a general principle, where parts of a potentially-affected area overlap areas where specific values or management plans have been defined or are proposed through legislative or other formal processes, those values and/or management plans should be taken into account when describing the environment, evaluating impacts and risks, setting environmental performance outcomes and planning OSMPs.

Since oil spills can affect areas long distances from the spill site, they have potential to impact areas and their associated environmental values within the Commonwealth marine area and the nearshore waters and coastlines of the continental mainland and shelf islands under the jurisdiction of States or the Northern Territory. Some potentially impacted areas may be formally or informally recognised for the important ecological, biodiversity, cultural (e.g. European or Indigenous) and/or socio-economic (e.g. fisheries, tourism) values they support. In view of this, titleholders should ensure that proposed monitoring activities in such areas are lawful (e.g. appropriate approvals are secured before implementing monitoring) and take the values and any specific management targets into account, while also ensuring that the EP submission complies with the Environment Regulations.

There may also be some circumstances where trans-national boundary issues may warrant attention by titleholders.

With regard to legislative and other considerations, when planning and applying OSMPs titleholders should:

- note that key pieces of legislation relevant to OSMPs for offshore petroleum activities include the OPGGS Act, Regulations and the EPBC Act
- aim to make the most of the opportunities and flexibility afforded by the objective-based regime
- ensure that the planning for monitoring programs considers the need for those programs to comply with the relevant Commonwealth, State and Northern Territory laws
- address the values and any specific management targets for designated sites and areas.

1.5 The EP, OPEP and OSMP

The EP, oil pollution emergency plan (OPEP) and OSMP are parts of an integrated package of environmental management documents designed to manage environmental issues and protect the environment during

routine operations and emergency incidents associated with offshore petroleum activities. With emphasis on oil spill monitoring, the general purposes of, and relationships between, these documents are outlined in this section.

In very simple terms, the EP provides fundamental information including a description of the environment that may be affected by an oil spill, an evaluation of the impacts and risks associated with such a spill, the titleholder's goal(s) for protection of the environment and standards for performance of control measures. Throughout, levels of impacts and risks need to be shown to be acceptable. The EP also sets out an implementation strategy that describes how the various aspects of environmental performance management will be rolled out by the titleholder during the operations phase of the activity.

By providing this information, the EP sets the foundation for the response strategies described in the OPEP that will be employed to combat a spill with the broad aim of achieving the titleholder's goal for environmental protection that is set in the EP. NOPSEMA has published specific guidance on oil pollution emergency planning, which titleholders are encouraged to consult.

Again in simple terms, information within the EP informs the form and content of the OSMP by identifying aspects of the operating environment that should be protected and monitored during an oil spill. Monitoring detailed in the OSMP may also provide a basis for:

- determining if (and/or when) the goals set for environmental protection are achieved
- 'testing' the efficacy of predictions of impact presented in the EP
- 'testing' the effectiveness of the oil spill response within the OPEP in protecting the environment to achieve the titleholder's goal.

An OSMP should be designed as a part of an integrated package of environmental management documentation that includes the EP and the OPEP.

2 Background

2.1 A brief overview of Australia's marine environment

With the recent proclamation of the extended continental shelf, Australia now has the world's third largest national marine territory, which includes parts of the Indian, Southern and Pacific oceans. Figure 1 Document structure and OSMP design process shows Australia's offshore maritime jurisdiction relevant to petroleum exploration and development activities and illustrates the vastness of this offshore area.

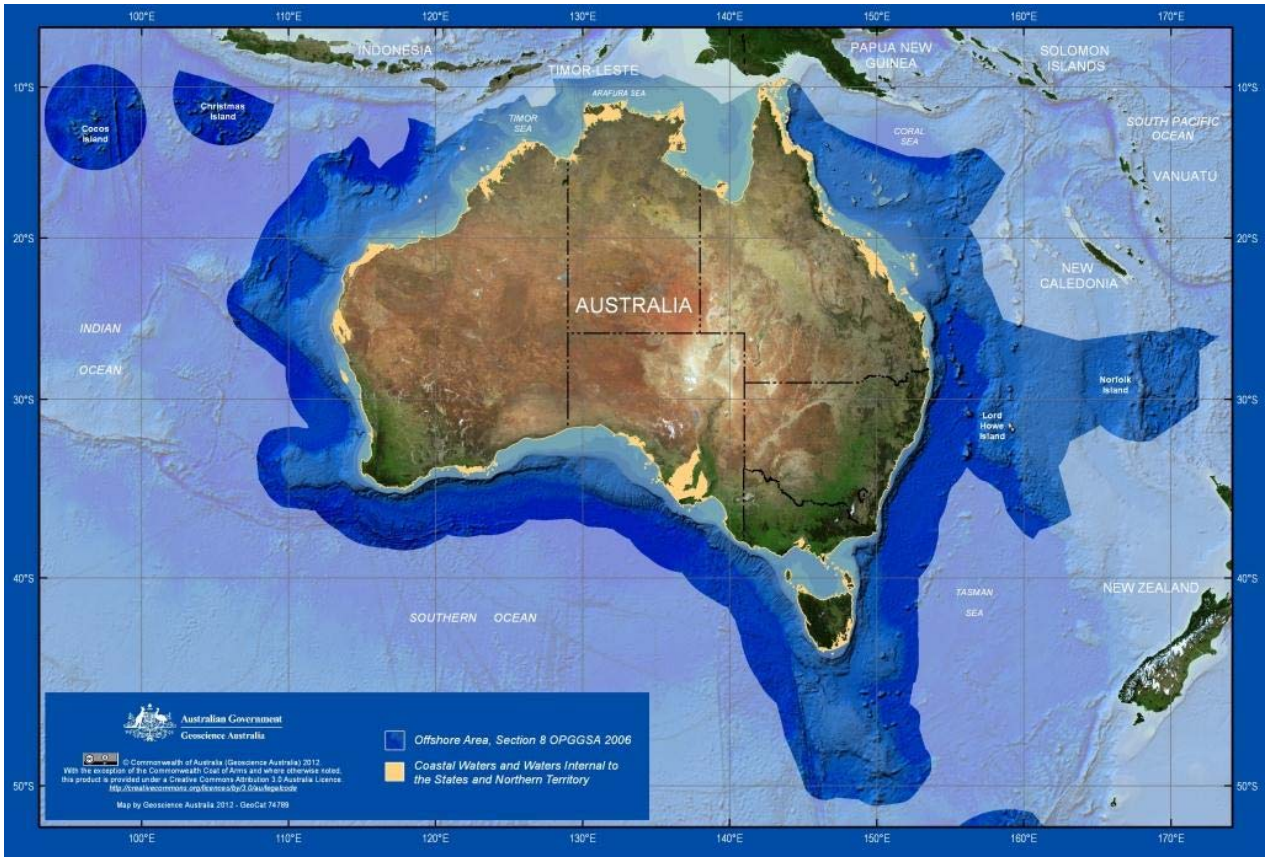


Figure 2 Australia's offshore area relevant to petroleum exploration and development activities.

Map Courtesy GeoScience Australia
Note: The boundaries depicted do not necessarily show the full extent of Australian jurisdiction and are without prejudice to Australia's maritime claims.

The vast geographic extent of the Australian offshore area, and its varied climactic, geological and oceanographic settings, mean that it supports a rich diversity of species and ecosystems. Australia's marine jurisdiction extends from the tropics in the north to cool temperate waters in the south and approximately 200 nautical miles from the continental mainland. It also takes in areas of deep ocean beyond the continental shelf and includes waters around offshore islands, such as Christmas, Cocos, Norfolk and Lord Howe islands, which are well offshore from mainland Australia (Figure 2).

While detailed knowledge of Australia's offshore marine environment remains patchy, there is a broad understanding of key features and values, and there are knowledge hotspots, particularly in areas known to be important for their biodiversity and ecological values, fisheries management and offshore hydrocarbon reserves. Through the Commonwealth's bioregional marine planning initiative, plans have been developed for four Australian Commonwealth marine bioregions. These plans bring together information about key biophysical features and conservation values, and identify key ecological features (KEFs) that are critical to the ecological functioning, integrity and/or biodiversity of the Commonwealth marine environment. Bioregional planning and the international Census of Marine Life initiative have also highlighted that Australia's oceans support globally-significant biodiversity and high levels endemicity in some regions. Halpern et al. (2008) in their assessment of the condition of the world's oceans also noted that the marine environment off northern

Australia supports among the least impacted marine ecosystems in the world along with high latitude polar regions. The authors suggest these waters represent one of the very few tropical marine areas remaining in a "very low impact" state.

As an island nation Australians have a strong affinity to the coast and ocean. Human uses of Australia's marine environment are varied and contribute significantly to the national economy through energy and food production, transport, industry, recreation, tourism and defence (AIMS, 2010). In 2009-2010, the reported fish landings (including mariculture) in Australia's Economic Exclusion Zone were 241,100 tonnes, with a gross value of $2.2 billion (ABS, 2012). Further, there is a high participation rate in marine recreational pursuits in Australia (e.g. an estimated 5 million people participate in recreational fishing each year), which highlights a strong public affinity with the ocean and it's biological resources. It is important to note, that many of these uses particularly those based around fisheries, recreation and tourism but also including transport and other marine industry depend on a clean and healthy marine environment.

The Australian State of the Environment Report (State of the Environment 2011 Committee, 2011), suggested that around 90% of Australia's liquid hydrocarbon and 74% of the nation's natural gas production is extracted from ocean areas. The estimated $145 billion worth of new gas projects currently under construction in Australia are expected to have general long-term economic and social benefits for the nation, in the form of export revenue, employment opportunities and tax payments (APPEA, 2011). Indeed it has been reported that offshore oil and gas activities make up over 50% of the economic value of Australia's marine industry (AIMS, 2010). With increasing global demand of energy, it could be expected that oil exploration and the natural gas part of the sector will continue to expand.

2.2 The Montara Commission of Inquiry

On 5 November 2009, the Commonwealth Minister for Resources and Energy announced a Commission of Inquiry into the uncontrolled release of oil and gas from the Montara Wellhead Platform in the Timor Sea, which commenced on 21 August 2009. The Inquiry investigated the likely causes of the incident and made recommendations to the Government on how to prevent and, if necessary, manage future incidents, including environment management matters.

The June 2010 Report of the Montara Commission of Inquiry made 105 recommendations which have implications for governments, regulators and the operational procedures and practices of the offshore petroleum industry. In the Final Government Response, the Government accepted 92 recommendations and noted 10. It did not accept three Montara Commission of Inquiry recommendations because they were technically inappropriate. Implementation of the Government's response has included a suite of initiatives, including amendments to legislation and improvements to strengthen institutional arrangements.

Recommendations 90, 95 and 96 are considered in this Information Paper. In particular, Recommendation 90 stated that 'off the shelf' monitoring programs should be developed that could be rapidly implemented in the event of a future spill from an offshore facility. NOPSEMA has led the implementation of this recommendation through robust regulatory oversight under the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009, including the provision of guidance in this Information Paper on monitoring programs. Under the Environment Regulations, a titleholder must have an accepted environment plan that is fit-for-purpose and specific to the activity and its environment in order to operate. An environment plan should include an OSMP that is similarly fit-for-purpose and specific to the activity and to the environment at risk. Each OSMP will be different as the environmental setting and, impacts and risks associated with each petroleum activity will be different (i.e. the OSMP for an offshore petroleum activity in Bass Strait may bear little resemblance to the OSMP for an activity in proximity to sensitive marine environment such as the Ningaloo Reef). Under these regulatory arrangements, petroleum activities should have an OSMP which is appropriate to nature and scale and the environmental impacts and risks, and is sufficient to inform remediation activities.

The Montara Commission of Inquiry also refers to aspects of the 'polluter pays' principle in its analysis and recommendations relating to the environmental response to the incident (Recommendations 95 and 96 of the Montara Commission of Inquiry Report). The Inquiry report points to scientific monitoring with an aim of assessing environmental impact as being a key part of 'polluter pays'. The Australian Government's final

response to the Inquiry's recommendations signalled its support for the 'polluter pays' principle and amendments have been made to the OPGGS Act to strengthen these requirements. Accordingly, titleholders are reminded that, in accordance with the 'polluter pays' principle, it is the titleholder who must bear the cost associated with all monitoring activities outlined in an OSMP, as well as any monitoring activities that are necessary in the event of an incident, even if they are not envisaged in the relevant OSMP.

2.3 Lessons learned from oil spill incidents

The Montara incident was Australia's third largest with respect to volume of oil spilled and it put spill response arrangements, including environmental monitoring capacity, to the test in a remote environmentally sensitive offshore area.

Together with the Macondo incident in the Gulf of Mexico in April 2010, these incidents serve to highlight there is no place for complacency when it comes to planning for the 'consequence' side of the risk equation (i.e. risk = likelihood x consequence), despite the very low likelihood of a major spill occurring. The immediate impacts of marine oil spills can be quite obvious, attract immense public attention and consequently both incidents, no doubt, adversely impacted the offshore petroleum industry's social licence to operate. On the other hand, the levels and types of environmental impacts that may be more subtle, take time to manifest, occur at places distant from the spill site or effect organisms indirectly, are much more difficult to determine. The challenge in determining these impacts may be even greater in situations where forward planning and preparation is inadequate or does not occur at all.

The Montara Commission of Inquiry found that the absence of solid reliable baseline data rendered the environmental monitoring arrangements in place for that spill inadequate. Similar concerns were raised with respect to aspects of the post-Macondo monitoring (e.g. Ragen, 2010). Underdeveloped planning for environmental monitoring of the Montara incident contributed to a delay in the implementation of environmental monitoring and lost opportunities for maximising returns from work that was being done.

> *"It is unlikely that the full impact of the blowout will ever be known. This reflects the vast and remote area affected by the spill; the absence of solid reliable baseline data on species and ecosystems, and the slow response in putting together a monitoring plan."*
>
> Montara Commission of Inquiry, 2010

There are a number of areas where environmental monitoring of offshore petroleum incidents may be improved in the aftermath of the Montara Incident, including:

- improved prior planning for environmental monitoring in the event of a spill, including the establishment of appropriate environmental baselines to inform environment damage assessment
- better integration of 'operational' and 'scientific' monitoring
- reducing the time taken to implement scientific monitoring
- the utilisation of water sampling undertaken during the response to inform assessments of the transport, fate and impact of dispersed oil
- the rigor of detailed design and implementation aspects of scientific monitoring
- the efficacy of monitoring triggers.

Governments (see Commonwealth of Australia, 2011) and industry (see APPEA, 2011) are taking steps to address the broad array is issues raised by the Montara and Macondo incidents. The lessons learnt specifically relevant to environmental monitoring of spill impacts are addressed in this Information Paper.

When planning and applying OSMPs titleholders should bear in mind:

- the vastness and remoteness of the offshore area when justifying their readiness;
- the global significance of a number of environmental values as part of their considerations of nature and scale
- seasonal variation in relation to the environmental values, in particular critical life stages susceptible to oil spill and response impacts
- that many values of Australia's offshore area rely on the maintenance of a clean and healthy marine environment
- the findings and recommendations of the Montara Commission of Inquiry and the Government's final response and implementation plan
- lessons learned from recent offshore incidents in the Timor Sea and Gulf of Mexico.

Planning

3 Planning for scientific monitoring

3.1 A fit-for-purpose OSMP

It is a requirement of the Environment Regulations that an EP's implementation strategy provides for monitoring of the impacts to the environment from oil pollution and response activities that is appropriate to the nature and scale of the risk of environmental impacts for the activity and is sufficient to inform any remediation activities. A key purpose of this Information Paper is to provide information that can be used by titleholders to develop fit-for-purpose OSMPs that suit their particular circumstances. It is therefore necessary to detail what might constitute a fit-for-purpose program.

One of the first steps that a titleholder will need to take is to decide what would be considered fit-for-purpose. Key considerations for this risk-based decision are the nature and scale of the activity, its environmental setting and predictions of impacts and risks associated with credible spill scenarios. Technical and predictive uncertainties also warrant careful consideration. .

Some general principles are suggested in Table 1 to provide some practical advice on what 'fit-for-purpose' might mean for the scientific monitoring elements of the OSMP. These principles are simply designed as prompts for titleholders to consider when evaluating whether their oil spill environmental monitoring programs may be fit-for-purpose.

Table 1 Suggested fit-for-purpose principles

Principle	Example questions to assist in the application of principles
Appropriate	Is the OMSP appropriate to the nature and scale of the activity and its impacts and risks? Does it address baseline data requirements for detecting and measuring impacts to an appropriate suite of indicators that would inform remediation activities?
Comprehensive	Does the OSMP comprehensively address relevant impacts and risks and meet all relevant legislative requirements?
Achievable	Will the design allow the titleholder to determine if the aims of the monitoring program and goal(s) for protection of the environment have been achieved?
Adaptable	Is the monitoring program design flexible enough to accommodate change that may be required to suit the scenario that unfolds in the event of an actual spill?
Ready	Does the plan demonstrate readiness with the people (e.g. suitably qualified and inducted personnel), logistics (e.g. vessels, accommodation), physical infrastructure (e.g. telecommunications) and adequate baseline data to promptly apply operational and scientific monitoring?
Timely	Can the scientific monitoring element be executed promptly to ensure that the timeframe for sampling to assess short term impact does not lapse?
Triggered	Does the program include clear and measurable initiation and termination criteria that ensure monitoring commences before opportunities are lost and is not terminated before relevant aims are demonstrably achieved?
Optimised	Will the design make the best use of data collected during operational monitoring for scientific monitoring purposes?
Justified	How will society judge the monitoring efforts - are the efforts to determine impacts justifiable? Is the monitoring logical, scientifically sound and have adequate statistical power to detect impacts and inform future remediation activities if necessary?
Communicative	Does the plan include an appropriate strategy for reporting and communicating findings to relevant audiences?

3.2 Monitoring aims

A broad aim for an OSMP should be to collect data that can be used to determine if the related goals for environmental protection set by the titleholder in the EP were met. Once a decision is made that a fit-for-purpose OSMP should be included in the submission, then a set of broad aims for the monitoring itself need to be determined.

The primary aim of scientific monitoring should be to determine the magnitude of environmental impacts arising from an oil spill, where magnitude has extent, severity and persistence (including recovery) dimensions.

It will often be necessary to establish more specific aims for individual features that are the focus of scientific monitoring. Marine conservation reserve documents often contain important information about the management targets, priorities, strategies, and actions for the reserve and its values. This information can

serve as valuable context for the setting of aims for the OSMP for specific receptors. For example, an appropriate monitoring aim for a particular receptor may be to collect data about that receptor that will allow the titleholder to determine whether a relevant management target set in a marine conservation reserve management plan is being achieved.

For scientific monitoring to achieve its aims, it may be necessary for monitoring activities to continue to occur for some time following the cessation of the response. By providing the basis for assessments of impacts over the short- and long-term following a spill, scientific monitoring data should be used inform priorities for recovery/remediation actions, as appropriate. Data collected by scientific monitoring should also provide for assessments of environmental performance based on termination criteria (see Section 9) and the titleholders' goals for environmental protection.

Although environmental impacts from oil spills can be significant, these events offer a rare opportunity to conduct research into the effects of oil on the environment in 'real world' settings. Capitalizing on these rare opportunities has potential to deliver large dividends in the form of improved fundamental understanding and the ability to test the effectiveness of control measures implemented during a spill and the veracity of impact predictions and, validate the findings of previous laboratory-based research. Accordingly, a secondary broad aim of scientific monitoring may be to continually improve predictive capacities and response effectiveness. Monitoring activities to address research-orientated aims may or may not be linked to the monitoring carried out to achieve the primary overarching aim to assess the magnitude of environmental impacts.

3.3 Defining the area of interest

Determining a study area is necessary for the planning and design of all environmental monitoring programs. In an EP, titleholders commonly present a spatially-defined area of the environment that may be affected (EMBA) by an oil spill from an offshore activity. Titleholders should refer to NOPSEMA (2015) for further general guidance relevant to generating the EMBA and evaluating environmental risks within that zone.

The EMBA provides important spatial context for the OSMP, but titleholders should be mindful of a number of important factors when considering applying the EMBA to the OSMP. Firstly, because the EMBA is often generated from stochastic modelling, it generally does not represent the possible outcome from a single spill scenario. Rather, it often represents the compilation of possible outcomes and encompasses the area predicted to be affected from a number of spill simulations (often somewhere in the range of 50-100 simulations). Because of this the EMBA is often large, covering areas that may not be affected by any single spill event. Furthermore, since the EMBA is most often generated with the help of predictive tools such as numerical models and research findings which are often not verified under field conditions (e.g. toxicity testing to derive effects thresholds), it will carry a degree of uncertainty.

In view of the above, it is very important that planning for an OSMP takes EMBA uncertainty into account and applies the precautionary principle as appropriate. For example, an OSMP may be designed with the entire extent of the EMBA in mind but include systems that allow the program to be adapted and applied in a way that is best-suited to the situation as it unfolds.

As noted above, the EMBA general provides only part of the spatial context for an OSMP. In many cases, the 'area of interest' for the OSMP may need to be larger than the EMBA, but includes it as a subset. This is primarily because the area of interest should not only include areas that might be impacted by a spill but also include areas that are unlikely to be impacted that could serve as reference or control sites in the monitoring program design. An alternative approach might be to limit the area of interest to the EMBA, but use a program design that allows the area of interest and the purpose of individual monitoring sites throughout the EMBA to be fine-tuned depending on the actual event. In such cases it may be necessary for the OSMP to detail clear points for decision-making about which sites within the EMBA will be used to assess impact and which of the remaining ones would serve as control or reference sites. The information to inform this decision-making could be collected and interpreted in near real-time with the operational monitoring component of an OSMP.

The claim is often made that large modelled EMBAs are conservative and represent worst case scenarios. Since the resources required (and cost) for monitoring will be positively correlated to the extent of the area

and diversity of receptors that should be monitored, evidence to support downward adjustment of the area of interest could have considerable benefits. Strategies to reduce or modify the boundaries of the area of interest as a spill unfolds could be considered, but they should be accompanied by strong technical justification, particularly where such strategies could have implications for the ability of scientific monitoring to achieve its aim(s).

General principles:

- OSMPs should be fit for purpose and this should be clearly demonstrated.
- OSMPs should be designed to provide data that determine if the environmental protection goals of a titleholder were met.
- Scientific monitoring should be designed with the aim of determining the extent, severity and persistence of environmental impacts.
- Scientific monitoring may have secondary aims (e.g. studies to improve predictive and response capacity for oil spills or to direct remediation efforts).
- OSMP design should be spatially-based, considering the need for both potential impact and reference/control sites.
- The OSMP may be designed to accommodate flexibility in the area of interest and the assigning of impact monitoring and reference sites based on information about the incident.

4 Identifying environmental values and sensitivities

The broad definition of the environment in the Environment Regulations can mean that, for some activities and particularly oil spills, it may be necessary to identify a wide range of environmental features, values and sensitivities over large geographic areas that may be affected. This can be a demanding task but it is a very important one, because the scope of features potentially affected by an oil spill will be one of the key determinants for the scope for the OSMP. Another key determinant for the scope of the OSMP relates to the types and levels of impacts and risks. Titleholders should note that the need to evaluate *all* the environmental impacts and risks for the activity may necessitate taking a broad view of environmental features and potential impact that goes beyond just those that are considered likely to be significant, or relevant to listed species and communities, and areas that are afforded special protection.

In the following sections, information is presented about existing sources of information and management/planning frameworks that titleholders may choose to adopt to help identify environmental features that may be affected by offshore petroleum activities. The information resources, existing management frameworks and an approach to assist in the assembly of information outlined below may be used to scope, rationalise and prioritise environmental features, including any particular values and sensitivities, which may be relevant to the OSMP.

A broad knowledge of the types of environmental features expected to be present in the area of interest and a general understanding of their potential vulnerability to the effects of oil spills and the associated response activities are worthwhile foundations for the steps that follow involving more specific identification of relevant environmental features. Users of this document are also referred to Section 5.1, which provides information on the use of cause-effect pathways for the development of OSMPs.

4.1 Possible information sources, frameworks and approaches

There are numerous approaches and resources available for identifying the environmental features that warrant consideration for the OSMP. In view of this, titleholders are encouraged to set about identifying

environmental values and sensitivities by considering a variety approaches and information to identify the parts of the environment relevant to their particular activity and area of interest. Titleholders should detail the approaches and methods used in order to demonstrate to the Regulator that the approach used and resultant outcomes are valid and appropriate. Whichever approaches are adopted for the identification and prioritisation relevant environmental features, their application should be logical, clearly described and allow titleholders to systematically demonstrate their rationale as to why some environmental features are given attention in the OSMP and, in some cases, why some others are not.

4.1.1 MNES, marine planning and conservation management resources

A considerable amount of information about environmental features of Australia's marine area can be found in documents describing MNES, marine planning and conservation management. This information may be used to describe the EMBA, evaluate impacts and risks, define environmental performance outcomes and generally inform the development of OSMP.

In an EP, titleholders must demonstrate that impacts and risks on the Commonwealth Marine Area (CMA) and relevant CMRs from both planned petroleum activities and emergency response activities will be reduced to ALARP and will not result in unacceptable impacts to the environment. CMRs are areas established by proclamation under the EPBC Act for the purpose of protecting and maintaining biological diversity in the reserves and contributing to the objectives of the national representative system of marine protected areas.

Titleholders must also be able to demonstrate that throughout an activity that impacts and risks to CMRs are consistent with relevant CMR management plans and any associated requirements.

- If there is no CMR management plan in place, titleholders should ensure that their activities are consistent with the Australian IUCN reserve management principles for the IUCN category to which the reserve or reserve zone was most recently assigned by proclamation.
- A review of the CMR Network began in 2014. For the current status of the review and its outcomes, titleholder's are encouraged to refer to DoE's website.

In addition to the CMA including CMRs, all MNES should be identified and considered in the EP in relation to the EMBA. There are a number of resources from which MNES can be identified and their values understood, including spatial tools, descriptive tools, recovery plans and marine bioregional plans. Databases are available on the DoE web site that can be searched to provide information about MNES, including listed threatened species, listed migratory species, listed marine and cetacean species, heritage values, threatened ecological communities and critical habitat. For further information on the 'protected matters search tool', titleholders should refer to http://www.environment.gov.au/epbc/publications/index.html#databases.

In addition, information from relevant State or Northern Territory agencies is likely to provide additional information on habitats for threatened or migratory species within areas under their jurisdiction. In considering this type of information, titleholders should be mindful that species and threatened communities listed under Commonwealth and State legislation may differ and these lists alone are unlikely to cover off all relevant features necessary to comply with requirements of the Environment Regulations.

Values are articulated for areas internationally-recognised for their environmental importance (e.g. Ramsar wetlands, World Heritage sites). When developing OSMPs that address the values of Ramsar sites for example, consideration should be given to the components, processes, benefits and services that form the ecological character of the site.

Marine bioregional plans are a valuable resource to guide the identification of environmental features within the Commonwealth marine area (www.environment.gov.au/marineplans). Advice designed to provide context for decision-making by proponents about what may constitute a significant impact to MNES is also provided in marine bioregional planning documents. Marine bioregional plans also contain information on protected species, protected places and key ecological features (KEFs). KEFs are elements of the Commonwealth marine environment that are of particular importance for ecosystem integrity and biodiversity conservation. The locations and descriptions of KEFs are presented in the bioregional plans and supporting documents. The location and extent of each KEF can also be viewed in a Conservation Values Atlas available on the DoE website (www.environment.gov.au/cva). The Conservation Values Atlas also identifies biologically-important areas for

a number of marine species. These biologically-important areas show where species are known to undertake certain behaviours (such as breeding, foraging, resting) and can provide additional insight into potential impact of proposed activities. While the KEFs can serve to focus studies and prioritise effort, consideration of impact on the Commonwealth marine environment outside the boundaries of the KEFs is still required.

Where the EMBA for a potential oil spill scenario or an area of interest coincides with an existing or proposed marine conservation reserve in Commonwealth or State/Northern Territory waters, titleholders should refer to the relevant planning and management documentation for information about the values of that reserve.

4.1.2 National Water Quality Management Strategy

The *National Water Quality Management Strategy* was jointly developed by two Ministerial Councils and provides detail around implementing a coordinated nationally-consistent water quality management system, based on input from the community to inform the setting of environmental values, management goals and objectives and criteria. The *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC/ARMCANZ, 2000) which are a part of the strategy documentation define the notion of 'environmental values' (EVs) as:

> the particular values or uses of the environment that are important for a healthy ecosystem or for public benefit, welfare, safety or health and which require protection from the effects of pollution, waste discharges and deposits. They include those values, which the local community and other stakeholders want to protect and enjoy now and in the future.

This notion of EVs is clearly relevant to oil spills and damage assessment and reflects key elements of definition of environment in the Environment Regulations (i.e. it covers ecological and social matters) and the intent of ESD (e.g. considers intergenerational equity).

ANZECC/ARMCANZ (2000) provides guidance on a 'default' set of EVs and suggests that all water resources (including the marine environment) should be subject to at least one of these, and in most cases more than one could be expected to apply. Default EVs that may be relevant to OSMPs are shown in Table 1. While, the default EVs provide a common high-level starting point for identifying the intrinsically important features of the environment that warrant protection from oil spills, for OSMP purposes it would be necessary to more-specifically define the component parts of the EVs that might be affected by spills and become the focus of monitoring.

Table 2 Environmental values that may be relevant to oil spill risk and impact monitoring

ANZECC/ARMCANZ (2000)
Aquatic ecosystems
Primary industries (e.g. aquaculture and human consumption of aquatic foods)
Recreation and aesthetics
Industrial
Cultural and Spiritual values

The EVs in Table 2 represent only a small part of the overall ANZECC/ARMCANZ (2000) framework for water quality management. Titleholders looking to apply the EVs approach to their activities are strongly encouraged to refer to the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Paper No.4* (ANZECC/ARMCANZ, 2000) in the first instance for more detailed guidance.

It should be noted that the Western Australian Government, through a community consultation process, has developed and spatially-defined interim EVs and Environmental Quality Objectives for the State's coastal waters on the northwest shelf (DoE, 2006), based on the national guidelines. Where relevant, titleholders should consider this information when identifying the features, and particular values and sensitivities of the environment that may be affected by their activities.

4.1.3 Other sources of information

Consultation with relevant stakeholders is an important element of the regulatory process under the Environment Regulations. It is another important means by which titleholders can identify important features of the environment (e.g. including social, cultural and heritage values) that may be vulnerable to an oil spill and should be taken into account when developing the OSMP. Consultation outcomes should therefore be carefully considered as an integral part of the OSMP development. Furthermore, consultation can assist in the identification of relevant standards, guidelines and codes of good practice and/or sources of existing environmental data, including baseline.

The Atlas of Living Australia (http://www.ala.org.au/) is an on-line resource that contains information on all the known species in Australia aggregated from a wide range of data providers. It provides a searchable database that may assist titleholders in identifying environmental features relevant to their particular activity and area of interest.

4.1.4 Conceptual models

The environments that may be affected by oil spills are extremely complex and may be comprised of many and varied features. In view of this, there may be considerable benefits associated with the use of tools that assist in the orderly assembly and consideration of knowledge about of how the environment is structured and functions, and how it might be affect by oil-associated stressors. Conceptual models offer one possible approach. Using a conceptual model to present information can help in the identification and prioritisation of sensitive receptors, interrelationships and potential responses of the environment to oil-associated stressors which and, in turn, inform development of the OSMP. It is not necessarily expected that titleholders would develop conceptual models and present them in the EP or OSMP. They are simply outlined here as a potential approach to identifying and assembling complex information about the environment for the planning of the OSMP.

An example schematic of a conceptual model is shown in Figure 3. It clearly identifies important environmental features and illustrates the level of detail that may be appropriate for those features. For each

feature, the model provides basic information relevant to the value, including its structure and function, and potential impact from an oil spill. The model in Figure 3 combines ecological and social features but if they are treated separately it may be necessary to consider how interactions between ecological features and social uses would be accounted for (e.g. effects of a spill on a fishery may be manifest through impacts on both ecological and social values of the environment).

As shown by Figure 3, a conceptual model developed for the purposes outlined above need not be overly complex, quantitative or produce empirical outputs. However, if they are applied then they should aim to capture key environmental features and processes at scales relevant to oil spill impacts. In this way, the model might reveal that some features would be at very high or low risk of impact and that some features may not be expected to be affected at all.

Conceptual models can also serve to identify where there are gaps in knowledge that need to be filled in order to predict and measure impacts or prioritise what to monitor. Under some circumstances it may be necessary to make assumptions to take account of knowledge gaps or predictive uncertainty. It is expected that any assumptions used in the design of the OSMP will be clearly stated and their implications evaluated.

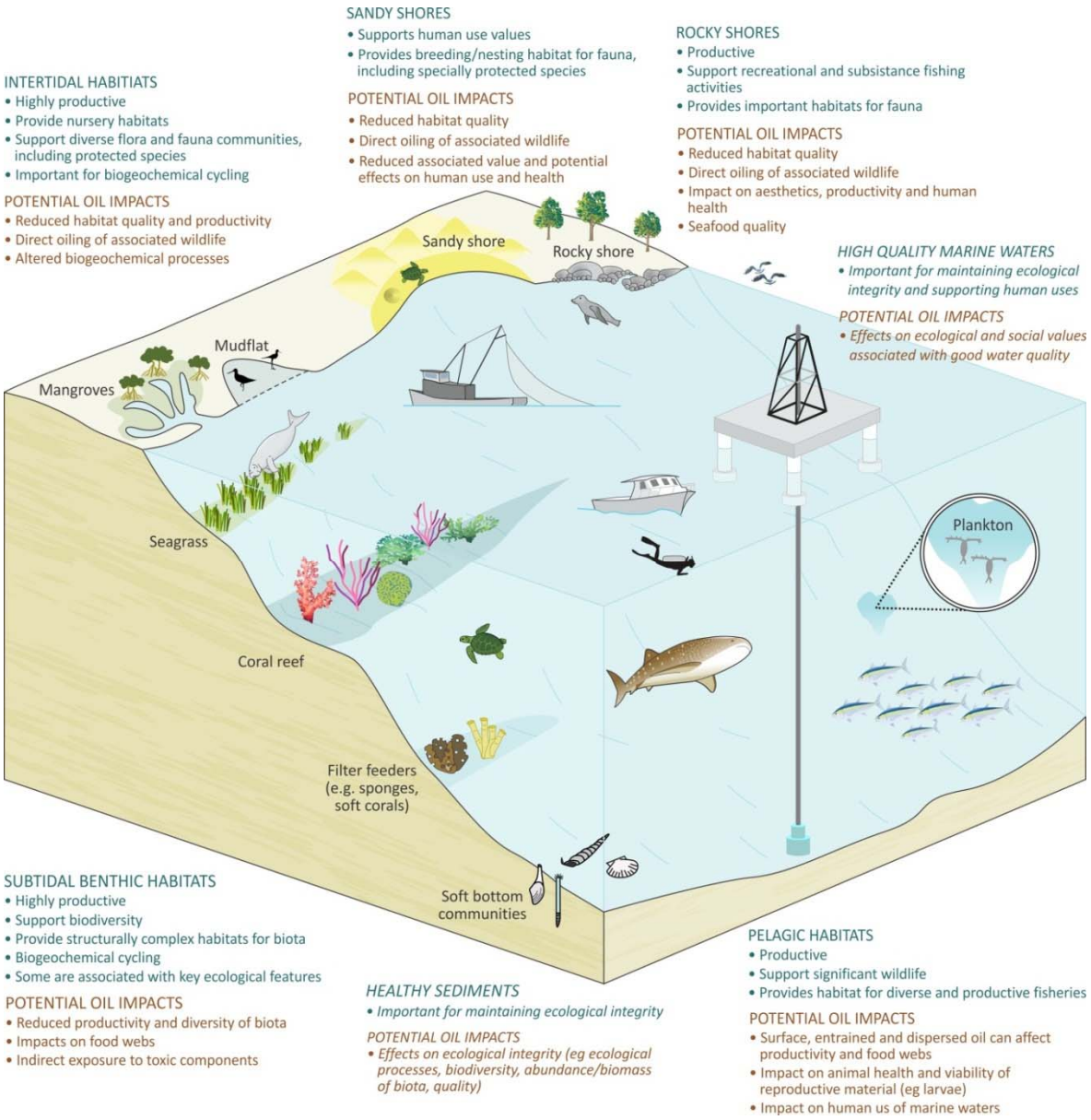


Figure 3 Example conceptual process model for oil spills

4.2 Environmental values and sensitivities

4.2.1 Physical and chemical receptors

Key physical and chemical features of marine ecosystems include light regimes, temperature, large and small scale oceanographic regimes, organic and inorganic carbon, oxygen status, nutrients, salinity and the range of biogeochemical and ecological processes associated with these elements. The physical and chemical features of an ecosystem strongly influence the types of biota present and their key population processes such as survival, growth and reproduction. Furthermore, disturbance or modification of the physical and chemical components of marine ecosystems has the potential to significantly affect elements of ecological integrity, including environmental quality. Accordingly, the states of these features are often used as indicators of environmental quality and the ecological integrity (see ANZECC/ARMCANZ, 2000).

A consequence of hydrocarbons being released into the marine environment from an offshore petroleum activity primarily involves the contamination of affected marine waters and sediments, which in turn may degrade key elements of ecological integrity (e.g. diversity, abundance and biomass of biota), including environmental quality, particular levels of which are prerequisites for certain human uses of the environment.

Even though there are strong dependencies and intrinsic links between the physical and chemical features of the marine environment and its biological ecology and quality for human use purposes, physical and chemical features are sometimes overlooked as attention is placed on biological features. In many cases, this would mean that important information about the spill and its effects would not be collected. Accordingly, to address this gap, titleholders should identify the key physical and chemical features of the environment that could provide direct information about the state of environmental quality and other valuable information that may support inference concerning potential impacts on biological features and their ecology, and human uses. Relevant features should be addressed in the planning for the OSMP.

Further information about particular biological features of Australia's marine environment and why they are considered important and potentially warrant explicit attention within the OSMP can be found in Appendix 1.

The importance of considering physical and chemical components of the marine environment (e.g. the impact of oil-associated stressors on indicators of marine water and sediment quality) is discussed further in Section 5.

In general, when identifying the environmental values and sensitivities to be taken into account within an OSMP, titleholders should:

- aim to make the most of the information in various published resources and existing frameworks
- identify and consider MNES
- be mindful of and where appropriate apply the various tools (e.g. search tools) available
- note the information presented above that outlines considerations relevant to a range of biophysical receptors that may be relevant to an OSMP.

5 Oil in the environment

5.1 Cause and effect

In order to select appropriate indicators, prioritise the receptors that will be monitored, design monitoring programs and set triggers to achieve aims of the OSMP, it is necessary to have an understanding of the way the spilled oil and response strategies interact with receptors to cause impacts.

Cause-effect relationships for potentially-affected environmental features use existing knowledge to describe how oil-associated stressors would be expected to interact with and impact parts of the receiving environment. They can be logically extended to describe recovery processes and trajectories for impacted receptors. However, it is important to note recovery (if it occurs at all) may not simply proceed in a reverse direction along the cause-effect pathway. In view of this, titleholders should be mindful it may be necessary to monitor different indicators to assess impacts and measure recovery.

In this paper, 'cause' is the physical and/or chemical presence of an oil-associated stressor (including co-occurring contaminants and spill response interventions) in water or sediment to which a receptor may be exposed. Receptors in this case may be ecological (e.g. biota, an ecological community such as a coral community) or social (e.g. a heritage site, human use of the environment that depends on a certain quality being maintained) features or values of the environment.

At the other end of the cause-effect relationship, an 'effect' is any adverse impact to receptors which occurs in response to exposure to the oil-associated stressor. The response to a stressor may include both direct effects (e.g. toxicity to marine biota and oiling of wildlife, oil contamination of seawater rendering it inappropriate for use in cooling or desalination processes) and indirect effects (e.g. interruption of food chain linkage and habitat contamination, impact on a fishery due to effects of oil on fish stocks).

Cause-effect relationships generally involve more than one discrete response in the receptor before an end point is reached. More often than not, as the degree of exposure (e.g. level and/or duration) increases, the associated cause-effect relationship involves increasingly more severe responses until the end point is reached. In general, full recovery from an end point is unlikely (e.g. mortality of biota, collapse or gross change of an ecological community or quality declining to a point where a human use is no longer supported or safe).

Cause-effect relationships can be used to guide the selection of monitoring indicators that are likely to show a response in the target receptor, deliver monitoring efficiencies and address the goal of a titleholder for environmental protection. For example, OSMP design may reflect a risk-based approach where, with good knowledge of the cause-effect relationship, it may be appropriate and efficient to focus monitoring initially on response indicators that lie early along the cause-effect pathway and signal only early warning signs of effect in the receptor. Under a risk based approach a shift in the focus of monitoring to response indicators located further along the cause-effect pathway would be triggered if pre-defined levels of response in the early warning indicator are breached.

Cause effect relationships also assist in the selection of appropriate monitoring indicators that minimise the risk of impacts going undetected or unmeasured. For example, it would be inappropriate to terminate an element of the OSMP before the time required for an effect to be realised has elapsed. Information about the timeframes for effects to occur can be gleaned from development of cause-effect relationships and this information can be used when establishing appropriate termination triggers for the OSMP.

Cause-effect relationships can also have application in operational response and management strategies by offering insights into potential effects and, how and when to arrest the cause of those effects before an end-point is reached to provide the best opportunities for recovery and effective adaptive management. In this way, cause-effect relationships may help identify operational response strategies (e.g. preventative controls or barriers) that could prevent potential adverse effects proceeding towards broad scale impacts.

The cause-effect relationships should be logical and scientifically defensible. Ideally they should be based on peer-reviewed science, though because knowledge of the marine environment and how it is affect by oil is far from complete, it is recognised that in some cases it may be necessary to apply professional judgement and

assumptions. Where assumptions are made, they should be documented and effort made to take the uncertainty they create into account in the design of the monitoring program. For example, where a high degree of uncertainty exists as to whether a receptor or indicator is best-suited to detecting and measuring impact, then multiple receptors or indicators should be monitored in an effort to address uncertainty.

The behaviour and fate of oil in the environment is complex and variable, depending on the properties of the oil itself and the conditions into which it is released. In view of this, and given that some understanding of oil properties and its environmental fate is a prerequisite for establishing cause-effect relationships for potentially affected receptors, there are some important things to know about oil when establishing cause-effect relationships. Some key aspects and processes include the:

- composition of oil associated stressors
- partitioning and weathering processes
- bioavailability.

5.2 Composition of the oil associated stressor

The composition of a crude oil or condensate is usually dominated by hydrocarbon classed compounds, which may include saturated hydrocarbons (aliphatic and alicyclic), unsaturated hydrocarbons (alkenes and alkynes) and aromatic hydrocarbons (monocyclic and polycyclic aromatics). Due to the broad range of petroleum hydrocarbon chemical species potentially present within a crude oil or condensate, the limitations for identifying and quantifying specific hydrocarbon classed compounds will be defined by the analytical methodology applied. For example, simple gravimetric-based methods are useful for screening the total concentration of heavier petroleum hydrocarbon compounds in a sample (i.e. $>C_{15}$) and will generally be expressed as a single combined concentration. However, gas chromatography-based methods may be required to separate, identify and quantify individual petroleum hydrocarbon constituents. Given the ecological risks for individual oil-associated stressor compounds will vary widely, identifying the chemical constituents to a greater resolution is considered more appropriate when monitoring potential impacts from specific contaminants of concern.

In addition to petroleum hydrocarbons, it is also important to consider the presence of non-hydrocarbon constituents which co-occur in the crude oil or condensate. Non-hydrocarbon classed constituents potentially present within an oil cover a wide variety of contaminants of potential concern. This may include non-hydrocarbon polar organic compounds (resin and asphaltene containing sulfur, nitrogen or oxygen), trace inorganics (including metals, metalloid compounds and radionuclides), major ions (such as salts and sulfur) and nutrients. Furthermore, the application of a chemical dispersants during a spill response may also be considered a non-hydrocarbon classed oil-associated stressor. Common examples of hydrocarbon and non-hydrocarbon classed contaminants of potential concern have been provided in Table 3.

Table 3 Examples of hydrocarbon and non-hydrocarbon classed oil-associated stressors

Oil-associated Stressor	Contaminant class	Examples of chemical species [1]
Petroleum Hydrocarbons	Aliphatic hydrocarbons (saturated)	n-alkanes, e.g. C_6-C_{36} (hexane – hexatriacontane, respectively)
	Alicyclic hydrocarbons (saturated)	mono-, di- and poly- cyclic alkanes, e.g. cyclohexane, decalin and cubane (respectively)
	Alkene hydrocarbons (unsaturated)	pentene, hexene, hexadecane, dimethylethylene
	Alkyne hydrocarbons (unsaturated)	methylacetylene, butyne, hexyne, decyne
	Monocyclic aromatic hydrocarbons	BTEX, e.g. benzene, toluene, ethyl-benzene, xylene
	Polycyclic aromatic hydrocarbons	PAHs, e.g. naphthalene, phenanthrene, fluoranthene, benzo(a)pyrene
Non-petroleum Hydrocarbons	Polar organic compounds	nitrobenzenes, phenols, propionic acid, pyrrole, thiophenes
	Chemical dispersants	potentially containing solvents and surfactants
	Metals and metalloids	arsenic, cadmium, chromium, copper, lead, mercury, nickel, vanadium, zinc
	Radionuclides	radium-226, radium-228, uranium-238, uranium-234, thorium-232, lead-201, lead-212, lead-214
	Major ions	bicarbonate, chloride, sodium, sulfate, potassium, sulfur
	Nutrients	ammonia, nitrogen (total, nitrite, nitrate) and phosphorous (total, orthophosphate)

[1] Note that examples of chemical species are not intended to be an exhaustive representation of the petroleum hydrocarbon and non-petroleum hydrocarbon chemical classes.

Identifying the potential risks and impacts associated with hydrocarbon and non-hydrocarbon contaminants of potential concern will also depend on the extent to which the oil-associated stressors partition between water and sediment phases within the receiving environment, i.e. dissolved, dispersed and particulate phases. Partitioning to dissolved, dispersed and particulate phases will strongly influence the bioavailability of a contaminant, i.e. the fraction of the contaminant available for uptake and assimilation by the biological receptor with the potential to cause an adverse effect. Factors such as the chemical speciation of the oil-associated stressor, and the biological receptor uptake exposure pathways, physiology and behaviour should be considered when attempting to understand the bioavailability of an oil-associated stressor.

5.3 General partitioning of the oil-associated stressor in the receiving environment

The distribution of oil-associated stressors within the ecosystem compartments (broadly defined here as the sea surface, water column, sea floor and the shoreline areas of emergent land) will be influenced by metocean factors and the physico-chemical properties of the oil. The spatial and temporal distribution of uncontained oil within the marine environment will depend on the volume released, type and physico-chemical characteristics of the oil (e.g. density, viscosity, asphaltene content, wax content), and the geographical location and timing (including seasonal weather patterns and oceanic conditions). However, the presence of oil in the marine

environment does not remain static, with natural weathering processes (such as evaporation, emulsification, spreading, physical dispersion, dissolution, biodegradation, precipitation, sedimentation and adsorption) and emergency response interventions (e.g. dispersant application, booming, in-situ burning) altering the physico-chemical properties of the spilled oil and subsequent distribution of dissolved, dispersed or particulate phases to the sea surface, water column, seabed and shoreline compartments of the receiving environment (Figure 4).

For example, lighter hydrocarbon fractions of the oil (e.g. volatiles and semi-volatiles) may evaporate to the atmosphere and/or dissolute into the water column as dissolved phases, reducing the total volume of oil at the sea surface. Non-hydrocarbon contaminants associated with oil (such as trace metals and metalloids) may also enter the water column as dissolved phases. By contrast, the formation of water-in-oil emulsions (often associated with heavier crudes containing wax, resin and asphaltene) may encourage persistence of the oil at the sea surface, potentially resulting in shoreline contact.

In addition to dissolution, oil may enter the water column as dispersed whole oil droplets (containing both hydrocarbon and non-hydrocarbon constituents) following physical disturbances such as wave turbulence, and response strategies such as the application of chemical dispersants. The dissolved and dispersed whole oil phases may then contact sub-surface features or shorelines where residence time in the water column is sufficient, or accumulate at the seabed following precipitation or adsorption to particulate matter in the water column (promoting sedimentation and deposition), or through direct contact with sediments at the seabed.

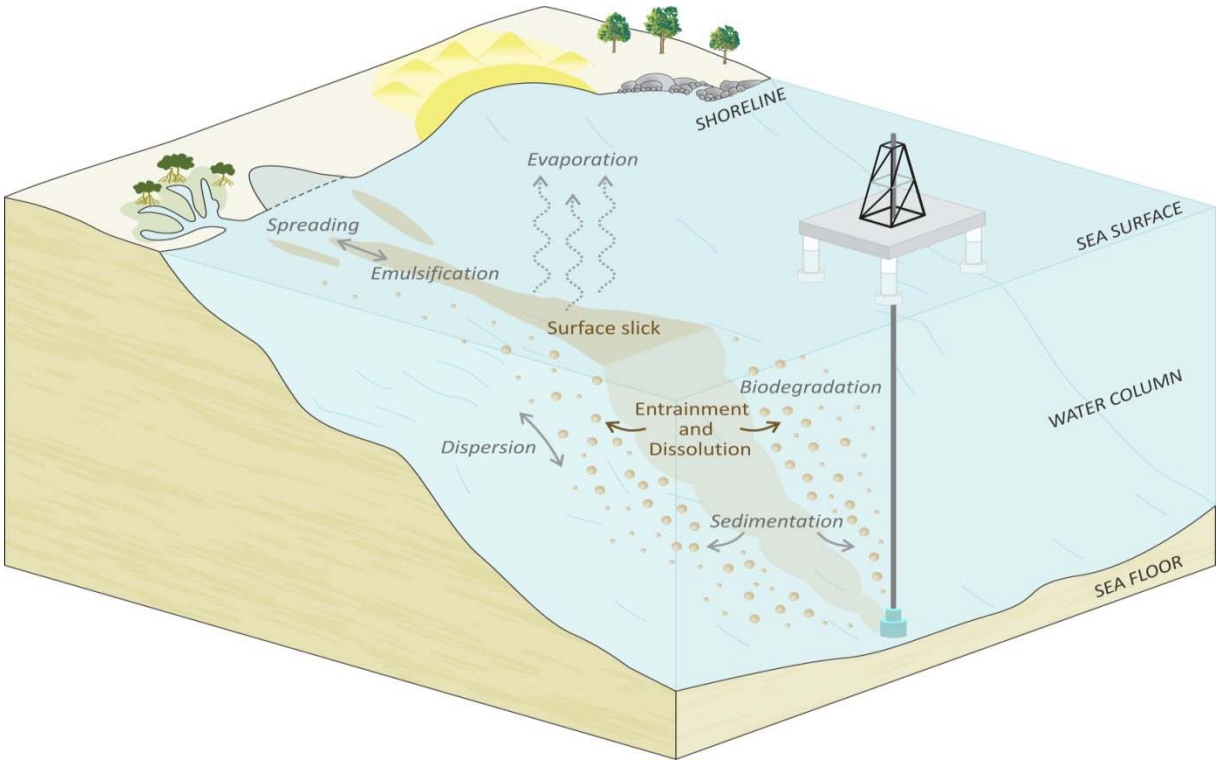


Figure 4 Weathering processes conceptual model

The extent of oil weathering and distribution to the sea surface, water column, seabed and shoreline is variable and will depend on the volume released, type and physico-chemical characteristics of the oil, as well as the seasonal weather patterns and ocean conditions. While these factors are acknowledged as being important for understanding the processes which influence the distribution of oil within the receiving environment, accurately identifying and quantifying the presence of an oil-associated stressor in the water and/or sediments should be a priority when investigating the cause of potential impacts to biological receptors.

However, identifying an oil-associated stressor in the water or sediment of the receiving environment does not necessarily indicate the presence of risk to a biological receptor. The potential for an adverse biological effect will depend on the bioavailability of an oil-associated stressor in the water and sediments.

5.4 Bioavailability of the oil-associated stressor

The bioavailability of an oil-associated stressor is defined herein as the fraction of the contaminant which is available for uptake and assimilation by a biological receptor with the potential to cause an adverse effect. The likelihood of an adverse biological effect occurring from hydrocarbon and non-hydrocarbon classed contaminant (present as a surface slick, or as dissolved, dispersed and particulate phase) increases with bioavailability.

- In general, knowledge of spilled hydrocarbons and how they may interact with, and behave in, the receiving environment is very important to ensure that predictions of impact and risk are sound and appropriate indicators are selected for inclusion in the OSMP.
- It is equally important to consider how response activities may affect the environment in order to target the OSMP appropriately.
- Cause-effect relationships offer one possible approach for selecting monitoring indicators.
- Composition, partitioning and bioavailability of spilled hydrocarbons are key determinants of how hydrocarbons will interact with the environment. These factors should be considered when planning an OSMP.

While some factors known to modify the bioavailability of selected contaminants have been well described, clear links to long-term biological effects are not fully understood with significant deviations from the estimated impacts frequently observed (Simpson and Batley, 2007; Driscoll and Burgess, 2007; Chapman et al., 2002; O'Conner et al., 1998; Word et al., 2005). The bioavailability of an oil-associated stressor will depend on (i) the chemical speciation of the contaminant, (ii) the organism exposure pathways, and (iii) the physiology and behaviour of a seabed organism. Further information on these three aspects of bioavailability is presented in Appendix 2.

6 Potential impacts of oil on the environment

The effects of spilled oil on environmental receptors are many and varied. For the purposes of planning a monitoring program to assess these effects, the likely impacts can be informed by previous oil spill incidents and experimental research. This information should be applied to the evaluation, prioritisation and types of monitoring activities planned for. In the ever developing field of petroleum exploration and production, consideration should also be given, however, to the development of monitoring programs to assess impacts that have not been previously investigated in line with the agenda of continual improvement. An example of this may be the effects of oil deposits on deep water filter feeding assemblages located in continental margin habitats or the effects of condensate on intertidal shorelines.

There are a number of ways to categorise the impacts of an oil spill on biota. At the highest level, impacts may be *direct* and immediate or *indirect* and manifest over the longer term. Direct effects include smothering by and inhalation or ingestion of the oil and occur in the short term i.e. days, weeks and months following a spill. Direct effects may also include not only the *physical* impacts of the oil itself, but also *chemical* impacts resulting from contact with the more toxic components of the oil stressor. In addition to the direct impacts of the oil itself and its toxic components, there may also be direct impacts related to the oil spill response activities, for example, the use of chemical dispersants in the open ocean, in situ burning of oil at sea, cleaning of shorelines and trampling of sensitive coastal habitats during booming and recovery operations.

Oil and spill response impacts may affect individual adult biota but may also impact different reproductive life stages such as eggs, larvae and/or juveniles. Impacts on reproduction may subsequently affect populations over medium (1 to 5 years) to longer (over 5 years) terms, essentially becoming indirect effects. Indirect effects include both ecological and social impacts. Indirect ecological impacts include, for example, effects on long term population viability, effects on food or habitats that support populations of other species, effects on

keystone or ecologically important species. Examples of social impacts include those that affect indigenous, tourism, heritage, fisheries, aquaculture, recreational or other human activities.

Information on potential direct and indirect impacts of oil on the environment is provided below with further detail provided in Appendix 3. This information is not intended to detail all of the potential impacts. Rather, it highlights some of the important ecological processes and environmental receptors that may be impacted to assist with the scoping of an oil impact evaluation process for a specific location.

6.1 Direct impacts

Biota known to be highly susceptible to the direct impacts of oil include those that primarily utilise the shoreline, sea surface and to some extent seabed compartments of the marine environment. Due to the nature of oil to float on water, mobile marine species may be able to avoid contact in the water column. Shoreline and seabed seabed flora and fauna are particularly at risk of physical contact with oil, especially those that occur in the intertidal zone where oil may be washed up, however previous incidents have also demonstrated the potential effects on seabed biota at depths greater than 50m. Marine birds, reptiles and mammals are also at high risk of oil contact due to their interaction with the sea surface for breathing and foraging. Slow moving fisheries species such as scallops and echinoderms, fish that show high fidelity to a site and sessile invertebrates, and fish constrained by aquaculture cages will be more susceptible to direct oil exposure than free swimming pelagic fish. Biota may also come into direct contact with the toxic components of oil contaminants via slow leaching from sediments on the seabed or shoreline, contact in the water column, or contact at the sea surface where inhalation of fumes can also occur. Contact with physical or chemical components of oil may result in mortality.

In addition to lethal effects, physical or chemical contact with oil may result in sub-lethal effects such as reduced growth, increased susceptibility to disease, reduced reproductive viability of adults, and mortality of eggs, larvae or juveniles, all of which may affect long term viability of populations. Many marine species including plants (e.g. mangroves, macroalgae), invertebrates (e.g. rock lobster, echinoderms) and fishes (e.g. tuna, reef fish) have pelagic eggs and/or larvae that float on or swim close to the sea surface rendering them susceptible to direct contact by oil even where adults are unaffected. Species that undergo mass spawning at specific locations and times, for example corals, sea cucumbers or fishes such as snappers and groupers, may be susceptible to loss of a cohort, which may be an issue for commercial species. Given that many different types of biota reproduce during a 'reproductive season' that is common across taxa, the sub-lethal effects of an oil spill on biological receptors is likely to be exacerbated if it occurs during the reproductive season of the area of interest.

As well as the impact of the oil itself, the response activities designed to mitigate the oil damage may have impacts of their own. Laboratory studies indicate that dispersants and dispersed crude oil together may be more toxic to corals than water soluble fractions of crude oil (Negri and Heyward 2000), and can increase the risk of PAH toxicity to nektonic fish (Ramachandran *et al.* 2004). It has been reported that dolphins have moved under booms, then surfaced and fed in oil affected water (see Ragen 2010), possibly because fish may be aggregated there. Physical mitigation activities may result in seagrass plants being torn or pulled out by vessel propellers and boom anchors or suffer other physical damage from trampling, vehicles and boat activity in shallow water (Premiam 2011). Rocky shore assemblages have previously been severely impacted by shoreline clean-up activities including shoreline cleaning with detergents, high pressure or hot water washing and scrubbing (IPEICA 1996). Recovery of these habitats ranged from a few years to a decade meaning that there may be a requirement for long-term monitoring of the impacts of the oil response. Certainly for sensitive saltmarsh assemblages, it is thought that clean-up activities may do more environmental damage than the spill itself (Premiam 2011). During the planning stages for an OSMP consideration should be given to monitoring of impacts that result from response activities as well as the oil itself.

6.2 Indirect impacts

While direct impacts are those where oil affects organisms, indirect impacts are where oil affects the ecosystem, which then affects organisms. Over the long term, oil spill impacts on individuals can have consequences for populations which may not become apparent until a considerable period of time has elapsed after a spill. Higher rates of mortality and reduced reproductive potential can have negative impacts for the

size and structure of animal populations' years from the spill incident. The severity of population-scale impacts will depend on a number of factors including: the magnitude of immediate impacts of the spill and response activities; the persistence of oil and oil-dispersant mixtures in the environment and their ongoing potential to cause negative effects on individuals and the components of the ecosystem on which those animals depend; and the inherent potential for populations to recover. Where populations of keystone habitat or food species are impacted, this can have flow on effects for other species present in the ecosystem. Subsequently, indirectly impacted species are also candidates that should be considered for scientific monitoring in the event of an oil spill. Flow on effects may also impact human users of the environment such as indigenous hunters, tourism operations or the fishing industry.

- The design of OSMPs should take into account that hydrocarbon spills may have wide range of direct and indirect impact.
- Direct and indirect impacts suggest the need for careful selection of indicators, spatial scales and timeframes in the design of an OSMP.
- Consideration should be given to the need for the OSMP to target both ecological and socio-economic receptors.

7 Monitoring design considerations

Where a high degree of confidence in a cause-effect pathway can be demonstrated, it may be possible to justify a risk-based monitoring design, which focuses initially on relatively easy to measure early warning indicators of potential effect that are situated early along cause effect pathway. For example, if effects of hydrocarbon contamination of shoreline sediment on the health of shorebirds are well understood, it may be possible focus monitoring initially on an early warning indicator of potential effects such as the concentrations of hydrocarbons in sediments at a number of depths and locations along shorelines. Fingerprinting of detected hydrocarbon material may also be considered. With this approach and by monitoring appropriate indicators with a robust experimental design it may be possible to conclude that impacts to steps further along the effect pathway are highly unlikely. Conversely, if monitoring data from measurement of early-warning indicators suggest uncertainty regarding further ecological effect, under a risk-based approach it may be necessary to step along the cause-effect pathway to include monitoring of more definitive indicators of the ultimate ecological impact. Decisions to step along the cause-effect pathway should be based on clear pre-defined criteria that reflect risk and scientific uncertainty regarding impact.

An alternative to the risk-based approach is to immediately and simultaneously focus monitoring on multiple indicators of effects. This approach would be particularly warranted where confidence in a cause-effect relationship is low or marginal, and/or the environmental receptors are particularly highly valued. Such an approach might involve rapid and simultaneous implementation of hydrocarbon contamination assessments, biota health and habitat condition monitoring and initiation of population studies.

Several approaches could be taken to select an overall framework for monitoring design to address the aims of scientific monitoring. Two approaches only are discussed briefly above. It should be noted that the information presented here serves to illustrate that different approaches can be considered and that scientific uncertainty/predictive confidence should be a key factor in decision-making with respect to the overall approach for OSMP design.

7.1 Key concepts for water and sediment quality assessment

In the event of an unplanned release of oil into the marine environment, the extent, severity and persistence of environmental impacts from the oil-associated stressors should be evaluated. A critical component of the initial monitoring response is an investigation of the distribution and bioavailability of the oil-associated stressor within water and/or sediments of the receiving environment (as described in Sections 5.3 and 5.4, respectively). This may be achieved using an established water and sediment quality assessment framework to demonstrate the presence or absence of environmental impacts.

Water and sediment quality assessment guidelines aim to define the extent of environmental risk through considerations of acceptable contaminant concentrations in the receiving environment. In Australia, the ANZECC/ARMCANZ (2000) water and sediment quality guidelines outline a flexible framework for examining the impacts and risks from an environmental stressor. Within the context of an of an oil-associated stressor, the framework may be adapted to consider chemical characterisation, ecotoxicology, biodegradation and bioaccumulation potential, and ecological community patterns as effective measures of an environmental impact. The OSMP should make allowance for further impact assessment following the identification of an oil-associated stressor in the water or sediments of the receiving environment. This may include an expansion of the chemical characterisation to consider the bioavailability of an oil-associated stressor using ecotoxicological testing.

It is also important to note that while several oil-associated stressors may be present at concentrations below the acute, sub-lethal or chronic biological effect thresholds (i.e. below the concentration at which an organism exhibits toxicity), the potential risk of contaminant persistence should not be discounted. The potential for an oil-associated stressor to biodegrade and bioaccumulate in the marine environment should be evaluated.

Certain contaminants which are available for bioaccumulation within an organism may also undergo trophic transfer up food chains and biomagnify (i.e. increase in concentration through three or more trophic levels). Common examples of contaminants present in crude oil or condensate with the potential for biomagnification may be include lipophilic organic contaminants such as PAHs (including PAH metabolites), and organo-metals such as methyl-mercury. The persistence of an oil-associated stressor should be monitored closely when assessing long-term environmental impacts.

Further information on these topics is presented in Appendix 4.

7.1.1 Ecological community assessment

Ecological communities are a critical component of the marine environment and influence surface productivity, the physical and chemical condition of the water column and sediment, and provide food sources to higher trophic levels (Gaston et al., 1998). The impacts of contaminated water and sediments on ecosystem community health may be measured directly through the examination of differences in communities between impacted and reference locations.

The purpose of an ecological assessment is to identify whether any components of the community have been adversely impacted by the contaminants identified in an area of interest. The underlying assumption of ecological assessment is that the oil-associated contaminants can induce stress that will affect the community structure and stability. The intimate association of a faunal group with the water or sediment means that any adverse effects to individuals resulting from oil-associated stressors are well-reflected in detrimental changes to the structure of their assemblages. Unlike short-term water or sediment toxicity tests, which generally measure acute or sub-lethal endpoints, more subtle and often undetected effects on reproduction and fecundity resulting from long-term chronic exposure to an oil-associated stressor can be more sensitively demonstrated from an examination of the ecological community (Chariton et al., 2010).

While ecological community assessments are a key consideration for assessing impacts from an oil-associated stressor, a more detailed discussion of seabed flora and fauna, fish and fisheries and wildlife has been provided in Appendix 3. The aim of chemical characterisation, ecotoxicology, biodegradation and bioaccumulation studies are to better define the ecological risks and impacts from an oil-associated stressor in the receiving environment, and provide scientifically defensible evidence supporting observations from the ecological impact assessments.

7.2 Selection of biological indicators

The next step in monitoring program design involves selecting the actual biological and ecological indicators that will become the focus of the OSMP.

Since the environment is extremely complex and the areas of interest potentially large, it is not practicable or even possible to measure every possible biological and ecological response variable in the environment, even for a single issue like an oil spill. However, where an oil spill is predicted to affect a KEF as identified by the

Commonwealth bioregional marine planning process, the characteristics that defined the KEF may lend themselves to be biological indicators for monitoring purposes. Indicator species also provide a practical way to track the response and recovery of the environment to an oil spill. Selecting the right indicator species is a critical part of monitoring program design and is fundamental to ensure that the program will achieve its overarching aim(s). Moreover, since the process of selecting the right things to monitor is so critical, to impart confidence in monitoring it is important that the selection process itself is logical and scientifically sound. Conceptual environmental process models and cause-effect pathways offer approaches to effectively guide and prioritise the selection of relevant and appropriate indicators for oil spill environmental monitoring. Selecting the right indicators to monitor is a key to success of a monitoring program that aims to determine magnitude of impact from an oil spill. It is recommended that the use of subject matter experts be consulted for the all aspects of the OSMP including selection of indicator species.

Selection of appropriate species should consider a number of factors, probably the most important being the selection of species that are sensitive to oil exposure and likely to be exposed to oil spill impacts owing to their location both vertically in the water column but also in the area of interest, food sources, site attachment etc. They should also have a wide distribution and sufficient abundance to permit efficient data collection and have a sufficient historical baseline data for the area of interest to allow pre- and post-spill comparison. The degree of reliability in taxonomic identification should also be considered, and this will vary with taxa and methodology. There is a substantial literature on the choice of species for monitoring programs, and these can be used to guide approaches (e.g. Freegard and Williams 2009, PREMIAM 2011). Furthermore, a review of effective biological indicators from previous spills e.g. bioaccumulation in bivalves, changes in the abundance of hydrocarbon degrading bacteria or exposure biomarkers in fish can be used to support choice of indicators in monitoring plans.

Where there is less confidence in cause-effect relationships or impacts are greater, it is likely that a greater number of species will need to be selected for environmental monitoring. Changes in community structure resulting from a spill impact would require the monitoring at an assemblage level for parameters such as species richness, diversity, abundance, biomass, health or percentage cover. Furthermore, most assemblages do not occur as monospecific aggregations, but are inherently mixed even at the habitat-forming level e.g. filter feeding assemblages of sponges, soft corals, ascidians (Heyward et al. 2010a), habitat mosaics of seagrass, macroalgae and corals (Heyward et al. 1997b, Heyward et al. 2010c). Ideally a number of species varying in their susceptibility to oil stressors should be investigated, and one approach may be to monitor ecological parameters of an assemblage such as species diversity (which requires estimates of both species presence and abundance) but to also focus on a number of indicator species to obtain in depth information about the impacts of oil on population parameters and individual health. Indicator species need to be chosen taking into consideration factors such as their functional importance, sensitivity and social importance, the knowledge base upon which the monitoring program can rely e.g. previous ecotoxicity studies or other relevant factors.

7.2.1 Habitat formers

Seabed flora and fauna are commonly an appropriate target for monitoring after an environmental impact for a number of reasons, including their importance in establishing indirect impacts (Section 8.2.1). They are sometimes long-lived and therefore integrate environmental change over long periods of time (e.g. corals, mangrove trees). They are macroscopic and sessile, which means they are relatively easy to sample quantitatively, and as a result have been well-studied scientifically and therefore have coarse taxonomic keys available. Their community structure often responds in a predictable manner to known environmental impacts i.e. variation in the abundance, diversity and distribution of organisms, and therefore the results of change can be interpreted with a degree of statistical confidence. Furthermore, there may be direct links with commercially valued resources such as fisheries, which provides added incentives for monitoring.

7.2.2 Keystone species

Keystone species have a substantial effect on the ecology of biota in an area. In some circumstances, monitoring these species can infer health of the ecosystem or the status of other species because the keystone species manages the population numbers of other species at the location. Understanding keystone species

requires exceptional knowledge of the ecosystem and the interactions between species and the environment over time. Some examples of species thought to be keystone species include: the Western rock lobster that is thought to be a species with a regionally important trophic role in the south-west marine region (Department of the Environment and Water Resources 2007), coral reef fishes such as batfishes (Bellwood et al. 2006) and triggerfishes (McClanahan 1995), which are thought to influence algal growth and the abundance of urchins respectively and grapsid crabs, which have numerous effects on mangrove ecology such as community composition, sediment characteristics and nutrient recycling (Lee, 1998). They may range from apex predators to a prey type with an exceptionally large biomass. All of these species have significant roles in an ecosystem, and an oil spill impact that affects them may have long term consequences on their community (see Section 8.2.2). Consideration of ecological functions and processes are required in determining the importance of individual species.

7.2.3 Rare, threatened, endangered and iconic species or habitats

Monitoring wildlife species that are the subjects of recovery plans is likely to be important, since impacts from an oil spill are likely to be contrary to objectives of the relevant recovery plans. Furthermore, monitoring species that are the subjects of international conventions/agreements to which Australia is a signatory or party would demonstrate commitment to obligations to protect the listed species. A small number of species of seabed flora and fauna are protected under legislative frameworks such as the EPBC Act. Examples of these include listed threatened or vulnerable species e.g. Tasmanian sea stars, *Marginaster littoralis* and *Patiriella vivipara* and listed threatened ecosystems e.g. Giant Kelp Marine Forests of South East Australia. A number of Australian marine wildlife and fish species are listed as threatened fauna including Critically Endangered, Endangered, Vulnerable and Conservation Dependent including species from a number of taxonomic groups such as sharks, seasnakes, seabirds, whales, turtles and fishes. Furthermore, the incidence of any listed species relevant to the EPBC Act in the area of interest should also be investigated for OSMP purposes, as many of these are also iconic species (e.g. seals and sealions, turtles, dugongs, whales and dolphins or habitats such ascoral reefs as discussed in Section 8.2.3). The KEFs identified through the Commonwealth marine bioregional planning and described in the Conservation Values Atlas, should also be considered to guide the focus of monitoring in view of their important in relation to the Commonwealth marine area.

7.2.4 Sentinel and sensitive species

Indicator species chosen may be so-called sentinel species, which are sensitive and therefore an early warning system of an impact. Amphipods (e.g. *Ampelisca spp*. a filter-feeding tube-dwelling species,), filter feeding bivalves (e.g. *Ensis spp*. (razorshells)) and burrowing urchins (e.g. *Echinocardium cordatum* (heart urchin)) have been identified as the main casualties at a number of oil spills in the northern hemisphere, washing up on the beaches after spills. Densities of *Ampelisca spp*. were dramatically reduced over large areas of seabed following the Amoco Cadiz spill, and populations took 15 years to return to pre-incident levels (Dauvin, 1998). A similarly widespread impact was shown after the Sea Empress spills. Growth inhibition after one day of oiling in the brown alga *Fucus vesiculosis* led Wrabel and Peckol 2000 to suggest it to be a potential indicator species, and *Fucus gardneri* was also affected by the Exxon Valdez spill (Stekoli and Deysher 2000). Similarly coral species differ in their tolerance to disturbances (Yee et al. 2008; Golbuu et al. 2008) and these studies could be used to inform the choice of sentinel species for an assemblage. Good background knowledge of the species in general, as well as it's ecology in the area of interest will be required prior to use as an indicator.

Species may also be chosen according to hydrocarbon uptake. Hydrocarbon uptake potential in marine species will be influenced by feeding methods (e.g. greater in filter feeding species such as mussels), duration of exposure (i.e. highly mobile species less susceptible to oil exposure) and trophic level (greater uptake potential in higher trophic level fish, e.g. Xu et al. (2011)). Previous studies on hydrocarbon uptake (e.g. Nandini Menon and Menon 1999, Watts et al. 2006, Cheney et al. 2009) can potentially be used to inform decisions about choice of sensitive species as well as measurement thresholds.

7.2.5 Ecotoxicological knowledge

Prior knowledge of ecotoxicology can also be valuable in choosing indicator species. Where there is confidence in cause – effect pathways, the titleholder will have more flexibility in selection of indicators (multiple lines of evidence to choose from). This allows titleholders to match the level of monitoring effort with the level of

environmental impact. An example of this flexibility and efficiency is the application to monitoring oil effects on mariculture production. If appropriate eco-toxicity studies were available to add confidence to cause-effect relationships in cultured species, water quality (in terms of oil concentration) could be an appropriate indicator of effects, providing an appropriate 'trigger' value (relating to an EC50 value for example) is set for implementation of fish monitoring. This would provide efficiencies as time and resource intensive fish monitoring would not be required unless oil concentration exceeded the trigger level. Furthermore, with appropriate water quality monitoring site selection, the program could provide early warning that oil concentration is reaching a level of concern and trigger additional management measures to protect sensitive resources.

For ecosystems in the northern hemisphere there is an abundance of published ecotoxicological methodologies using representative species of particular habitats that have been carried out in response to marine oil spills. Examples include periwinkles (*Littorina littorea*) (Livingstone et al., 1985), limpets (*Patella vulgata*) (Glegg et al. 1999), mussels (Livingstone et al. 1985, Lima et al. 2008a) microalgae (Gaur and Kumar 1981, Bratbak et al. 1982) and green algae (Tukaj 1987), shannys (*Lipophrys pholis*) (Lima et al. (2008b) and Santos et al. (2010), the common goby (*Pomatoschistus microps*) (Vieira et al. 2008). Many of the recommended baseline biomarkers can be modified or are equally relevant for a wide range of other fish and invertebrates, so the choice of species can be amended to what is readily available and may be different for a range of habitats. However, it should be noted that there is currently a poor understanding of ecotoxicology for tropical and deep water species and hence caution is required when using northern hemisphere species as standards. Pilot studies using locally relevant species should be considered.

7.3 Spatial and temporal variation

Monitoring programs need to be designed to collect information over appropriate spatial and temporal scales. Determining what constitutes an appropriate scale requires consideration of factors including the nature and scale of the spill, the associated area of interest and response activities, the at-risk resources and uses, and knowledge of likely impact and recovery processes. The environment varies on a hierarchy of temporal and spatial scales, as does use of particular parts of the environment by biota e.g. migrations, nursery habitats. Therefore it will be difficult to detect oil spill impacts due beyond natural variation unless concentrations of oil or chemicals are very high, hence the importance of monitoring at an appropriate scale. An understanding of metocean conditions and the likely scale over which effects may be spread is required in order to determine the correct scales for monitoring. Well thought out cause-effect pathways should offer some guidance in determining the appropriate scales of monitoring. Environmental spatial and temporal variation is especially important in the design of an adequate baseline data set and should be applied to initiation and termination criteria for the OSMP. Spatial and temporal variation is discussed in Section 8 on Baselines and Section 9 on Initiation and Termination Criteria, and is a crucial element in determining the success of any monitoring program.

7.4 Selection of monitoring techniques

The next important step in the monitoring design process is to determine appropriate monitoring techniques. It may be appropriate to review the literature generated following previous spills, both petroleum and maritime, to determine which monitoring techniques have been most effective. These should be capable of being implemented, when the need arises to detect and measure the magnitude of environmental response(s) in the indicators selected. This Information Paper will not attempt to outline all potential monitoring techniques, or evaluate which techniques are most appropriate. An evaluation should be completed for each monitoring activity required in order to select techniques that are fit-for-purpose. It is likely that a suite of different techniques will be required for the range of predicted causes and effects. Where the effectiveness of monitoring techniques in a specific environment is uncertain, the use of pilot studies should be considered. It is recommended that the use of subject matter experts be consulted for the all aspects of the OMSP including selection of monitoring techniques.

Some important items for consideration in the selection of monitoring techniques include:

- assessing the comparability with techniques used to collect available baseline data, especially where primary purpose for data collection was not directly related to oil spill impact assessment

- considering factors such as seasonality or particular times of day when monitoring is most appropriate and effective (for example, presence of migratory species may be seasonal and species such may display marked diurnal movement patterns)
- assessing the needs for, and securing, any conservation and animal ethics approvals before undertaking proposed monitoring
- providing assurance that techniques proposed will allow collection of sufficient numbers of samples to meet a high standard of scientific rigor, noting that the monitoring may be need to occur for some time following the spill to detect the less obvious effects of hydrocarbon contamination
- determining if the technique is suitable for the receiving environment (e.g. demonstrating that any risks posed by a particular technique do not outweigh the benefits of conducting monitoring in that way)
- with respect to maximising integration, evaluating whether techniques applied in operational monitoring and response activities provide data in a format and timeframe that allows it to provide timely context for scientific monitoring
- determining the requirements for subject matter experts required to implement certain monitoring techniques and in turn ensuring that those experts are available and operationally ready
- relevance of technique to applicable standards, i.e. where the intent, for example, is to compare hydrocarbon levels measured in shellfish tissues with available seafood safety standards
- will the technique provide data in a format and timeframe that allows a timely management response to mitigate further impacts, i.e. lead time for laboratory to provide result in relation to time till expected oil impact on sensitive resource
- whether appropriate non-extractive monitoring techniques are available to minimise the environment impacts of monitoring (e.g. use of video technique to measure fish population structure as opposed to trawl surveys, use of genomic techniques)

These items apply to the monitoring of all biological receptors, considerations more specific to the different kinds of biota are presented in Appendix 5.

7.5 Selection of potential impact and reference/control sites

Care needs to be taken when selecting monitoring sites to ensure that the distribution of sites is as representative as possible of the area of interest. The selection of sampling sites and spatial distribution of individual sampling points is best decided after detailed appraisal of baseline data from a sufficient number of sampling locations and times to provide information on spatial and temporal variability.

The process of choosing individual sampling points should consider a number of factors, including the particular oil-associated stressor being investigated, its effects on selected receptors, the variability in the indicators of interest, factors influencing that variability and the magnitude of variations which require characterisation.

Potential impact monitoring sites should be located within the area predicted to be impacted by credible spill scenarios and associated planned response activities. Their specific locations and distribution should be informed by the predicted behaviour and fate of oil, the likely response activities and the distribution of sensitive receptors. Sites should be positioned relative to the spill source to allow the full extent, severity and persistence of impacts to each sensitive receptor to be determined. As data from monitoring sites become available and are interpreted, if it becomes evident that some sites initially predicted to be influenced by the spill were actually not influenced in any way, a case may be presented for these sites to be transitioned into reference sites for the remainder of the monitoring program. Depending on the monitoring design, a modification of this nature can have the effect of increasing the power of the monitoring program to detect change.

Suitable reference/control sites should be as similar as possible to the associated potential impact monitoring sites, but be located to ensure they are not influenced in any way by the spill or response activities. In this way, data from reference/control sites provide information about the background condition of the environmental features being monitored at potential impact sites. In simple terms, data from suitable

reference and control sites serve as a basis for interpreting data collected at monitoring sites. Data collected from reference sites during a spill also serve to maintain contemporary baseline information to complement that already collected.

Titleholders should be mindful that spills which potentially influence very large areas, can present problems for establishing suitable reference sites due to the large geographic separation of un-influenced areas from potential impact monitoring sites. In these situations, adequate baseline data will be critical for ensuring that the monitoring program will achieve its overarching objectives.

There needs to be a degree of flexibility, and possibly redundancy, built in to the planning of potential impact and reference/control sites. This is to allow scientific monitoring program design to be adaptable to data coming in from operational monitoring, which documents key characteristics of the actual spill. Adaptability will ensure that data collected at each site can fulfil its purpose (e.g. to indicate impact or background conditions).

7.6 Replication, precision and power

A critical aspect of monitoring program design is to determine the number of samples required to achieve the objectives of the program. The variability inherent in natural systems gives rise to statistical uncertainty, which can be controlled by sampling an appropriate number of representative sites and taking an appropriate number of replicate samples at each site.

Insufficient site and sample replication can bias findings of monitoring programs in one of two ways. Type I errors are effectively false positive outcomes (an cause for concern when it is in fact not warranted) and Type II errors give rise to a 'false sense of security' when it is concluded that there is no effect when, in fact, there is one. Monitoring program design should aim to minimise Type I and Type II error rates and at the same time maximise cost effectiveness and scientific rigour.

Statistical power is a relevant consideration in this regard. In simple terms, statistic power is a measure of the likelihood that a monitoring program will detect an effect when there is an effect there to be detected. When statistical power is high, then the probability of making a Type II error is reduced.

Statistical power that can be achieved by a monitoring design is affected by the magnitude of effect the program aims to detect and the size of the sample used to detect it. Essentially, bigger effects are easier to detect than smaller effects, while larger numbers of samples tend to produce greater test precision than a small number of samples.

While power, replication and precision are key issues for consideration, it is strongly recommended that specialist statistical advice be sought on matters of experimental design and statistics.

7.7 Quality control

Quality assurance (QA) and quality control (QC) is a key part of instilling confidence in the program. QA/QC measures that should be considered include:

- establishing clear chains of custody, roles and lines of responsibility and processes for sampling, data collection, data entry/management, statistical analyses and interpretation
- maintenance of systems to ensure that those responsible for packages of work are appropriately qualified/accredited to do the work and are competent in the specific tasks
- maintenance of metadata
- processes for data backup, storage and archiving
- establishing process for regular review of the OSMP.

7.8 Data analysis and interpretation

There are no specific requirements for the use of particular data analysis tools or methods, however titleholders are encouraged to seek specialist advice in relation to experimental design, data analysis and interpretation matters during the planning phase to assure credibility of interpretation and that the objectives of the program can be achieved.

7.9 Peer review

Peer review, particularly for specialist or technical elements of an OSMP, is highly recommended at the drafting stage. The Montara Commission of Inquiry also found that monitoring programs should be subject to peer review. Peer reviewers should be suitably-qualified and well-regarded amongst their peers for work in the area they are being asked to review. Terms of reference for peer reviews should set out clear tasks and ideally be made available with the final OSMP, along with a peer reviewer's close out report that describes the degree to which the peer reviewer considers their comments have and have not been addressed. Titleholders should note that while peer review is considered a valuable process by the regulator, it does not remove the need for NOPSEMA to assess the full EP for compliance with the Environment Regulations.

Consideration should be given to the conceptual and technical information and principles presented in this section regarding monitoring design.

Application

Marine environments are inherently complex, diverse and spatially and temporally variable and it is therefore critical that appropriate levels of prior planning are completed to ensure that a rigorous monitoring program can be rapidly implemented in the event of an oil spill. If no or only very limited prior planning has occurred, it would be extremely difficult to implement a robust and scientifically sound monitoring program in an appropriate timeframe in an emergency situation. The following advice provides a possible approach to the practical application of an OSMP. With the planning and design work completed, a titleholder should be well placed to effectively mount an environmental monitoring response to an oil spill incident; however it is also important that appropriate system level measures (specific systems, practices, procedures, roles and responsibilities, competency and training) are in place to ensure that a titleholder is, and remains, ready to apply the program.

Titleholders should be prepared for requests from third-parties (e.g. Government agencies or parties acting for them) to facilitate access to areas near by a facility for the purpose of environmental monitoring. Titleholders are therefore strongly encouraged to include arrangements within the OSMPs to facilitate reasonable requests for such access, subject to the proper consideration of safety and other relevant matters under the OPGGS Act. Furthermore implementation arrangement for OSMPs should plan for higher expectations for transparency of findings than might have been the case in the past. Titleholders should plan to share findings of their OSMP as they become available with relevant authorities. Consistent with maintaining a social licence to operate, titleholders should also plan strategies for disclosing findings with relevant stakeholders.

8 Baseline studies and data

Various inquiries into the environmental management aspects of the Montara and Macondo incidents have found that a lack of adequate baseline data was among the major impediments to determining the environmental effects of the incidents. Accordingly, it is critical that performance in the area of understanding the pre-spill or baseline environment is significantly improved.

Titleholders should consider identifying and then to the extent possible, making the most of any overlap of the general information requirements for the EP and the OSMP (e.g. description of the existing environment and the evaluation of impacts and risks), when compiling baseline information. This should reduce duplication of effort and to help focus attention on the parts of the existing environment for which further baseline information is required to design and implement the OSMP. Notwithstanding, titleholders should be mindful that specific tasks may demand differing levels of detail. For example, while a relatively general level of baseline information about the structure and function of coral reefs within an area of interest may be adequate for impact and risk assessment purposes, considerably more resolute baseline ecological data may be necessary to design and implement coral reef monitoring elements of the OSMP. Where necessary, or if in doubt, titleholders should seek their own specialist advice on the specific baseline information requirements for various impact and risk assessment and monitoring tasks.

There are considerable benefits associated with having baseline data. Since natural systems vary in time and space due to natural events (e.g. tropical cyclones) or other non-spill related anthropogenic influences (e.g. climate change effects), good baseline data can allow titleholders to discriminate effects of a spill from change in the environment attributable to other factors. Similarly, investigations aimed at identifying chemical characteristics (e.g. finger printing) and toxicity of reservoir hydrocarbons at a number of stages of the weathering process should also be considered part of baseline studies. Data on the breakdown products, toxicity and predicted environmental fate of oil-dispersant mixtures are also likely to be valuable assets. For example, this type information would be useful for interpreting data from post-spill studies aimed at monitoring the fate and impacts of oil-associated, particularly in areas known for their natural hydrocarbon seeps where it would be important to have capacity to discriminate potential sources of any detected hydrocarbons.

In the following sections, general advice is provided on each of the topics above with a focus on their application to the design of scientific components of a fit-for purpose oil spill environmental monitoring program.

8.1 An adequate environmental baseline

Once key environmental values and sensitivities within the area of interest have been identified and indicators selected for the monitoring design, it is necessary to understand their baseline condition. Importantly, this evaluation of baseline environmental conditions should consider physical (e.g. water and sediment) as well as biological aspects of the environment and extend to socioeconomic values (e.g. human uses). A possible framework based on the use of conceptual process models and cause-effect pathways to link oil-associated stressors with responses in sensitive environmental receptors as a means of identifying indicators is outlined in Section 4.

While it is generally accepted that baseline environmental data is necessary to interpret environmental monitoring data in the context of natural variability, there are no specific criteria that signify that a baseline data set is adequate. This is hardly surprising given the vastness of Australia's offshore area, the diversity of environmental values that could be affected by a spill, the range of possible responses those values might display and the wide array of different techniques available for monitoring. Nevertheless general advice on what might reasonably constitute an adequate environmental baseline can be gleaned from general knowledge of the ecology of Australia's marine environment, the overarching aim(s) of the scientific element of an OSMP as well as relevant findings of the Montara Commission of Inquiry.

In all cases, titleholders should be able to demonstrate that their experimental design would allow environmental impacts arising from an oil spill to be detected and separated from natural variation. Baseline sample points should be representative of the receptor's distribution and there should be a sufficient number of sample points spread over a suitable area and timeframe to properly characterise spatial and temporal variability. Further, the indicators monitored for a given value should be relevant to that value's response to oil-associated stressors.

Scientific monitoring may require a multi-year commitment. Based on experience from previous incidents such as the Exxon Valdez spill, monitoring of wildlife populations for example has been occurring at varying frequencies since the spill in 1989. In view of this, adequate baseline data for the indicators to be measured by scientific monitoring is of utmost importance if the monitoring is to allow impacts to be detected and disentangled from natural variability in population parameters. It is acknowledged that long term data sets focussing on appropriate indicators are not easy to collect or readily available. It is common for titleholders to refer to data collected by others as forming a part of the baseline information on species and populations. While this is a generally legitimate approach to acquiring adequate baseline data, it is important to recognise potential limitations. For example, while existing data may focus on an indicator suitable to meet the requirements and standards of the original collector, this does not necessarily mean that data for that indicator would constitute an adequate baseline to support a fit for purpose OSMP.

As a general principle, an environmental baseline data set may be considered adequate if it would allow the titleholder to confidently detect spill effects in view of natural background spatial and temporal variability, and determine the extent, severity and persistence of oil spill impacts on environmental values and sensitivities relevant to the area of interest.

Overall, the success of the OSMP is dependent on a strong understanding of baseline environmental condition including information about the characteristics of reservoir hydrocarbons.

8.2 Natural variability

The natural environment and society's use of it is inherently variable. This environmental variability occurs over a range of spatial and temporal scales.

Knowledge of inherent spatial and temporal variability in the environment is required to ensure that monitoring activities collect appropriate data and those data are interpreted correctly. General considerations and sources of variability that may be relevant to the design and application of the OSMP, including associated baseline studies, are listed briefly below.

- Spatial Variation

Variation on general themes:

Habitats of a similar general type vary, sometimes subtly and sometimes grossly, in space across gradients of exposure, temperature, water depth and other environmental variables. Application of the OSMP, including baseline studies, should aim to prevent (or where prevention is not possible minimise) the influence of environmental variables such as those above from confounding the interpretation of monitoring data.

Small-scale patchiness:

Besides the larger scale and more obvious patterns of variation that can be evident in the distribution and abundance of marine flora and fauna, small-scale patchiness that results from variation in microhabitats may also need to be considered. Spatial extent and replication of sampling may help to control for the influence of small scale variability on monitoring data and its interpretation.

Vertical zonation/distributions:

The distributions, presence and abundances of marine biota often vary across environmental gradients. For example, biota and the associations they form vary across vertical gradients from the supratidal zone, through the water column and on the seabed with increasing water depth. Gradients in water temperature and light availability are key drivers of the types and distributions of biological communities present, while a water depth is important factor influencing commercial fisheries for example. Since the location of receptors along environmental gradients influences the risk of exposure to oil-associated stressors and the interpretation of monitoring data, spatial zonation may an important consideration for the design of many OSMPs.

- Temporal variation

Diurnal variation:

The time of day can be an important consideration for timing of sampling, particularly when abundance is a key indicator for some fauna species, to ensure comparability of data. Peoples' use of the environment also varies markedly between day and night.

Seasonality:

Many plant and animal species exhibit marked and readily-predictable seasonality with respect to their abundance, distribution and key ecological processes such as reproduction - aspects that influence a species' susceptibility to the effects of oil-associated stressors. Similarly, since socio-economic effects of spills can be strongly influenced by the time of year that impacts occur (e.g. impacts on strongly seasonal tourism or fishing activities). Accordingly, to ensure that appropriate indicators are selected and monitoring data are interpreted correctly, capturing seasonality will be an important design consideration for some receptors.

Inter-annual variability:

The shorter scale diurnal and seasonal variability introduced above almost always vary to some degree between years. Inter-annual variability in the environment may be influenced by large-scale climate processes such as El Nino-El Nina for example or longer term ecological processes such as succession. As a spill event is unpredictable, an understanding of inter-annual variability is important for interpreting monitoring data, particularly for indicators that might be monitored for some period of time following a spill event.

8.3 General approaches to conducting baseline studies

Planning to collect baseline data should always be complete well in advance of any spill occurring. This principle applies to baseline studies that are conducted well in advance of an oil spill and is particularly important for reactive baseline studies where timeframes for successful implementation might be short. A further design principle is that baseline studies should allow the natural spatial and temporal variability of sensitive receptors to be described at scales and using indicators relevant and appropriate to oil spill monitoring. Furthermore, as for all monitoring studies, titleholders should demonstrate a sound scientific basis for their baseline studies and describe selection criteria for impact and un-impacted control/reference sites. The scientific design, including site selection should consider the end use of the data in interpreting data collected through the OSMP. Operations are also encouraged to give attention to information in published

guidelines when planning surveys on specific groups of biota or species (e.g. EPBC Act policy statements and guidelines published at www.environment.gov.au).

Baseline environmental data may be obtained through desktop studies, dedicated field surveys or environmental monitoring programs conducted during routine operations. Strategic partnership arrangements might also be considered as a means of developing regional baseline understanding, including the maintenance of an up-to-date baseline.

For some locations or specific environmental values there may be sufficient existing and available data to justify a desk top study as the primary means of drawing together an adequate baseline data set. Some general points to consider when deciding whether existing data may be sufficient to justify a desk-top study include:

- assurances that existing environmental data are available and accessible
- confirmation that raw data are accompanied by appropriate metadata that describes how, when and why they were collected, who collected them and caveats that need to be observed
- considering the above, assessments of whether the existing data actually represent baseline conditions
- spatial coverage of data that includes the EMBA from largest credible spill scenario, and extends to outer parts of the area of interest where it may be appropriate to establish reference sites
- the time elapsed since data were collected and the potential risk that recent natural disturbances such as those associated with tropical cyclones will not have been accounted for
- appropriate temporal coverage to allow understanding of natural temporal variation at diurnal, seasonal and inter-annual variations as relevant
- considerations around whether the available data are directly related to what is being measured in the OSMP.

Where gaps in pre-existing data are identified, attention should be given to collecting data to address those gaps, with priority given to selected indicators for the OSMP relevant to the values/receptors considered particularly vulnerable to oil-associated stressors and ecologically and/or commercially important (IMO, 2009).

Attempts are often made to establish environmental baselines by conducting a one-off field program or by assembling information from other one-off field studies with a desk-top study. While a one-off study may be adequate to develop an understanding of the environment at one point in time, a single baseline study is, by definition, inadequate for determining patterns of natural temporal variability. For example, a one off baseline study will not characterise patterns of habitat utilisation by highly mobile or migratory species or the longer term changes to species, populations, communities and ecosystems that might occur in the face of climate change effects. One-off studies are also likely to fail to identify key ecological windows, such as readily predictable periods of the year or sites known to be important for key ecosystem processes (e.g. reproduction in corals fish and turtles) or social uses (e.g. aquaculture leases or commercial fishing areas). In principle, baseline studies should be designed with the scientific component of the OSMP in mind to maximise the utility of baseline data for achieving the overarching aim of the program.

Environmental monitoring conducted during routine operations (e.g. to determine whether environmental performance outcomes and standards are being achieved) can make valuable contributions to baseline data sets. Monitoring conducted during routine operations can serve to establish time series data and maintain up-to-date environmental baseline data sets for environmental values and sensitivities at reference sites that are not influenced by routine operations but which are predicted to be impacted by a spill. Data from routine monitoring may be particularly valuable in situations where the initial baseline data has coarse resolution or was collected with only limited survey effort. For example a time series of water quality data collected during routine operations at un-impacted reference sites can be used to derive site-specific water quality guideline values (i.e. using methods set out in ANZECC & ARMCANZ, 2000) which may be valuable for evaluating the performance of spill response activities or forming the basis of initiation/termination triggers for the OSMP.

While tactical activity-specific baseline studies can provide information that meets the standard of an adequate baseline, consideration may also be given to more strategic approaches to characterising the existing environment. Strategic approaches might involve partnerships or collaborative arrangements to allow cost and

data sharing. By bringing resources together from a number of parties, baseline studies may be able to be extended over larger regional or sub-regional spatial scales and for longer periods of time, than what might be achievable without pooling resources. Strategic approaches have the potential benefit of delivering more consistent data that may have broader utility. Truly collaborative programs can have benefits over more tactical activity-specific studies in that they can allow better characterisation of natural environmental variability and provide resultant data to each collaborating partner at a cost to each partner that may be comparable to the cost of conducting a series of local and less resolute short term baseline studies.

Developing an understanding of the variability of natural systems is best achieved though longer term baseline studies which, by definition, should be planned and executed well in advance of a spill occurring. However, there may be some environmental values for which titleholders might wish to present a case to substitute more proactive baseline studies with 'reactive' baseline studies. A reactive approach should generally be a last resort or used to update existing baseline data with 'up to the minute' information. A reactive baseline study would target at-risk sensitive environmental receptors and be conducted after a spill commences but before those receptors are exposed to any oil-associated stressor. In proposing a reactive baseline study, titleholders would be expected to demonstrate that relevant scientific issues have been evaluated and the approach is appropriate to the nature and scale of the activity. An example of one such issue would be provision for the proposed reactive baseline study to not only collect data on the receptor of interest, but concurrently demonstrate that the receptor not been exposed to an oil-associated stressor at the time data were collected. It may also be necessary to consider contingency measures in the event that the receptors of interest are shown to have been exposed to an oil-associated stressor. Similarly, titleholders would also be expected to carefully appraise practicalities and logistical issues that are key determinants of the success of a reactive baseline. For example, travel/mobilisation times for people and equipment, and access to certain areas (e.g. for health and safety reasons) should be carefully considered as these issues have potential to compromise the ability of a reactive program to provide adequate baseline data. With these issues in mind, titleholders should expect particular scrutiny of cases to conduct reactive baseline studies in remote or particularly sensitive areas. In presenting their case, titleholders should be mindful that the same general adequacy principle that applies to more proactive baselines should also be applied to reactive baseline studies – effectively that pre-impact environmental data should be adequate to allow the titleholder to detect environmental impacts attributable to an oil spill and disentangle impacts from natural temporal and variability.

8.4 Water sediment quality baseline considerations

The availability of robust water and sediment quality baseline data is a basic requirement when investigating a potential ecological impact from an oil-associated stressor. In the context of water and sediment quality monitoring, an evaluation of the distribution and bioavailability of an oil-associated stressor should consider key concepts such as chemical characterisation, ecotoxicology, biodegradation and bioaccumulation using a variety of both laboratory-based simulations and field-based studies. Planned environmental monitoring activities that are informed by baseline data will improve incident response time and greatly enhance monitoring efficiency by minimising unnecessary (and potentially costly) field based activities.

An important prerequisite for undertaking water and sediment quality baseline studies is prior knowledge of the oil-associated stressor, although often the reservoir specific crude oil or condensate may not be available, e.g. exploration drilling activities. Under such circumstances, a suitably representative analogue (in association with relevant literature) will provide equally useful information, however the baseline studies should be updated using the actual reservoir specific hydrocarbon product, when this material becomes available. The type and complexity of the baseline studies will also depend on considerations for the nature and scale of the activity (see Section 15).

Robust baseline studies incorporating key concepts such as chemical characterisation, ecotoxicology, biodegradation and bioaccumulation provide useful information regarding the fate, toxicity and persistence of an oil-associated stressor in the water and/or sediment. Examples of water and sediment quality baseline studies may include (though are not limited to) background water and sediment quality surveys, simulated weathering studies with dispersant efficacy testing, and deriving reliable species protection trigger values. The availability of baseline data will provide greater confidence for evaluating impacts in the event of an oil spill and may assist with prioritising appropriate monitoring activities. The following examples have been selected

to demonstrate studies which provide useful information for evaluating the distribution and bioavailability of an oil-associated stressor in water, sediments and biota

8.4.1 Background water and sediment quality

Hydrocarbon and non-hydrocarbon oil-associated stressors released into the marine environment will partition to the water and/or sediments within the ecosystem compartments. Establishing the existing background levels of an oil-associated stressor in the water and sediment provides a useful reference for determining the extent of distribution, change in environmental concentrations, and potential risk to biological receptors exposed within the area of interest.

The analysis of target analytes in the baseline field survey should be quantitative to allow direct comparison with post spill levels. However, semi-quantitative methods may be acceptable for the purposes of screening and identifying the oil-associated stressors when characterising a crude-oil or condensate. Similarly, where a baseline field survey is unavailable or out-dated, a semi-quantitative approach may be useful for determining the presence or absence of oil-associated stressors in the water, sediment and biota for further investigation.

Detailed further reading on baseline water and sediment quality and various approaches is presented in Appendix 5.

8.5 Maintaining the baseline

As noted earlier, since large scale influences such as large scale climate variability or extreme weather event can affect the baseline condition of the environment, maintaining a current baseline can be very valuable for correctly attributing potential causes of change. If for example a marine oil spill occurred around the time and in the vicinity of a large coral bleaching event, in the absence of supporting data observers may suggest that bleaching of corals occurred as a direct result of the spill. However, up to date baseline data for sea water temperature and regional reef health, would provide a strong line of evidence to suggest that observed coral bleaching is unlikely to have occurred as a direct result of the spill and more likely to be a result of thermal stress for example. Notwithstanding, effects of the spill may influence the capacity for and rate of recovery from bleaching.

There are a number of means by which titleholders could consider maintaining an up to date baseline. As already mentioned, environmental monitoring during routine operations can be used to develop time series data and in doing so provide contemporary empirical data on the condition of the environment. Similarly, strategic data acquisition programs can also provide for longer-term surveillance of the environment than might be possible under a localised activity-specific study. Data sharing among users of the environment can also help maintain a contemporary baseline data set, but careful consideration needs to be given to methodological and data consistency issues to maximise utility of shared data. Finally and also as already discussed, reactive baseline studies can be considered for providing very up to date pre-impact information, if well justified.

Environmental baseline data set may be considered adequate if it would allow the titleholder to confidently detect spill effects in view of natural background spatial and temporal variability, and determine the extent, severity and persistence of oil spill impacts on environmental values and sensitivities in affect parts of an area of interest.

As a general rule, studies designed to establish an adequate environmental baseline should be planned and executed well in advance of any spill occurring.

Proactive baseline studies may be desk top, field-based or utilise other monitoring data (or be a combination of these approaches) and should aim to define natural spatial and temporal variability of sensitive receptors at relevant and appropriate scales.

Titleholders may consider presenting a well-supported case to justify 'reactive' baseline studies where there are inadequate baseline data.

Baseline studies should consider the benefits in the OSMP have a multiple-lines-of-evidence approach to measurement of impact.

It is important to maintain an up to date baseline data set.

9 Initiation and termination triggers

The OSMP should include initiation and termination triggers for the various elements of environmental monitoring. These may be empirical values or narrative statements that relate directly to the threats that an oil spill would pose to environmental features, sensitive receptors or an environmental performance outcome set in the EP. In all cases, initiation and termination criteria should be specific to stressors and receptors, measurable and have a time component.

The description of the environmental values and sensitivities and evaluation of impacts and risks that is set out in the EP should provide valuable context for the setting of initiation and termination criteria for inclusion in the OSMP. For example, triggers may reflect a defined level of protection for environmental values and/or achievement of appropriate environmental performance outcomes and standards that are identified in the EP. Alternatively, they may be informed by a detailed description of the baseline or another suitable reference conditions

When setting the triggers, careful consideration will need to be given to ensuring that appropriate information would be available to allow assessments against the triggers. This is particularly relevant where triggers for initiating elements of the scientific monitoring are based on findings of operational monitoring. In these cases, titleholders should ensure that the relevant components operational monitoring are sufficiently rigorous to minimise the chance of not triggering scientific monitoring when in fact it should have been triggered (i.e. a Type II error).

Initiation triggers for scientific monitoring may not always rely on empirical data from operational monitoring. In some cases it may be appropriate to initiate scientific monitoring based on the nature and scale of the spill event itself or decisions to implement a particular response activity. For example, depending on the nature and scale of a credible spill scenario or how events play out on the day, it may be appropriate for initiation triggers for all scientific monitoring elements of the OSMP to be simply based on the occurrence of a spill. In such a case, particular aspects of monitoring may be terminated if compelling evidence can be produced to justify the termination of those aspects. Similarly, monitoring programs to determine impacts on seabed and pelagic species and communities may be triggered by a subsurface spill incident or a decision to apply dispersant to spilled hydrocarbon.

Termination criteria should be based on measurable points that demonstrate environmental values and ecological structure and function have been fully restored, either naturally or through active management intervention. Where there is a high degree of scientific uncertainty regarding the recovery potential and

timeframes for some environmental features, this should be explicitly recognised in termination criteria. The framework based on the environmental values as described in the National Water Quality Management Strategy and outlined in Section 4 may provide helpful guidance.

If initiation or termination criteria comprise multiple components, then it is important to clearly define how a breach of a trigger (which would lead to initiation or termination of an OSMP element) would be interpreted. It would be appropriate to consider the precautionary principle (a foundation principle of ESD), when defining what would constitute triggering of any multifaceted criteria (i.e. a breach of a single component of the trigger would initiate monitoring).

Titleholders may wish to consider a 'sign-off' procedure for decision-making around the implementation and termination triggers. The intent of a sign-off procedure would be to provide for expert and/or stakeholder oversight of the suitability of information used for assessment against the triggers and the decisions taken in concerning the triggers. Where triggers are reflected in environmental performance outcomes and/or standards, a sign-off procedure would provide a mechanism for validating the titleholder's environmental performance with respect to application of the triggers. Some guidance, including a possible template for a sign-off procedure is provided on the Environment and Science Coordinators Toolbox section of the AMSA web site[1].

Appropriate initiation and termination triggers should be provided for elements of the OSMP. The triggers should be measurable and reduce ambiguity in their interpretation.

Careful consideration is needed to ensure that appropriate information will be available to make assessments against the triggers.

In all cases, time is particularly important when considering initiation criteria for the scientific component of the OSMP. Accordingly, it is important that the triggers themselves and the triggering mechanisms eliminate or at least reduce 'grey areas' of interpretation. To effect sufficiently prompt implementation triggers should be constructed such that it can be clearly and consistently determined if they are breached or not. Speedy implementation also relies on an appropriate degree of readiness to execute scientific monitoring to ensure that sampling windows for evaluating short term effects do not close before monitoring can commence.

1 http://www.amsa.gov.au/Marine_Environment_Protection/National_plan/Environment_and_Scientific_Coordinators_Toolbox/Foreshore_Assessment_and_Termination.pdf

10 Personnel, logistics and infrastructure

When considering whether an OSMP is fit-for-purpose it is important to consider readiness, and more specifically:

> Is the plan ready with the people (e.g. suitably qualified personnel), logistics (e.g. vessels, accommodation), physical infrastructure (e.g. telecommunications) and adequate baseline data to promptly apply operational and scientific monitoring?

In answering this question of readiness, there are a number of tests that could be applied, including:

- Are the resources identified suitable for the task and location?
- Are these resources available and how will availability be maintained for the duration of the petroleum activity?
- Are the resources operationally ready and how will readiness be maintained for the duration of the petroleum activity?

The suitability of logistics resources to support monitoring efforts should consider the site specific constraints such as water depth in relation to vessel draft and safe diving or telecommunications network coverage in relation to data transmission. Suitability should also be considered in terms of whether equipment will be appropriately supported by vessels, e.g. is appropriate lifting equipment available. Important considerations for personnel will include items such as experience and competency.

The availability of resources should be considered in terms of contractual and logistics arrangements. For items of equipment that are critical for the success of monitoring, measures such as standby arrangements or contingency suppliers should be considered. The maintenance of availability may require regular testing of arrangements with relevant service providers.

Operational readiness of personnel and equipment is critical as the absence of appropriate operational readiness testing can result in significant delays, particularly in remote areas. Operational readiness assessment should consider what needs to happen before a person or a piece of equipment can be mobilised to a monitoring location and cover internal and external requirements. Important factors may include, but are not limited to, marine and terrestrial quarantine, training and induction requirements, compliance audits, fauna and flora collection permits, site access permissions and procedural documents (e.g. safe work instructions). These factors can present significant challenges and therefore close attention should be given to these issues early in the planning process.

It is also important to consider that the definition of operationally ready will differ depending on the nature and scale of the credible spill scenario. For example, if an oil spill scenario involved oil potentially contacting sensitive environmental receptors within a number of days a greater level of readiness would be expected to be demonstrated than for a scenario where the spill site is relatively distant from sensitive environmental values. The OSMP (or elsewhere in the submission) should demonstrate that resources can be mobilised within a timeframe that is appropriate to the nature and scale of the spill risk.

10.1 Demonstration of readiness

Evaluation of the readiness of required personnel, logistics and infrastructure should be documented to ensure that readiness can be demonstrated as part of an EP submission. This demonstration of readiness should include provision of appropriate evidence. Items that may need to be verified as part of a readiness demonstration may include, but are not limited to:

- Vessels are suitable to carry out OSMP scope, have met or will meet the titleholder's internal operational readiness requirements (e.g. HSE audits etc.) and have appropriate contracts in place.
- Environmental service providers have relevant experience and competencies, adequate resourcing, appropriate contracts in place, adequate understanding of the scope of work and have undergone an operational readiness assessment.
- Environmental monitoring equipment is available and ready to mobilise, including consideration of calibration and suitability for specific operating environments.

- Transport modes and routes, storage and accommodation for equipment and personnel have been assessed, with appropriate arrangements in place.
- Chain of custody procedures for environmental samples are established.
- Logistics issues such as marine and terrestrial quarantine requirements and specific training requirements have been addressed.

This evidence may take many forms, but one potential approach is to include the full text of consultation outcomes from readiness discussions with relevant OSMP service providers. Regardless of the approach, it is important that titleholders demonstrate readiness and not simply availability. An appropriate service provider may be 'available' to assist, but in the absence of an operational readiness check considering important items such as those above, it may be a matter of weeks or even months before they are ready to mobilise and safely and effectively implement the OSMP.

10.1.1 Testing arrangements and pilot studies

The scientific monitoring response to an oil spill is often outlined in the OPEP, and as such, it may be appropriate to test the monitoring arrangements along with the OPEP arrangements. The scope of this testing should be clearly outlined in an EP/OSMP submission to demonstrate that it is appropriate for testing the readiness of OSMP service providers.

The use of pilot studies during the OSMP planning phase is another potential approach to demonstrating readiness and refining OSMP design. Pilot studies are small scale studies that aim to establish the efficacy of a proposed monitoring technique in achieving a stated objective. The use of pilot studies may serve the dual purpose of determining scientific efficacy of a monitoring technique, as well as resolving logistics issues. An example of scientific efficacy testing is whether an appropriate number of replicate impact and control sites can be established for a given habitat, while logistics issues that may be encountered and overcome may include tidal restrictions for site access or whether for example, the a particular piece of equipment can be used successfully at the study site.

10.2 Health and safety

Routine operations of the offshore petroleum industry carry a level of risk to human safety. Conducting activities in response to emergency events can be expected to present even higher levels of risk. Accordingly, it is essential that all necessary precautions are taken to ensure the health and safety of people involved in applying the OSMP. Potential hazards should be identified early in the planning process, with one approach being to facilitate a hazard identification workshop or similar to ensure all relevant hazards are identified and appropriate safety measures are in place prior to a spill event. The timely provision of training, procedural documents (e.g. safe work procedures), personal protective equipment and other safety measures identified should be incorporated into planning for the OSMP and demonstrated in the submission.

10.3 System level measures to ensure readiness

The review of personnel, logistics and infrastructure requirements to meet the environmental performance outcomes related to the OSMP should be supported by system level measures that will be implemented to ensure that these resources are ready and that the outcomes and standards can and will be met. These system level measures may include planned audits, operational readiness testing or training schedules and should be relevant to the roles and responsibilities of personnel, training and competency requirements, specialist equipment needs and health and safety considerations.

Drills, audits and exercises are one example of the kinds of measures that can be implemented to ensure readiness. Where measures of this nature are used they should be relevant to the specific OSMP requirements to ensure important shortfalls are identified early. Additionally, the description of drills, audits and exercises proposed to test OSMP readiness should include the additional measures or changes that will be taken to address any identified shortfalls.

10.4 Collaboration and partnerships

Implementing environmental monitoring programs can be resource intensive and require a wide variety of scientific and technical skills, all of which may not be immediately available to the titleholder. In view of this, consideration may be given to whether entering into collaborative or partnership arrangements may offer a suitable means of ensuring the right skills are applied and to share the burden of monitoring. Partnerships and collaborative approaches may be particularly beneficial for establishing appropriate environmental baselines in remote, biodiverse and/or geographically large areas.

Well-designed collaborative studies can bring greater levels of resourcing to bear on addressing an issue than might be possible with a tactical activity-specific approach. Benefits of collaborations include allowing for consistent approaches to data collection over larger spatial scales and for longer periods of time than what might be achievable without pooling resources. Truly strategic collaborative programs can allow better characterisation of the natural environment and by doing so provide a greater degree of confidence in the findings of post-spill studies aimed at measuring effects. Strategic collaboration can also result in lower cost to each collaborating partner for a comparable or even higher standard of information than might able to be delivered by conducting a series of local and less resolute short term studies.

Coordination of monitoring activities between different organisations is also critical to ensure that monitoring effort is focussed on relevant indicators of environmental condition and unnecessary duplication is avoided. Advice is offered in Section 4 on a framework for identifying indicators of the environment's response to oil.

11 OSMP outcomes

The results of the OSMP should be used to inform management actions at a variety of levels including; reporting, response actions, reflecting on goals, deciding if further studies are required and directing clean-up and remediation efforts if necessary. All management actions arising from monitoring results should be clearly outlined in the OSMP. These actions are described in further detail below.

11.1 Reporting results and performance monitoring

The Environment Regulations set out a range of reporting requirements. Titleholders should ensure that these requirements are appropriately reflected in their EPs and OSMP. Reporting the results of the monitoring programs should be of a sufficient level for the titleholder and the Regulator to determine if the goals of the titleholder in protecting the environment were met during the oil spill response operations. Titleholders should expect that scientific results of the OSMP, as well as operational details of OSMP implementation will need to be reported. The form, content and frequency of this reporting should be clearly outlined and be appropriate to the nature and scale of the activity.

The form and structure of reports needs to address requirements of the Environment Regulations and further information on these requirements can be sourced from published guidance on the NOPSEMA website. Where possible, titleholders may consider tailoring reports to suit multiple audiences such as NOPSEMA and a broader audience and stakeholders to inform the outcome of the spill and response efforts. A clear demonstration of a proactive response to the spill, monitoring its effects and commitment to clean-up if necessary will assist in maintaining a social licence to operate.

11.2 Spill response actions

In preparation for an oil spill response, preventative controls are firstly identified to try and prevent a spill and secondly mitigation controls are identified to contain spilled oil and prevent it from spreading further once a spill has occurred. Environmental performance standards are set which define the level of performance required of those controls and the results from the OSMP may be used to help determine if the spill response met those standards. This particularly applies to controls that were designed to prevent oil from spreading beyond pre-determined limits and reaching sensitive environmental receptors. The results from the operational monitoring under this scenario can also be used to trigger scientific monitoring as discussed earlier in Section 9. For further information on environmental performance standards please refer to published guidance on the NOPSEMA website for EP preparation.

11.3 Reflecting on goals

Scientific monitoring results may be used to determine if the environmental protection goals of the titleholder, expressed as environmental performance outcomes in the EP, are being met. Goals related to the prevention of harm, or protection of particularly sensitive environmental features outside of the planned area of operations, may not be achieved during an unplanned oil spill event. This may then trigger internal and external reporting requirements. These outcomes should also inform lessons learnt for future prevention and preparedness actions. For further information on reporting requirements and environmental performance outcomes please refer to published guidance on the NOPSEMA website for EP contents.

During a successful emergency response, the ideal outcome would be that goals for the protection of sensitive environments were achieved. In this case, reporting full details of the successful outcome is extremely valuable both to the titleholder, in order to demonstrate compliance with the Environment Regulations and to maintain social license to operate, but also to the industry in terms of lessons learnt for their own prevention and preparedness planning. Sharing this information with industry is strongly encouraged.

Monitoring results will also indicate whether the primary aim of the monitoring itself was met; that is that the extent, severity and duration of the impact resulting from an oil spill were determined. The outcome in this case should inform future design considerations and planning for oil spill monitoring activities. If no impact could be measured due to failings of the monitoring design or implementation issues during the response, rather than there being no significant impact from the spill, this information should be used to prevent similar short-comings in monitoring design in the future. If the OSMP was implemented as designed, was able to achieve the aim of detecting impacts and was able to demonstrate that impacts from the spill were within acceptable limits, then this is also extremely valuable information and publication to a broader audience should be also considered as opportunities to learn from oil spill scenarios are very limited.

11.4 Further studies, clean-up and remediation

Scientific monitoring may reveal that significant impact to sensitive environmental receptors has occurred as a result of exposure to hydrocarbons or from response efforts. Scientific studies should continue to determine the long term effects from the spill, but should also consider if additional studies of other environmental receptors are required. If the design of the monitoring program took the approach of selecting indicators that were likely to exhibit a response to hydrocarbons then careful interpretation of the results is required to determine if further scientific studies are needed to uncover the full environmental impact from the spill. The requirement for further studies and the design of these studies will be heavily dependent on the indicators that were chosen and what level of the environment they represent. For example, impacts detected at a species level will have different outcomes in terms of future studies to impacts detected at a community level. The former example may require a higher level assessment of community and ecosystem level impacts and potentially also assessment of impacts to societal uses of the impacted species (e.g. impact to a fishery). The latter example may require a more detailed assessment of species within that community as well as ecosystem and/or social impacts.

If an oil spill was predicted to be of low consequence and no significant impacts were evident using a robust experimental design, further investigations may not be required.

If significant impacts are detected, clean-up operations should be considered to remove oil and to manage persistent contaminants. Clean-up operations need to be considered very carefully to ensure that the benefits of clean-up efforts out-weigh the potential for further damage resulting from those clean-up efforts. Please refer to the Net Environmental Benefit Process in the OPEP Guidance Note (NOPSEMA 2014) for further information.

It is possible that in some cases, damaged areas or impacted fauna may benefit from remediation efforts or even require remediation to ensure long term sustainability of communities or populations. Remediation efforts can be extremely costly and may have little benefit at a community level if not planned and implemented properly. Careful consideration should be given to any planned remediation efforts and these plans should be supported by evidence in the plan of stakeholder support and the appropriate approvals and licencing.

Recognition that timely and safe implementation of the OSMP is critical but presents a considerable challenge since there is uncertainty about how an emergency situation will play out on the day. Adding to the challenge is that an OSMP will require an array of specialist expertise and equipment.

Titleholders should therefore carefully consider how to demonstrate that they will maintain a suitable level of readiness with respect to the people, logistics and infrastructure required to implement the OSMP.

Titleholders should ensure that their reporting arrangements for outputs and outcomes of the OSMP address the requirements of the Regulations.

Titleholders should also consider what the results of the monitoring may lead to in terms of further studies, clean-up, remediation and lessons learnt.

12 Challenges and opportunities

The development of scientific monitoring programs to detect and quantify impacts from oil spills presents a number of challenges and opportunities. It is hoped that this information paper will assist titleholders to address some of the challenges as well as identify opportunities. Table 4 identifies some of the challenges and attempts to set out the potential opportunity(ies) presented by each challenge.

Table 4 Some examples of challenges and opportunities presented by the planning and application of scientific monitoring programs

Challenges	Opportunities
Baseline surveys	
Overlap in areas surveyed by different titleholders	More strategic and regionally consistent approaches to baseline environmental surveys.
Extent of required baseline	Collaborative and partnership arrangements can reduce costs to individual titleholders.
Different survey techniques between titleholders impacting on the utility of data	Improve data consistency and utility through the development of appropriate standards for marine data collection.
Data sharing	
Concern about providing competitive advantage to other titleholders	Australian Oceans Data Network (AODN) is a potential resource for facilitating data discovery and access. Where commercial constraints exist, the metadata can be uploaded to the AODN to make the data discoverable, with caveats on accessibility. Other industry data sharing initiatives also exist.
Scientific uncertainty	
Conservative approaches to monitoring are resource intensive and costly.	Establish strategic initiatives to identify and address key sources of uncertainty in oil spill impact assessment (e.g. end-user driven strategic research initiatives).
Social license to operate	
Heightened public concern/scrutiny about oil spill risks post-Montara and Deepwater Horizon (Macondo)	Demonstrate appropriate planning and preparedness through the development of a fit-for-purpose monitoring program.
	Highlight the monitoring program provisions during the stakeholder consultation process.
Designing fit-for-purpose monitoring programs	
The OPGGS (E) Regulations are not prescriptive about monitoring requirements	Capitalise on this flexibility to develop a fit-for-purpose monitoring program that can be practically and efficiently implemented and deliver high quality environmental outcomes.

13 Critical factors for success

This information paper is intended to provide an overview of a process for developing an OSMP and provide possible approaches and important matters to consider in demonstrating that an OSMP is rigorous, fit-for-purpose and meets the requirements of the Environment Regulations.

The information presented in this paper is not a template for developing an OSMP, nor is it a proxy for the assessment process undertaken by NOPSEMA. Notwithstanding, the factors outlined in Figure 5 below are considered critical to the success of an OSMP and therefore should be addressed where an OSMP is deemed to be an appropriate part of an EP submission.

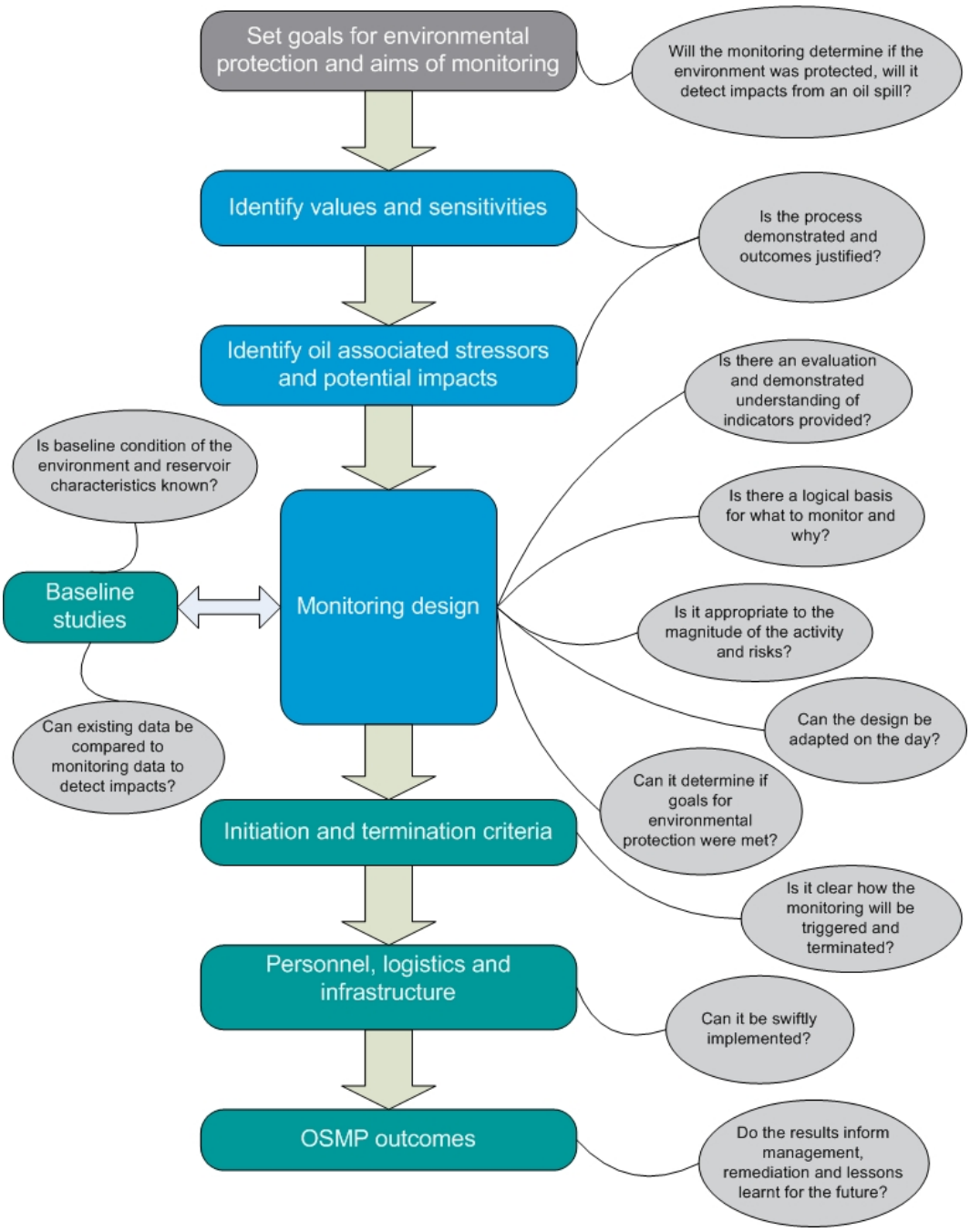


Figure 5 Critical success factors

14 Terminology

The environment and environmental impacts

Definitions of 'environment' and 'environmental impact' from the Environment Regulations are used in this Information Paper. Titleholders should refer to the Environment Regulations for complete definitions, but note that the Environment Regulations:

- take a broad view of the environment, with the definition covering ecosystems, natural and physical resources, qualities, heritage values and, socio-economic and cultural features
- take a similarly broad view that environmental impacts include any change that wholly or partially results from an activity.

This Information Paper places most emphasis on monitoring of physical and ecological parts of the marine environment following an oil spill. Nevertheless, titleholders need to be mindful of the breadth of the Regulation's definition of the environment when developing their OSMPs. Examples of various socio-economic and heritage considerations are presented, where pertinent.

Ecological integrity

Ecological integrity is a term referred to in this document. It is the ability of the ecosystem to support and maintain key ecological processes and a community of organisms with a species composition, diversity and functional organisation that is as comparable as possible to that occurring in natural habitats within a region.

Nature and scale

The concepts of *nature* and *scale* are enshrined in the Environment Regulations as considerations for the acceptance 'test' applied to EPs. Here the focus is on activities relevant to oil spills and the proposed responses to those incidents.

With respect to oil spills, *nature* may encompass factors including:

- the inherent features of credible spill scenarios, including information about the facility (surface or subsurface spill source) and its location, and the timing of a spill
- properties of spilled hydrocarbons, including their physical and chemical characteristics, weathering properties and environmental toxicity at various time steps during and following a spill incident
- predicted environmental impacts of dispersants and oil-dispersant mixtures at various time steps;
- features of proposed response activities
- the environmental setting of the potential spill scenarios and response activities, including its natural variability and sensitivities such as matters of National Environmental Significance and other recognised values of marine conservation reserves.

The notion of *scale* on the other hand might be explained by factors including the:

- spill volumes and durations
- predicted timeframe to stop the spill or mount effective response strategies
- extent of the area over which impacts are predicted to occur and the severity of those impacts
- scope and magnitude of response activities and time frame required to implement
- predicted persistence and toxicity of oil, and its impacts on the environment.

There are many aspects relevant to nature and scale and the lists above should not be taken to be comprehensive or relevant to all situations. While the points above may provide a guide, titleholders should also ensure they take account of the views and perceptions of relevant stakeholders and be mindful of uncertainty when establishing the nature and scale of their oil spill related activities within the EP.

Environmental monitoring

For the purpose of this Information Paper, environmental monitoring is the systematic collection and analysis of environmental information to support response and assessment of impacts from an oil spill. Environmental

monitoring is used to evaluate the performance of spill response strategies used to minimise environmental harm, to determine the magnitude of environmental impacts and to inform remediation activities if necessary and appropriate.

As noted earlier in this paper, operational and scientific monitoring activities are conducted following an oil spill to achieve different but related objectives. Since a key objective of scientific monitoring is to assess environmental impacts from a spill, an integral part of these studies involves the collection of baseline data to allow impacts attributable to an oil spill to be detected and separated from background levels of natural variation. Considerations relevant to environmental baselines are discussed in further in Section 8.

There are synergies and areas of overlap between operational and scientific monitoring that should be identified and addressed during the design of the OSMP with an aim of strengthening overall integration of monitoring activities. An end result should be a cohesive overall OSMP package that:

- allows titleholders to make the best use of information flowing from a sequence of monitoring activities
- is efficient to implement
- is effective in achieving specific monitoring objectives.

Oil spills and oil- associated stressors

Oil spills are unplanned releases of hydrocarbons to the marine environment from an offshore petroleum activity. Inherent features of oil spills such as the physical and/or chemical presence of the oil and any associated oil spill response activities that may impact the environment are collectively termed ‘oil-associated stressors'.

Some examples of oil-associated stressors include:

- direct environmental toxicity of oil, dispersant and oil-dispersant mixtures
- indirect effects of oil that are not immediately obvious or which may manifest at locations distant from the spill site (e.g. trophic effects, reduced fecundity or recruitment failure in biota)
- inherent features of proposed shoreline deflection / protection and clean-up activities on shorelines.

Careful scoping of the range of oil-associated stressors is an important task for OSMP design. Oil-associated stressors constitute the ‘cause’ components of cause-effect relationships, which are discussed further in Section 5.1 as a possible framework for rationalising the process of selecting what to monitor.

Exposure

In this paper, refers to a part of the environment being subjected to the action or influence of an oil-associated stressor.

15 References, Acknowledgements and Notes[2]

Legislation

Offshore Petroleum and Greenhouse Gas Storage Act 2006

Offshore Petroleum and Greenhouse Gas (Environment) Regulations 2009

References

Allen, G. (2004). Marine fishes of tropical Australia and south-east Asia. Western Australian Museum, Perth.

ANZECC & ARMCANZ (2000). *The Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. National Water Quality Management Strategy Paper No 4, Australian and New Zealand Environment and Conservation Council & Agriculture and Resource Management Council of Australia and New Zealand, Canberra.

Australian Bureau of Statistics (2012). http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/1301.0~2012~Main%20Features~Fishing~182

Australian Institute of Marine Science (2010). The AIMS index of Marine Industry, December 2010. Australian Institute of Marine Science, Townsville, Qld December 2010, 10pp

Australian Institute of Marine Science (2009). Australian Institute of Marine Science submission to the Commission of Inquiry – Montara wellhead platform uncontrolled hydrocarbon release. 22 December 2009.

Australian Petroleum Production and Exploration Association (2011). State of the industry 2011: A status report on Platform for Prosperity – a strategy for maximising the value of Australia's oil and gas resources. APPEA, 2011

Australian State of the Environment Committee, (2011). Australia State of the Environment 2011, Independent Report to the Australian Government Minister for Sustainability, Environment, Water, Population and Communities. CSIRO Publishing on behalf of the Department of Sustainability, Environment, Water, Population and Communities, Canberra.

Ballachey, B.E. (1995). Exxon Valdez Oil spill State/Federal Natural Resource Damage Assessment Final Report: Biomarkers of damage to sea otters in Prince William Sound, Alaska following potential exposure to oil spilled from the Exxon Valdez. Marine Mammal Study 6-1, Final Report. May 1995

Bellwood, D.R., Hughes, T.P., Hoey, A.S. (2006). Sleeping functional group drives coral-reef recovery. Current Biology. 16: 2434-2439.

Bratbak, G., Heldal, M., Knutsen, G., Lien, T., Norland, S. (1982). Correlation of dispersant effectiveness and toxicity of oil dispersants towards the alga *Chlamydomonas reinhardti*. Marine Pollution Bulletin 13(10): 351-353.

Carls, M.G., Rice, S.D. and Hose, J.E. (1999). Sensitivity of fish embryos to weathered crude oil: Part I. Low-level exposure during incubation causes malformations, genetic damage, and mortality in larval pacific herring (*Clupea pallasi*). Environmental Toxicology and Chemistry 18(3): 481-493.

[2] References in this section apply to both the Information Paper and associated appendices. References are yet to be completed.

Carls, M.G. and Thedinga, J.F. (2010). Exposure of pink salmon embryos to dissolved polynuclear aromatic hydrocarbons delays development, prolonging vulnerability to mechanical damage. Marine Environmental Research 69(5): 318-325.

Cheney. M.A., Liu, J., Amei, A., Zhao, X., Joo, S.W., Qian, S. (2009). A comparative study on the uptake of polycyclic aromatic hydrocarbons by Anodata californiensis. Environmental Pollution. 157(2): 601-608

Commonwealth of Australia (2011). Final Government Response to the Report of the Montara Commission of Inquiry. Report produced by Department of Resources, Energy and Tourism, Canberra, ACT

Commonwealth of Australia (2009). Matters of National Environmental Significance: Significant impact guidelines 1.1, *Environment Protection and Biodiversity Conservation Act 1999* Policy Statement.

Commonwealth of Australia (2003). Recovery Plan for Marine Turtles in Australia. A plan prepared by the Marine Species Section Approvals and Wildlife Division, Environment Australia in consultation with the Marine Turtle Recovery Team. Canberra, Australia, July 2003

Cury, P.M. and Christensen, V. (2005). Quantitative ecosystem indicators for fisheries management. ICES Journal of Marine Science 62: 307 – 310.

DAFF (2012). http://www.daff.qld.gov.au/28_9125.htm).

Dambacher, J.M., Hayes, K.R., Hosack, G.R., Clifford, D., Dutra, L.X.C., Moeseneder, C.H., Palmer, M.J., Rochester, W.A. and Taranto, T.J. (2011). Project Summary: National Marine Ecological Indicators. Prepared for Department of Sustainability, Environment, Water, Population and Communities. CSIRO, Hobart.

Dauvin J.C. (1998) The fine sand Abra alba community of the Bay of Morlaix twenty years after the Amoco Cadiz oil spill. Marine Pollution Bulletin, 36, 669-676

Dean, T.A., M.S. Stekoll, S.C. Jewett, R.O. Smith & J.E. Hose. (1998). Eelgrass (Zostera marina L.) in Prince William Sound, Alaska: effects of the Exxon Valdez oil spill. Mar. Poll. Bull. 36: 201–210.

Department of Environment (2006). Pilbara Coastal Water Quality Consultation Outcomes — Environmental Values and Environmental Quality Objectives, Department of Environment, Government of Western Australia, Marine Series Report No. 1.

Department of the Environment and Water Resources (2007). The south-west marine region: ecosystems and key species groups. Commonwealth of Australia, Canberra, 2006.

Department of the Environment, Water, Heritage and the Arts, (2010). Survey Guidelines for Australia's Threatened Birds. EPBC Act survey guidelines. DEWHA, Canberra, 2010

Department of Environment and Heritage (2005a). Blue, Fin and Sei Whale Recovery plan 2005-2010. Department of Environment and Heritage, Canberra, Australia May 2005

Department of Environment and Heritage (2005b). Humpback Whale Recovery plan 2005-2010. Department of Environment and Heritage, Canberra, Australia May 2005

Det Norske Veritas (2011). Assessment of the risk of pollution from marine oil spills in Australian ports and waters. Final Report to the Australian Maritime Safety Authority. Report Number PP002916, 14 December 2011.

Ecologically Sustainable Development Steering Committee (1992). A national Strategy for Ecologically Sustainable Development. Prepared for the Council of Australian Governments. December 1992.

Fall, J.A. (1995). Harbor seal and sea otter cooperative subsistence harvest assistance, Exxon *Valdez* Oil Spill Restoration Project Annual Report (Restoration Projects 94244 and 95244), Alaska Department of Fish and Game, Division of Subsistence, Anchorage, Alaska

Fox, N.J. & Beckley, L.E. (2005). Priority areas for conservation of Western Australian coastal fishes: a comparison of hotspot, biogeographical and complementarity approaches. Biological Conservation 125: 399-410.

Freegard, C. and Williams, M. (2009). Designing a Monitoring Project for Significant Native Fauna Species. Version 1.2 (July 2009). Prepared for Resource Condition Monitoring - Significant Native Species and Ecological Communities Project. Department of Environment and Conservation.

Fukuyama, A.K., Shigenaka, G., Hoff, R.Z. (2000). Effects of residual Exxon Valdez oil on intertidal *Protothaca staminea*: mortality, growth, and bioaccumulation of hydrocarbons in transplanted clams. Marine Pollution Bulletin 40 (11): 1042-1050.

Gagnon, M.M., Rawson, C. (2011). Montara Well Release, Monitoring Study S4A – Assessment of Effects on Timor Sea Fish. Curtin University, Perth, Australia. 208 pages.

Gaur, J.P. and Kumar, H.D. (1981). Growth reponse of four micro-algae to three crude oils and a furnace oil. Environmental Pollution Series A, Ecological and Biological. 25(1): 77-85.

Glegg, G.A., Hickman, L., Rowland, S.J. (1999). Contamination of limpets (*Patella vulgata*) following the Sea Empress oil spill. Marine Pollution Bulletin 38(2): 119-125.

Gohlke, J.M., Doke, D., Tipre, M., Leader, M. and Fitzgerald, T. (2011). A review of seafood safety after the Deepwater Horizon blowout. Environmental Health Perspectives 119 (8).

Golbuu, Y., Fabricius, K., Victor, S., Richmond, R.H. (2008). Gradients in coral reef communities exposed to muddy river discharge in Pohnpei, Micronesia. Estuarine and Coastal Shelf Science, 76 (1): 14-20.

Halpern, B.S., Walbridge S., Selkoe K.A, Kappel C.V., Micheli F., D'Agrosa C., Bruno J.F., Casey K.S., Ebert C., Fox H.E., Fujita R., Heinemann D., Lenihan, H.S., Madin E.M.P., Perry M.T., Selig E.R., Spalding M., Steneck R. and Watson R. (2008). A global map of human impact on marine ecosystems. Science 319:948-952

Heyward, A., Pinceratto, E., Smith, L. (1997). Big Bank Shoals of the Timor Sea: An environmental resource atlas. BHP Petroleum Hoese, D.F., Bray, D.J., Allen, G.R. & Paxton, J. 2006. Fishes. In: Zoological Catalogue of Australia 35 (Parts 1- 3): 1-2178. ABRS & CSIRO Publishing, Australia.

Heyward, A., Fromont, J., Schonberg, C.H.L., Colquhuon, J, Radford, B., Gomez, O. (2010a). The sponge gardens of Ningaloo Reef, Western Australia. The Open Marine Biology Journal. 4: 3-11.

Heyward, A., Moore, C., Radford, B., Colquhoun, J., (2010b) Monitoring program for the Montara well release Timor Sea: Final report on the nature of Barracouta and Vulcan shoals. Report prepared by the Australian Institute of Marine Science for PTTEP Australasia (Ashmore Cartier) Pty. Ltd.

Heyward, A., Radford, B., Burns, K., Colquhoun, J., Moore, C. (2010c) Montara surveys: Final report on seabed surveys at Ashmore, Cartier and Seringpatam Reefs. Report prepared by the Australian Institute of Marine Science for PTTEP Australasia (Ashmore Cartier) Pty. Ltd.

Howard, R. K., Edgar, G. J., Hutchings, P. A. (1989). Faunal assemblages of seagrass beds. In: Larkum, A. Mr. D.,McComb, A. J., Shepherd, S. A. (eds.) Biology of seagrasses. Elsevier, Amsterdam, p. 536-564

Integral Consulting Inc. (2006). Exxon Valdez Oil Spill Restoration Project Final Report 2005. Assessment of Lingering Oil and Resource Injuries from the Exxon Valdez Oil Spill. Restoration Project 040776 Final Report for the Exxon Valdez Oil Spill Trustee Council, June 2006

International Maritime Organisation (2009). IMO/UNEP guidance manual on the assessment and restoration of environmental damage following marine oil spills. IMO, London.

IPIECA (1991) Biological impacts of oil pollution – IPIECA report series volume 1

IPIECA (1993) Biological impacts of oil pollution: mangroves – IPIECA report series volume 4

IPIECA (1994) Biological Impacts of Oil Pollution: Saltmarshes – IPIECA report series volume 6

IPIECA (1996) Biological impacts of oil pollution: rocky shores – IPIECA report series volume 7

IPIECA (2000). Biological impacts of oil pollution: fisheries. IPIECA Report Series, Volume 8.

ISO, (1992). Sensory analysis – Methodology – Vocabulary. International Standards Organisation. ISO 5492: 1992. Geneva.

ITOPF (2011a). Effects of oil pollution on fisheries and mariculture. Technical Information Paper 11. Impact PR and Design Limited, Canterbury.

ITOPF (2011b). Effects of oil pollution on the marine environment, Technical Information Paper 13. Impact PR and Design Limited, Canterbury.

Jewett, S.C., T.A. Dean, R.O. Smith, & A. Blanchard. (1999). The Exxon Valdez oil spill: impacts and recovery of the soft-bottom seabed community in and adjacent to eelgrass beds. Marine Ecology Progress Series 185:59-83.

Jewett, S. C., T.A. Dean, B.R. Woodin, M.K. Hoberg, and J.J. Stegeman. (2002). Exposure to hydrocarbons ten years after the Exxon Valdez oil spill: evidence from cytochrome P4501A expression and biliary FACs in nearshore demersal fishes. Marine Environmental Research 54:21-48

Jones, M. (Ed.) (2000). Fisheries and the Environment. pp53-73. In: Caton, A. and McLoughlin, K. (Eds). Fishery Status Reports 1999: Resource Assessments of Australian Commonwealth Fisheries. Bureau of Rural Sciences, Canberra. 250pp.

Kenworthy, W.J., Durako, M.J., Fatemy, S.M.R., Valavi, H. & Thayer, G.W. (1993). Ecology of seagrasses in northeastern Saudi Arabia one year after the Gulf War oil spill, Marine Pollution Bulletin, vol. 27, pp. 213–222.

Kirby, M.F., Lyons, B.P., Waldock, M.J., Woodhead, R.J., Goodsir, F., Law, R.J., Matthiessen, P., Neall, P., Stewart, C., Thain, J.T., Tylor, T. and Feist, S.W. (2000). Biomarkers of polycyclic aromatic hydrocarbon (PAH) exposure in fish and their application in marine monitoring. Science Series Technical Report Number 110, CEFAS, Lowestoft.

Lane, A. and Harrison, P.L. 2000 Effects of oil contaminants on survivorship of larvae of the scleractinian reef corals Acropora tenuis, Goniastrea aspera and Platygyra sinensis from the Great Barrier Reef. Proceedings of the 9th International Coral Reef Symposium, Bali, Indonesia 23-27 October 2000.

Law , R.J., Kirby, M.F., Moore, J., Barry, J., Balaam, J. (2011) PREMIAM Pollution response in emergencies marine impact assessment and monitoring – post-incident monitoring guidelines Moller, T.H., Dicks, B., Whittle, K.J. and Girin, M. (year unknown). Fishing and harvesting bans in oil spill response. Paper #095, International Oil Spill Conference.

Lee, S.Y. (1998). Ecological role of grapsid crabs in mangrove ecosystems: a review. Marine and Freshwater Research 49(4) 335 – 343.

Lima, I., Moreira, S.M., Osten, J.R., Soares, A.M.V.M., Guilhermino, L. (2008a). Biochemical responses of the marine mussel Mytilus galloprovincialis to petrochemical environmental contamination along the North-western coast of Portugal. Chemosphere. 66(7): 1230-1242.

Lima, D., Santos, M.M., Ferreira, A.M., Micaelo, C., Reis-Henriques, M.A. (2008b). The use of the shanny Lipophrys pholis for pollution monitoring: A new sentinel species for the northwestern European marine ecosystems. Environment International 34(1): 94-101.

Livingstone, D.R., Moore, M.N., Lowe, D.M., Nasci, C. and Farrar, S.V. (1985). Responses of the cytochrome P-450 monooxygenase system to diesel oil in the common mussel, Mytilus edulis L., and the periwinkle, Littorina littorea L. Aquatic Toxicology 7(1-2): 79-91.

Loughlin, T.R., B.E. Ballachey, and B.A. Wright. 1996. Overview of studies to determine injury caused by the *Exxon Valdez* oil spill to marine mammals. pp. 798-808. In: *Proceedings of the* Exxon Valdez *Oil Spill Symposium*. American Fisheries Society Symposium 18. S. Rice,R. Spies, D. Wolfe, and B. Wright (eds). American Fisheries Society, Bethesda, MD.

Marine Mammal Commission (2011). Assessing the Long-term Effects of the BP Deepwater Horizon Oil Spill on Marine Mammals in the Gulf of Mexico: A Statement of Research Needs. A report prepared by the U.S. Marine Mammal Commission with input from the National Marine Fisheries Service, National Ocean Service, Fish and Wildlife Service, and Bureau of Ocean Energy Management, Regulation and Enforcement. Maryland, USA 38pp.

Mazet J.A.K., Newman S.H., Gilardi, K.V.K., Tseng F.S., Holcomb J.B., Jessup D.A. and Ziccardi M.H. (2002). Advances in oiled bird emergency medicine and management. *Journal of Avian Medicine and Surgery* 16(2):146–149, 2002.

McClanahan, T.R., (1995). Fish predators and scavengers of the sea urchin Echinometra mathaei in Kenyan coral-reef marine parks. Environmental Biology of Fishes 43, 187±193.

Meehan, W.J. and Ostrander, G.K. (1997). Coral bleaching: a potential biomarker of environmental stress. Journal of Toxicology and Environmental Health 50: 529-552.

Mercurio, P., Negri, A.P., Burns, K.B., Heyward, A.J. et al. (2004). The ecotoxicology of vegetable versus mineral based lubricating oils: 3. Coral fertilization and adult corals. Environmental Pollution 129:183-194.

Nandini Menon, N. and Menon N.R. (1999). Uptake of polycyclic aromatic hydrocarbons from suspended oil borne sediments by the marine bivalve Sunetta scripta. Aquatic Toxicology. 45(1) P63-69.

Negri, A.P. and Heyward, A.J. (2000) Inhibition of fertilization and larval metamorphosis of the coral Acropora millepora (Ehrenberg, 1834) by petroleum products. Marine Pollution Bulletin 41 (7-12): 420-427.

NOPSEMA (2014). Information Paper: Oil Pollution Risk Management. National Offshore Petroleum Safety and Environmental Management Authority, Revision 0, September 2014.

NOPSEMA (2015). Guidance Note: Environment Plan Content Requirements. National Offshore Petroleum Safety and Environmental Management Authority, Revision 2, September 2015.

Norwegian Oil Industry Association (OLF)(2012). Deepwater Horizon: Lessons Learned and Follow-up. Stavanger, Norway, 3 May 2012.

Offshore Petroleum and Greenhouse Gas Storage Act 2006.

Offshore Petroleum and Greenhouse Gas (Environment) Regulations 2009.

Paine, M.D. and Leggett, W.C. (1992). Effects of Hibernia crude oil on capelin (*Mallotus villosus*) embryos and larvae. Marine Environmental Research 33: 159-187.

Parks Victoria (2006). Wilsons Promontory Marine National Park and Wilsons Promontory Marine Park Management Plan. Parks Victoria, Melbourne, May 2006

Penela-Arenaz, M., Bellas, J., Vazquez, E. (2009). Effects of the Prestige oil spill on the biota of NW Spain: 5 years of learning. Chapter 5. Advances in Marine Biology. Elsevier Pty Ltd.

Peterson, C. H., Anderson, S.S., Cherr, G.N., Ambrose, R.F., Anghera, S., Bay, S., Blum, M., Condon, R., Dean, T.A., Grahan, M., Guzy, M., Hampton, S., Joye, S., Lambrinos, J., Mate, B., Meffert, D., Powers, S.P.,

Somasundaran, P., Spies, R.B., Taylor, C.M., Tjeerdema, R., Adams E.E. (2012). A tale of two spills: Novel science and policy implications of an emerging new oil spill model. BioScience 62(5): 461-469.

Pogonoski, J.J., Pollard, D.A. and Paxton, J.R. (2002). Conservation overview and action plan for Australian threatened and potentially threatened marine and estuarine fishes. Environment Australia, Canberra.

Ramachandran, S.D., Hodson, P.V., Khan, C.W. and Lee, K. (2004). Oil dispersant increases PAH uptake by fish exposed to crude oil. Ecotoxicology and Environmental Safety 59: 300-308.

Ragen, T.J. (2010). Testimony before the House Subcommittee on insular affairs, oceans and wildlife regarding the Deepwater Horizon oil spill and its effects on marine mammals. 10 June 2010.

Reed, M., Spaulding, M., Lorda, E., Walker, H. and Saila, S. (1984). Oil spill fishery impact assessment modelling: the fisheries recruitment problem. Estuarine, Coastal and Shelf Science 19: 591 – 610.

Santos, M.M., Sole, M., Lima, D., Hambach, B., Ferreira A.M., Reis-Henriques, M.A. (2010). Validating a multi-biomarker approach with the shanny Lipophrys pholis to monitor oil spills in European marine ecosystems. Chemosphere 81(6): 685-691.

Sheng, Y., Tang, D., Pan, G. (2011). Phytoplankton bloom over the Northwest Shelf of Australia after the Mondara oil spill in 2009. Geomatics, Natural Hazards and Risk. 2:4, 329-347

Shepherd S.A. and Robertson E.L. (1989). Regional studies - seagrasses of South Australia, Victoria and Bass Strait. In: Larkum A.W.D., McComb A.J. and Shepherd S.A. Eds. Biology of seagrasses. Elsevier, Amsterdam, pp. 211-229.

Spraker, T.R., L.F. Lowry, and K.J. Frost. (1994). Gross necropsy and histopathological lesions found in harbor seals. pp. 281-311. In: *Marine Mammals and the* Exxon Valdez. T.R.Loughlin (ed). Academic Press, San Diego, CA.

State of the Environment 2011 Committee (2011). Australia State of the Environment 2011. Independent report to the Australian Government Ministerfor Sustainability, Environment, Water, Populations and Communities. Canberra. SEWPAC 2011.

Stekoli, M.S. and Deysher, L. (2000). Response of the dominant alga Fucus gardneri (Silva) (Phaeophyceae) to the Exxon Valdez oil spill and clean-up. Marine Pollution Bulletin 40(11): 1028-1041.

Sumaila, U.R., Cisneros-Montemayor, A.M., Dyck, A., Huang, L., Cheung, W., Jacquet, J., Kleisner, K., Lam, V., McCrea-Strub, A., Swartz, W., Watson, R., Zeller, D. and Pauly, D. (2012). Impact of the Deepwater Horizon well blowout on the economics of US Gulf fisheries. Canadian Journal of Fisheries and Aquatic Science 69: 499 – 510.

Tukaj, Z. (1987). The effects of crude and fuel oils on the growth, chlorophyll 'a' content and dry matter production of a green alga *Scenedesmus quadricauda* (Turp.) breb. Environmental Pollution 47(1): 9-24.

UC Davis School of Veterinary Medicine (2012). Oiled wildlife Care Network. Cited from http://www.vetmed.ucdavis.edu/owcn/oiled_wildlife/index.cfm on 30 August 2012

Upton, H. (2011). The Deepwater Horizon Oil Spill and the Gulf of Mexico Fishing Industry. Congressional Research Service Report for Congress, February 2011.

US EPA (2000). Guidance for assessing chemical contaminant data for use in fish advisories, Volume 1: Fish sampling and analysis third edition. US EPA, Washington, DC, November 2000.

Vieira, L.R., Sousa, A., Frasco, M.F., Lima, I., Morgado, F., Guilhermino, L. (2008). Acute effects of Benzo[a]pyrene, anthracene and a fuel oil on biomarkers of the common goby Pomatoschistus microps (Teleostei, Gobiidae). Science of the Total Environment 395(2-3): 87-100.

Watts, A.W., Ballestero, T.P., Gardner, K.H. (2006). Uptake of polycyclic aromatic hydrocarbons (PAHs) in salt marsh plants Spartina alterniflora grown in contaminated sediments. Chemosphere. 62(8): 1253-1260.

White, H.W., Hsing, P., Cho, W., Shank, T.M., Cordes, E.E., Quattrinid, A.M., Nelson, R.K., Camillif, R. Demopoulos, A.W.J., German, C.R., Brooks, J.M., Roberts, H.H., Shedd, W. Reddy, C.M., Fisher, C.R. (2012). Impact of the Deepwater Horizon oil spill on a deep-water coral community in the Gulf of Mexico. Proceedings of the National Academy of Sciences. published ahead of print March 27, 2012, doi:10.1073/pnas.1118029109.

Wrabel, M.L. and Peckol, P. (2000). Effects of bioremediation on toxicity and chemical composition of No. 2 fuel oil: Growth reponses of the brown alga Fucus vesiculosis. Marine Pollution Bulletin 40(2): 135-139.

Xu, S., Song, J., Yuan, H., Li, X., Li, N., Duan, L. and Yu. Y. (2011). Petroleum hydrocarbons and their effects on fishery species in the Bohai Sea, North China. Journal of Environmental Sciences 23(4): 553 – 559.

Yearsley, G.K., Last, P.R. & Hoese, D.F. (eds) 2006. Standard names of Australian fishes. CSIRO-CMAR Research Paper 009. 65pp.

Yee, S.H., Santavy, D.L., Barron, M.G. (2008). Comparing environmental influences on coral bleaching 162-174

Yender, R., Michel, J. and Lord, C. (2002). Managing seafood safety after an oil spill. Seattle: Hazardous materials response division, Office of response and restoration, National Oceanic and Atmospheric Administration.

Acknowledgements

NOPSEMA is grateful for the valuable contributions to the draft document made by the following agencies – DoE, DIIS, AMSA, CSIRO, AIMS and GA.

Notes

All regulatory references contained within this Guidance Note are from the Commonwealth *Offshore Petroleum and Greenhouse Gas Storage Act 2006* and the associated Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 unless otherwise stated.

For more information regarding this guidance note, contact the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA):

- Telephone: +61 (0)8 6188- 8700, or
- e-mail: information@nopsema.gov.au

Technical Appendices

Appendix 1 Environmental features and sensitivities

1.1 Sensitive biological receptors

For the purpose of the following discussion, biological features that may be relevant to OSMPs have been split into three groups to provide broad guidance that can be applied to marine biota generally. The groups are 1) seabed flora and fauna, 2) fish and fisheries and 3) wildlife. These groups are highlighted here in view of their importance for the maintenance of marine ecological integrity and human uses and to provide prompts for their consideration in OSMPs, where appropriate.

The social and economic values are important to consider, however the summary below will focus on the ecological values of the three receptor groups. This ecological focus follows the premise that clean and healthy ecosystems are required to support safe and sustainable human use activities and protect socio-economic values.

1.1.1 Benthic flora and fauna

For the purpose of this information paper, flora and fauna are those biota that grow on or within seabed substrates in the intertidal, subtidal and deep ocean zones. Key groups of benthic flora and fauna that may warrant attention within the OSMP include:

- habitat-forming benthic primary producers such as corals, seagrasses, macroalgae, mangroves, salt marsh vegetation;
- habitat-forming benthic filter feeders such as sponges, sea fans and sea whips; and
- biota that do not leave the substratum, including invertebrate fauna (those not commercially targeted), infauna and micro-algal communities associated with the habitat formers described above.

The habitats in which the benthic flora and fauna are the key structural components or are important parts, are intrinsically valuable for the productivity, biodiversity and associated human use they support. The 'iconic' benthic habitats such as coral reefs, seagrass meadows, saltmarshes and mangroves are relatively well-studied and so some level of relevant information for planning an OSMP is often available. Habitats such as coral reefs and deep-water sponge gardens are recognised fish nursery areas and provide an important source of food and shelter for a diversity of biota, while saltmarshes and mangroves provide an important link between marine and terrestrial ecosystems. The importance of some benthic habitats may also be formally recognised within marine reserve systems or other protection mechanisms such as World Heritage or Ramsar listing.

Other, less recognized, habitats can also have considerable environmental value but require additional effort to identify and evaluate. Examples of these habitat types include sandy, muddy and rocky shorelines, macroalgal reefs, mosaics comprised of corals, sponges, algae and/or seagrasses and deep-water substrata dominated by filter feeding communities or benthic infauna. Habitat mosaics can be difficult to characterise due to their patchy and dynamic nature. This will likely have implications for the design of the OSMP. Deep water habitats are difficult to evaluate due to their remoteness and/or logistical challenges encountered during sampling.

There is often a lack of information or scientific certainty for benthic habitats, though this alone is not a valid reason to exclude them from consideration in the EP and OSMP. Deep water sampling in recent years for example has discovered a number of undescribed species as well as previously-unknown habitats of value. For example highly diverse and dense sponge gardens have been described in the deeper waters off Ningaloo Reef (e.g. Heyward et al. 2010; Schonberg and Fromont, 2012). In view of these findings, appropriate sampling efforts are an important part of ensuring a thorough description of the environment that may be affected by deep-sea petroleum activities and measures are put in place to afford adequate protection and to measure impact if they occur.

It is also important to recognise that benthic habitats vary with change in latitude (e.g. tropical vs temperate), exposure and hydrodynamic regime, substratum type, water depth and sometimes season. These are factors that may require consideration when planning an OSMP.

Finally, if benthic habitats are identified early in the planning process, this may provide the opportunity to obtain further information to relevant to monitoring design. For example, if geophysical survey data collected early in the development of a petroleum activity identified benthic anomalies (e.g. pinnacles or coral bombora) in a Permit area, there may be an opportunity to obtain further information to guide the description of the environment, the evaluation of impacts and risks assessment and where relevant, design of the OSMP. In addition to field sampling, a thorough consultation process may assist with identifying benthic habitats.

1.1.2 Fish and fisheries

For the purpose of this information paper, the definition of fish will include all species of bony fish and cartilaginous fish (sharks and rays) and commercially targeted crustaceans, molluscs including cephalopods and echinoderms. The fish supported industries considered include fisheries (the capture of wild fish species) and mariculture (the cultivation of captive species in the marine environment). Mariculture refers to farming of captive bred stock or grow-out of naturally occurring larvae and juveniles of wild caught stocks.

The commercially targeted crustaceans are primarily the decapod crustaceans such as rock lobster, crabs and shrimps. Over 2,250 decapod crustacean species have been recorded from Australia with only a small proportion commercially targeted, for example 30 species of crustacean are targeted or occur as significant secondary catch on the east coast of Australia (Tzioumis and Keable, 2007). Despite the small number of species targeted, crustacean fisheries are highly valuable, for example the western rock lobster fishery is the most valuable single species fishery in Australia (DEWR, 2007). Decapod crustaceans such as rock lobsters, blue swimmer crabs and mud crabs are also highly sought after by recreational fishers.

There are an estimated 15,000 species of marine mollusc in Australian waters (Beesley et al. 1998 in DEWR, 2007) and a small number of these species are considered highly valuable. For example, the mobile cephalopods (e.g. squid, cuttlefish and octopus) are targeted by jig, pot and trawl fisheries as well as recreational fishers, while the sessile bivalves (e.g. mussels and oysters) support a valuable mariculture industry and are an important food source for indigenous Australians. Another highly valuable marine mollusc is the abalone, which supports significant commercial and recreational fisheries. Echinoderms are also commercially targeted to a lesser extent with fisheries in existence for sea cucumbers (beche-de-mer) and sea urchins.

Important information on commercially targeted fish species is provided by the relevant fisheries management agencies. Fisheries operating in Australian waters are managed by either the Australian Fisheries Management Authority (AFMA) or the relevant state agency depending on the location and fishing method. The Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) provides Fishery Status reports for AFMA managed fisheries, including information on the biological, environmental and commercial status of the fisheries. State agencies such as the Department of Fisheries, Western Australia and the Department of Primary Industries, Victoria also provide fishery status reports.

The environmental value of Australia's fish resources is evidenced by formal protection of important habitats under a National Marine Reserve System, for example the Cod Grounds Commonwealth Marine Reserve was declared to protect important habitat of the endangered grey nurse shark. Individual species are also provided formal protection under the EPBC Act and various pieces of state/Northern Territory legislation. For example, the green sawfish (*Pristis zijsron*) is currently protected (listed vulnerable) under the EPBC Act and is also protected in WA, NSW and NT waters under the various state/territory legislation. A number of Australian fish species are also listed internationally on the IUCN Red List of Threatened Species, for example the iconic Queensland grouper (*Epinephelus lanceolatus*). Titleholders are encouraged to review relevant legislation to identify listed threatened species in their area of interest, however it is important to recognise that the listed species may not adequately represent the fish species of value in a given area. For example, the fish species listed under the EPBC Act 1999 are primarily syngnathid species (seahorses and pipefish) and a number of shark species and these listed species will not adequately represent the commercially, recreationally or ecologically important fish species in a given area.

Where threatened or potentially threatened fish species are identified within an area of interest, it is important to determine whether formal action plans are in place which identifies critical habitats and conservation strategies for species survival. For example, the Conservation Overview and Action Plan for

Australian threatened and potentially threatened marine and estuarine fishes (Pogonoski et al. 2002) provides important information on conservation status, critical habitats and recommended conservation priorities for Australia's threatened fishes. There are also a number of information papers that have been produced to identify marine environmental values within the Commonwealth marine regions that may provide useful information on potential fish values within an area of interest. For example, a description of key species groups in the East Marine Region was produced by the Australian Museum (Tzioumis and Keable, 2007).

Marine fishes that are not formally recognised by legislation may have perceived value due to their palatability (e.g. seafood products such as scallops and pink snapper), commercial value (e.g. pearl oyster), iconic nature (large groupers, whale sharks, barracuda) or ecological function (e.g. the role of small pelagic fishes as a food source for commercially targeted and/or protected pelagic predators). Mobile fish species such as bony fish and sharks may migrate over large distances and may only represent a value in an area of interest at a certain time of year, for example the annual whale shark feeding aggregation period at Ningaloo Reef. Times and locations of particular importance to fish for feeding, breeding or migration will need to be considered and understood in relation to seasonal and inter-annual variability, vulnerability to an oil spill and the design of an OSMP.

1.1.3 Wildlife

Australia's offshore marine environment supports a rich and diverse wildlife fauna. For the purpose of this information paper, wildlife are the larger species of mammals, reptiles and birds that either live in the ocean or are dependent on marine and coastal ecosystems for long term sustainability of populations and are considered to be vulnerable to the effects of oil spills. Examples of key groups of wildlife covered in this paper include cetaceans, dugong, pinnipeds, marine reptiles (turtles, sea snakes, crocodiles), shorebirds and seabirds.

Numerous species, which are either Australian residents or visit our waters and coasts during migration or utilise habitats for a key part of their life history are specially protected under Australian Commonwealth environmental law (i.e. EPBC Act). Some of these species and their critical habitats are the subjects of international conventions and agreements to which Australia is a signatory. Australia has international obligations to promote and enhance the survival and conservation of migratory species and their critical habitats under the Convention on Migratory Species (i.e. the Bonn Convention), and agreements entered into with Japan (JAMBA), China (CAMBA) and the Republic of Korea (ROKAMBA) for the protection of migratory birds.

Numerous species are also protected because of their conservation status. The EPBC Act affords special protection to listed threatened species and communities. Threatened species and communities are classified in accordance with IUCN Red List categories (www.iucnredlist.org). They include Australian resident and migratory species from each of the groups classified here as wildlife.

Titleholders should review the information at www.environment.gov.au regarding the EPBC Act, relevant international conventions and agreements, and Australia's obligations when developing OSMPs.

Australia's wildlife species may also be considered culturally important, for example turtles and dugong are hunted and contribute to the diet of indigenous Australians. These activities may be restricted to certain times of year and locations. Baseline surveys and other planning activities for OSMPs should aim to determine the dynamics of cultural values of wildlife species as well as socio-economic values such as ecotourism so that monitoring in the event of a spill can be properly targeted to ensure it achieves its objectives.

Since some wildlife species utilise different habitats at different times of year, the potential for, and extent, severity and persistence of, ecological impacts to wildlife will often depend on when and where a spill occurs. Accordingly, the notion of sensitive ecological windows will often be a relevant consideration when planning wildlife aspects of OSMPs. In the context of wildlife, sensitive ecological windows are the readily-predictable times of year, geographic locations or combinations of the two that are critical for the conservation and sustainability of populations. For example, sensitive ecological windows can be times of the year and locations known to be important for mating, spawning, feeding or nesting. They may also be an area of ocean known to be utilised as a migration corridor for a listed migratory species. Titleholders should review the relevance of sensitive ecological windows to wildlife within the defined area of interest and plan baseline studies and the

OSMP accordingly, while being mindful of scientific uncertainty associated with current knowledge about a species' behaviour and its utilisation of habitat.

Appendix 2 Oil in the environment

2.1 Chemical speciation

Chemical speciation is defined as the specific form of an element or compound based on isotopic composition, oxidation state and/or molecular structure (Campbell et al., 2006). Following the release of an oil-associated stressor into the marine receiving environment, a change in physico-chemistry will alter the speciation of a contaminant, and subsequently the bioavailability to a biological receptor.

The chemical speciation of hydrocarbon and non-hydrocarbon contaminants present as dissolved, dispersed and particulate phases is complex, and will be influenced by both the physical and chemical properties of the contaminant (e.g. solubility, volatility, reactivity, concentration), and the receiving environment (e.g. pH, dissolved oxygen, salinity, temperature, particle size, organic carbon). Before reaching equilibria within the water or sediments of the receiving environment, the oil-associated stressor may undergo several chemical and physical processes, including adsorption (e.g. organic matter and iron and manganese oxyhydroxides), dissolution (e.g. oxidation or transformation from mineralised/elemental states into ionic forms), complexation (e.g. with dissolved organic carbon or anions including carbonate, chloride, sulfate and hydroxide), ion exchange (e.g. interchange of ions on clay minerals) and precipitation (e.g. with ligands such as carbonate, hydroxide, silicate, phosphate and sulfide), (Chapman et al., 1998; Cantwell and Burgess, 2001; Fan and Wang, 2001; O'Day et al., 2000; Simpson et al., 2000).

For example, particulate organic carbon in sediment has been demonstrated as an important binding phase for hydrocarbon classed contaminants (e.g. polycyclic aromatic hydrocarbons), decreasing the bioavailability to biological receptors. Further reductions in the bioavailability of hydrocarbon contaminants may also occur through the evaporation of volatile aromatics (such as BTEX) and biodegradation of aliphatic hydrocarbons (such as n-alkanes). By comparison, other contaminants may be transformed to more bioavailable phases. Examples may include (though are not limited to) the dissolution of polar hydrocarbons from dispersed hydrocarbon phases (e.g. phenols) or the oxidation and dissolution mineralised metal phases associated with the reservoir geochemistry (e.g. metal-sulfide phases), both of which may increase the presence of bioavailable contaminants in the water column. This physico-chemical change in a dissolved, dispersed and particulate phase of an oil-associated stressor will also have implications for bio accessibility, which is essentially controlled by the contaminant exposure pathway of the biological receptor.

2.2 Organism exposure pathways

The assimilation of a dissolved, dispersed or particulate oil-associated stressor by a biological receptor may occur as the result of uptake through either dissolved or dietary exposure pathways (Rainbow, 2002; Luoma and Fisher, 1997; Luoma et al., 1992; Besser et al., 2005; Griscom and Fisher, 2004; Meyer et al., 2005). For the dissolved phase, the exposure may be via the water column, or pore water and burrow water in sediments. The dietary exposure route may include both biotic (e.g. algae, plant or other benthos) and abiotic (e.g. organic detritus or sediments) sources of particulate phases, though dispersed phases of whole-oil may also become ingested.

The range of potential biological receptors residing in the sea surface, water column, and sea floor and shoreline compartments of the receiving environment is diverse. Hence, the importance of the dissolved and dietary exposure pathways is likely to vary considerably (Wang and Fisher, 1999a; Warren et al., 1998; Munger et al., 1997). For example, where the ingestion of particulate phases may be a major dietary exposure pathway for seabed invertebrates which filter feed or graze on sediment substrates, uptake from the dissolved and dispersed phases may be of more importance for phytoplankton or several pelagic fish which reside in the water column (Simpson and Batley, 2006; Selck et al., 1998; Tran et al., 2002). For this reason, the dissolved, dispersed and particulate phases of oil-associated stressors should be considered in both the water and sediments of the receiving environment compartments.

2.3 Organism physiology and behaviour

In addition to the exposure pathway, organism physiology will influence the assimilation of a dissolved, dispersed or particulate oil-associated stressor into the tissues of a biological receptor (Wang and Fisher,

1999b). The significance of an accumulated contaminant is species-specific and assimilation is dependent on the balance between increased bioavailability and the rate of metabolism and elimination (Ahearn et al., 2004; Rainbow, 2007; Wang et al., 1995). An oil-associated stressor has the potential to bind to any molecule with an affinity for that contaminant, rendering the complex potentially toxic through prevention of normal metabolic functionality. An ingested oil-associated stressor may be considered available until it is excreted, molecularly sequestered or detoxified to a less available form.

For example, a biological receptor may regulate, accumulate or excrete a detoxified store of non-hydrocarbon contaminants such as essential (e.g. copper, zinc and cobalt) and non-essential (e.g. cadmium, lead and mercury) trace metals. Non-ionic organic chemicals (such as lipophilic hydrocarbon classed contaminants) may be rapidly metabolised and accumulate in the tissues of the biological receptors (e.g. PAH metabolites in the biliary secretions of fish). Adverse biological effects may occur when the rate of uptake exceeds the rate of excretion and detoxification of metabolically available contaminant (Borgman and Norwood, 1997; Vijver et al., 2004).

The behaviour of a biological receptor also has the potential to influence exposure to an oil-associated stressor. For example, seabed invertebrate communities may resuspend contaminated sediments as a consequence of bioturbation and bioirrigation by the burrowing, feeding, tubing, excretion, respiration and locomotion activities of seabed animals. This activity may expose both the pore water and the sediment particles to the overlying water column, potentially allowing uptake by filter feeding organisms in the water column, or solubilising contaminants previously partitioned to the sediment phases (Roper et al., 1995; Wenzho and Glud, 2004).

Alternatively, other biological receptors may possess behavioural traits that may reduce the exposure duration and uptake of oil-associated stressors. For example, the exposure and uptake of a contaminant source is effectively reduced through selective feeding strategies (i.e. identifying and minimising dietary ingestion of contaminated sediments), or avoidance mechanisms (i.e. sensing and avoiding elevated concentrations of dissolved hydrocarbons in the water column).

The environmental impact of an unplanned release of crude oil or condensate into the marine environment will be influenced by the distribution (sea surface, water column, sea floor and shoreline) and bioavailability of the oil-associated stressor (including chemical speciation, and organism exposure pathways, physiology and behaviour). Therefore, the water and sediment quality monitoring program should be adequately developed to consider these key concepts when investigating the presence or absence of an adverse environmental impact. An understanding of the distribution and bioavailability of an oil-associated stressor in the receiving environment will enable the cause-effects pathways to be defined for specific ecological receptors and support ecological monitoring observations to determine if an impact has occurred.

Appendix 3 Environmental impacts

3.1 Direct impacts

3.1.1 Seabed flora and fauna

Inter-tidal flora and fauna at risk if the shoreline is contacted by spilled oil include seabed phototrophs such as mangroves, saltmarshes, coral reefs, seagrass beds, macroalgal stands and their inhabitants, filter feeding organisms such as sponges and soft corals and their inhabitants, inhabitants of rocky and sedimentary shores, microalgal assemblages such as stromatolites and rhodoliths and any other living organisms and assemblages that occur on the sea bed or sea shore. For all marine seabed primary producers, mortality can result from oil covering photoreceptors and pores for oxygen exchange. All other organisms can still be wholly or partially smothered by oil which can inhibit normal breathing, feeding and reproducing activities. The leaves of the seagrass species Zostera become blackened where they come into contact with oil and they suffer reduced growth rates (e.g. Kenworthy et al. 1993, Dean et al., 1998). Mangroves, which are dependent on oxygen supplied via pores in their aerial roots and occur in the inter-tidal zone, are particularly susceptible to smothering. For mangroves, the toxic components of the oil, especially lower molecular weight aromatic compounds can also damage cell membranes in the subsurface roots, impair the normal salt exclusion process, and the resulting influx of salt interferes with the plants ability to maintain a salt balance (IPIECA 1993).

Topographically complex intertidal habitats such as mangroves, coral reefs and rocky shores that encompass a range of microhabitats such as cracks, crevices, rockpools and overhangs are at a greater risk, along with their inhabitants. These complex microhabitats tend to retain water during low tides and so are populated by diverse assemblages of soft bodied sessile animals such as sea anemones, sponges, echinoderms and sea-squirts as well as providing refuges for mobile animals such as molluscs, crustaceans and fish. The exposed surfaces of these shores are often quickly washed clean of oil; however, oil can become concentrated in these habitats where it will cause the greatest damage.

Seabed flora and fauna inhabiting sedimentary shores or in seabed sediments in other habitat types such as mangroves and seagrasses, including both inter-tidal and sub-tidal zones, may also be smothered by oil, particularly at low tide. Oil may penetrate burrows in the sediments, killing resident crabs and worms, or coat molluscs, barnacles and bivalves on the sediment surface. Weathered oil that sinks, oil particles that become entrained or attached to sediments, or other oil deposits can still cause damage. It is known that toxic sediments inhibit seed establishment in mangroves and may impact saltmarsh vegetation where asexual vegetative growth is often seasonal. Seagrasses which are often ephemeral are known to be reliant on seed banks to recolonise, therefore protecting and monitoring sediments containing seed banks from chronic oil contamination is probably equally as important as protecting seagrasses themselves for the long term persistence of seagrass ecosystems. If not cleaned up, oil can persist and remain toxic in sheltered muddy sediments for many years or decades, particularly in anoxic sediments such as are often found in the tropics (IPIECA 1991). The effects of residual oil on other seabed flora and fauna has been well studies in the northern hemisphere (e.g. see Penela-Arenaz et al. 2009), for example, survival and growth rates of intertidal clams and fisheswere still affected greater than 5 years following the Exxon Valdez oil spill (Fukuyama et al. 2000, Jewett et al. 2002).

A recent publication from the Macondo oil spill show stressed corals and a decline in the health of corals near the location of oil release from the Deepwater Horizon spill where brown flocculent material containing traces of weathered oil was found (White et al. 2012). Dinoflagellate function, either in terms of photosynthesis or bleaching, has been affected in corals exposed to mineral derived hydrocarbons and dispersant from accidental and experimental spills (Mercurio et al. 2004, Meehan and Ostrander, 1997). Oil and dispersant may also affect coral larval fertilisation, metamorphosis and survivorship (Land and Harrison 2000, Negri and Heyward 2000, Mercurio et al. 2004). Given the extension of the industry to deeper water drilling programs where corals and other seabed flora and fauna are being continually discovered, greater investigations of the effects of oil on lesser known deep water habitats is warranted (Peterson et al. 2012).

3.1.2 Fish and fisheries

While oil is in the open water mobile fishes and fisheries species may be able to avoid affected areas, however, previous research has found biomarker evidence of hydrocarbon exposure in both pelagic and demersal fishes (Gagnon and Rawson 2011). Mass mortalities of mobile species such as bony fish are rarely observed after oil spill incidents (IPIECA, 2000) and likely to be limited to circumstances where oil reaches enclosed or partially enclosed water bodies such as lagoons or bays with limited flushing potential. Direct oil pollution impacts to slow-moving seabed fisheries species such as scallops and echinoderms have been documented for previous major oil spills. Where oil reaches the seabed and persists on or in the sediments, however, there is the potential for seabed fish species such as flounder, or strongly habitat associated demersal fishes, including rare and endangered species e.g. seadragons and seahorses or handfishes to be affected by direct physical or chemical contact with oil.

Direct chemical impacts to fish will be greatest for eggs, embryos and larvae as they are particularly sensitive to oil pollution events (e.g. Paine et al. 1992, Carls et al. 2008, Carls and Thedinga 2010). Toxic compounds such as polycyclic aromatic hydrocarbons (PAHs) can result in effects on growth, development and survival of embryos and larvae even after substantial weathering (Paine et al. 1992). There is a greater probability of exposure for pelagic early life history stages which may become entrained in contaminated surface waters. However, some fish and invertebrate fisheries species are seabed egg layers (e.g. damselfishes, squid and triggerfishes) or have specific nursery habitats such as mangrove stands and seagrass beds. Oil in sediments or nearby oil deposits on the seabed could have potential impacts on egg development and survival of these species. Persistent oil in coastal sediments or degraded habitats could affect larval settlement and survival over many years.

Mariculture operations often involve the enclosure of bony fish (in pens or cages) or hanging of bivalve molluscs on ropes for grow-out and these fish are more vulnerable to oil exposure as they are unable to actively avoid areas of oil pollution. Fisheries species located within mariculture operations typically occur in nearshore waters, far removed from offshore petroleum operations, however it should be recognised that the shallow waters of offshore islands may be important mariculture sites, and also that the impact from a well blowout has the potential to extend to nearshore waters. The scale of impacts will depend on the concentration and composition of oil and the nature of the mariculture facility. Intertidal mollusc mariculture is considered particularly sensitive to oil spill impacts (IPIECA, 2000) with potential for sub-lethal effects to be long term where oil is entrained and retained in the sediments. Onshore tanks and sea impoundments are also considered sensitive as they require circulation of high quality marine water and a high stocking density may increase the severity of oil contamination effects. As well as contamination and toxic effects to mariculture fish stocks, the equipment itself is at risk of contamination, resulting in lengthy clean-up operations to prevent contamination of new stocks and delays to further production.

Fishing operations in Australia use a variety of gear to target fish in different environments with varying sensitivities to oil contamination (refer IPIECA, 2000 for a proposed sensitivity ranking). The fish targeted by fisheries have the potential to become contaminated through direct contact with oil in the marine environment or through contact with oil contaminated fishing gear. In either scenario, these fish will not be suitable for consumption due to flavour taint and/or toxic levels of hydrocarbons.

Tainting is an issue for both fisheries and mariculture operations and refers to the uptake of oil derived substances in the tissues of fish, which leads to an odour or flavour foreign to the food product (ISO, 1992). Tainting effects are generally more severe in cultivated fish as they are spatially restricted and unable to swim away. Tainting can occur through direct absorption from water and sediments as well as through consumption of contaminated prey species. Filter feeding species such as bivalve molluscs and fish species with a high fat content, such as tuna, are particularly vulnerable to tainting and bioaccumulation potential should also be considered. Tainting and potential toxic effects of hydrocarbons in fish has the potential to cause major economic impacts to fish supported industries as consumers may avoid seafood well after hydrocarbon levels in tissues have returned to background levels. It is therefore critical that a scientifically sound monitoring program is established to support decision making around closures and re-opening of fisheries and instil public confidence. A large body of literature exists on the role of science in managing seafood safety, with some examples provided below.

Further reading on the role of science in managing seafood safety

The management of fish taint impacts is important and complex, with many examples from around the world where poor management has resulted in a loss of confidence from the public in seafood safety, further exacerbating the economic impacts of an oil spill.

There is significant further reading available on this topic, often in the form of 'lessons learned' from previous incidents. Refer for example:

- Yender et al. 2002 for guidance on assessing likelihood of seafood contamination and effective monitoring for contamination. http://docs.lib.noaa.gov/noaa_documents/NOS/ORR/963_seafood2.pdf
- US EPA (2000) for guidance on fish sampling and analysis design to assess chemical contaminant levels.
- Moller et al. (year unknown) for a discussion on the importance of scientific criteria to inform fishery closure and re-opening decisions. http://www.itopf.com/_assets/documents/fishban.pdf
- Gohlke et al. (2011) for a review of seafood safety protocols after the Deepwater Horizon Blowout.

3.1.3 Wildlife

Direct contact with hydrocarbons can affect skin, fur and plumage and eyes of marine wildlife. In addition, wildlife may ingest contaminated water or prey or inhale volatile hydrocarbons when surfacing. Individual animals that are either in poor health (e.g. injured animals) or otherwise physiologically stressed (e.g. pregnant females), may be more susceptible to exposure to oil, particularly if the release is protracted and spilled hydrocarbons are persistent in an animal's habitat.

Skin, fur or plumage is often the first part of the animal to come into direct contact with oil and/or oil-dispersant mixtures. For cetaceans and dugongs, skin-oil contact puts individuals at risk of skin irritation, inflammation, burns and necrosis. Open injuries and lesions have potential to expose affected animals to increased risk of secondary health problems such as infection (UC Davis School of Veterinary Medicine, 2012). When birds come into contact with oil, the complex structure of their feathers can be affected such that they do not provide effective insulation and repel water. Affected birds can have difficulty swimming, flying and foraging and many rescued birds show signs of hypothermia (Mazet et al. 2002). Like bird feathers, the haircoat of pinnipeds acts to regulate the animal's temperature and buoyancy. Oiling of the coat allows water to come into direct contact with the animal's skin, causing rapid onset of hypothermia. Oil can smother bird and reptile eggs, impacting gas exchange and therefore hatching success. There are also reports of developmental effects in embryos of eggs exposed to oil (US EPA 2000).

Direct contact with eyes has potential to cause significant effects in wildlife. Necropsies of harbour seals in the months immediately following the Exxon Valdez spill indicated, among other things, conjunctivitis (Spraker et al. 1994, Fall 1995) and though comparable studies on other wildlife are rare, similar effects could be anticipated in mammal and turtle species that may swim through, or regularly break the surface of, oil-affected water.

Marine wildlife species are susceptible to ingestion of oil due to their foraging and feeding behaviours. There is considerable risk of cetaceans, pinnipeds, dugong and birds ingesting hydrocarbons while foraging in oil-affected areas and consuming oil-affected food resources. Young animals may also ingest oil when suckling from an oiled mother or by consuming oil-contaminated food. The mouth anatomy and feeding behaviour of baleen whales makes these species particularly susceptible to ingestion of oil. Since baleen whales use comb-like keratinous plates (baleen) to filter food from large volumes of water, feeding in oil affected waters has

potential to cause fouling of the baleen (Marine Mammal Commission 2011). This in turn may adversely affect the animal's ability to feed. Birds spend considerable time preening themselves to maintain the condition of their feathers. In an oiled bird, there is a high likelihood that preening would result in some ingestion of oil. In dugongs the sensory hairs around the mouth, which are thought to have a role in foraging, may be affected by oil in turn potentially impacting the animal's feeding.

Ingested oil can lead to a range of physical injuries and physiological effects. When oil or dispersed oil is ingested they can damage the gastrointestinal tract, which in turn can affect digestion and uptake of nutrients from food. Internal organs such as the kidneys and liver which have roles in the metabolism of waste and toxins can also be damaged by oil (see Integral Consulting Inc., 2006 [sea otters], see Mazet et al., 2002 [birds]). There have been reports of ulcers, diarrhoea and a decreased ability to absorb nutrients from food in oil-affected birds (UC Davis, 2012). Ingestion of oil by adult birds can also affect egg condition.

Inhalation of volatile hydrocarbons and oil droplets while breathing has potential to result in effects on mucous membranes and respiratory tissues of respiratory tracts and lungs of wildlife. Harbour seals were found with symptoms of pneumonia (Fall 1995) and interstitial pulmonary emphysema (Integral Consulting Inc. 2006) following oil exposure due to the Exxon Valdez spill and again similar effects might be anticipated in other mammals. Breathing hydrocarbon vapours is known to result in nerve damage and behavioural problems in humans and so it may be reasonable to assume similar effects in marine mammals (e.g. Loughlin et al. 1996). Monitoring for the chemical impacts, for which the cause is not always immediately visible, will be more challenging than monitoring for the physical impacts, which are clearly visible. However, any impacts to marine biota that occur shortly after an oil spill event in the area in which the oil is present will be assumed to have occurred as the result of the spill unless water quality and sediment studies can demonstrate otherwise.

Further reading on direct impacts of oil

There is significant further reading available about the environmental impacts of oil, often in the form of 'lessons learned' from previous incidents. Refer for example to the primary literature by the following authors:

- D.M Di Toro
- J.A. McGrath
- J.P. Incardona
- P.V. Hodson
- U. Varanasi,
- T.K. Collier.

3.2 Indirect impacts

3.2.4 Habitat and food species

Indirect impacts to biota may arise due to changes in the habitats and ecosystems on which they rely. For example, reduction in the quantity and quality of food resources may impact the health or survival of individual animals. Damage to populations of prey species has potential to have flow on consequences through food webs ultimately affecting high order consumers. Furthermore, populations may rely on specific habitat features to provide nursery, feeding and breeding areas and impacts to these habitats will result in indirect impacts on populations. The impacts may result from factors such as a reduction in available prey or suitable habitats for settlement of recruits.

Some assemblages are particularly important in terms of ecosystem services. For example, in seagrass assemblages, the oil and dispersed oil can have significant effects on fauna living in and on the sediments and

on the seagrass leaves (e.g. Jewett et al., 1999). Furthermore, damage to the seagrass plants may also affect neighbouring ecosystems that rely on services from the seagrass e.g. fish nursery habitats. Mangrove habitats are also recognised as especially important in terms of the provision of ecosystem services to not only the immediate habitat that it forms, but also to species that inhabit nearby seagrass and reef habitats. Assessment of commercial fisheries in Australia now often includes an assessment of impacts to the ecosystem as a whole (e.g. AFMA's ecological risk assessment process for offshore fisheries). This ecological risk assessment recognises the importance of a healthy ecosystem for sustainable fisheries.

3.2.5 Ecosystem functions

Impacts of oil on environmental receptors may have flow on effects for other species in an ecosystem outside of habitat and predator-prey relationships. Crustaceans, such as amphipods and fiddler crabs, are often involved in detritus breakdown by taking leaves into burrows within the sediments. If these species are removed from an area the process of decomposition may be significantly slowed having flow-on effects such as on water quality. Similarly, a disruption in crab and starfish populations in any habitat may result in reduced predation on snails and mussels may upset grazing balances and competitive relationships for space. As an example, studies of the effects of the Prestige oil spill in Spain on rocky shore assemblages found decreases in biomass and, size and species abundance of algae six months after the event. Despite this, however, there were longer term increases in richness and diversity due to changes in the abundance of dominant species (Urgorri et al. 2004 cited in Penela-Arenaz et al. 2009). Similarly, species replacements have been found in saltmarsh plants impacted by oil spill, for example, where an experimental oiling in Wales eliminated presence of the sea rush Juncus and allowed the oil tolerant fast-growing creeping grass Agrostis to dominate IPIECA (1994). The flow-on effects of an oil spill on biological assemblages should not be underestimated.

3.2.6 Socio-economic impacts

In the Environment Regulations, the definition of environment means ecosystems and their constituent parts, including people and communities, natural and physical resources, qualities and characteristics of locations, places and areas, heritage value and social, economic and cultural features. Subsequently, there may be social impacts from an oil spill that require scientific monitoring as an assessment of impact. These may include effects on indigenous, tourism, heritage, fisheries, aquaculture, recreational, economic or other human activities. When designing a monitoring program thorough research on all aspects of the environment in the area of interest needs to be undertaken before evaluation and prioritisation of monitoring program activities can occur. Examples of socio-economic impacts include effects on species listed under State, Commonwealth or International legislation, which are also often the source of interest for tourism activities such as wildlife watching cruises or the targets of indigenous hunting. Impacts to iconic habitats such as coral reefs or regularly used amenities such as sandy beaches may also have economic repercussions. Fisheries and mariculture operations may be directly impacted by oil spills through interference with fishing activities, contamination of equipment and fish resources (tainting) and mortality of fish resources. As discussed above, oil pollution also has the potential to cause sub-lethal effects to fish such as retardation of growth and larval development, which may result in reductions in fishery yields.

Appendix 4 Monitoring parameters

4.1 Chemical characterisation

Water and sediment quality guidelines aim to define the extent of environmental risk through considerations of acceptable contaminant concentrations in the receiving ecosystems. In Australia, the ANZECC/ARMCANZ (2000) water and sediment quality guidelines outline a range of trigger values for contaminants of potential concern which are designed to be protective of an ecosystem, and predictive of an adverse biological effect. Exceedance of a guideline trigger value generally indicates that there is potential for an impact to occur (or to have occurred), but does not provide any certainty that an impact will occur (or has occurred).

Ideally, water and sediment quality guideline trigger values should delineate between the presence or absence of an adverse biological effect. This usually involves identifying and quantifying contaminants present in water (e.g. dissolved and total concentrations) and sediments (e.g. pore water and particulate concentrations) for comparison with the respective guideline trigger values. However, given the chemical complexity of hydrocarbon and non-hydrocarbon oil-associated stressors, a comparison of water and sediment chemistry with guideline trigger values may not be sufficient to accurately predict the environmental risk associated with an exceedance due to the presence of co-occurring contaminants, the limited range of reliable trigger values, and the many physico-chemical factors known to influence bioavailability.

For example, using a gravimetric analytical method to quantify the petroleum hydrocarbon content of a water or sediment is useful for the purpose of estimating the combined total of hydrocarbon classed compounds. However, the measurement represents the combined concentration of all petroleum hydrocarbons in the complex mixture (as defined by the analytical method), for which the potential toxic properties of individual compounds will vary (TPH Criteria Working Group Series, 1998). Furthermore, the method does not account for non-hydrocarbon oil-associated stressors. While it is chemically possible to speciate and quantify the individual contaminants present, reliable water and sediment quality trigger values may not be available for comparison. Alternatively, where a reliable trigger values are available and have been exceeded, it is equally possible that the contaminant is non-bioavailable, which may lead to the implementation of unnecessary and potentially costly monitoring activities.

4.2 Ecotoxicology

While improvements have been made in distinguishing the bioavailable portion of contaminants within water and sediment, significant uncertainty still exists when attempting to predict biological effects from chemical estimates of contaminant bioavailability (Rainbow, 2002; Simpson and Batley, 2007). Adverse biological effects are often due to complex interactions between chemical speciation and organism exposure pathways, physiology and behaviour (Simpson, 2005; Louma and Rainbow, 2005; Rainbow, 2007). The combined influence from these interactions are not yet fully understood for predicting biological effects (Besser et al., 2003; Riba et al., 2004; Vijver et al., 2004; Simpson, 2005). Where contaminants are detected above guideline trigger values or background levels in-situ, or uncertainty relating the chemical characterisation exists; toxicity testing should be initiated to better understand the bioavailability and potential impacts of the oil-associated stressor.

For the purposes of water and sediment quality assessment, the uncertainty arising from the initial chemical measurements of contaminant concentrations is reduced using toxicity testing. Toxicity testing provides a biologically-based and more environmentally realistic representation of the contaminant bioavailability a marine organism is likely to encounter. Furthermore, the potentially complex chemical speciation of the contaminant can be assessed in association with organism physiology and behavioural influences on toxicity.

A range of tropical, sub-tropical and temperate bioassays are available for assessing water and sediment quality. These include standardised protocols for representative test organisms which reside in the water column and/or benthos (e.g. bacteria, microalgae, macroalgae, crustaceans, molluscs, echinoderms, polychaete worms and fish). The endpoints for the bioassays may measure either acute effects (e.g. mortality), or the more sensitive sub-lethal and chronic effects (e.g. inhibition of growth, fertilisation, larval development or reproduction).

Biochemical and physiological responses following exposure to an oil-associated stressor may also be assessed using sub-lethal biomarker measurements (e.g. detoxification enzyme production, DNA damage). The use of sub-lethal biomarker tests are considered appropriate where a concentration-response relationship has been established for an oil-associated stressor and demonstrated to correspond with standardised biological endpoints, e.g. sub-lethal effects such as growth, development or reproduction. The selected tests should be appropriate to meet the objectives of the water and sediment quality assessment. Therefore, a justification for the selected toxicity tests should be provided in the proposed monitoring program. Criteria which are of relevance when selecting an appropriate toxicity test include considerations for:

- Relevance of the bioassay to the receiving environment;
- Sensitivity to a broad range of oil-associated stressors;
- Assessing dissolved and/or particulate phases of a contaminant;
- Contaminant exposure pathways of the test organism (dietary versus dissolved uptake);
- Relevance of test endpoints (acute, sub-lethal and chronic effects) to short-term and long-term impacts.

4.3 Biodegradation and Bioaccumulation

Biodegradation is a weathering process which occurs when a component of the oil-associated stressor (e.g. organic compounds) is converted to simpler molecules via biological processes. The rate and extent of biodegradation will depend on the type of microorganisms present and the environmental conditions (including temperature, oxygen levels and nutrient availability). Naturally occurring bacteria in seawater and sediment generally control biodegradation in marine environments, with aerobic biodegradation more likely to occur in the water column, and either aerobic or anaerobic biodegradation occurring in the sediments. The susceptibility of an oil-associated stressor to biodegradation is also influenced by chemical structure. For example, low molecular weight compounds are readily broken down (e.g. short chain n-alkanes), while multi-ring aromatic hydrocarbons are relatively stable (e.g. naphthalene, phenanthrene).

Biodegradation contributes to minimising the persistence of an oil-associated stressor released into the receiving environment following conversion to a less toxic metabolite, or through complete removal. For example, while adverse effects to biological receptors may initially occur over the short-term, the extent may remain localised (provided secondary metabolites are non-toxic). However, the absence of biodegradation implies that an oil-associated stressor may have the ability to exert toxicity over a wide spatial and temporal scale as the crude oil or condensate becomes distributed across the environmental compartments.

The persistence of an oil-associated stressor may also be determined by the contaminants bioaccumulation potential. Bioaccumulation refers to the accumulation of contaminants in the tissues of organisms through any exposure route, including respiration, ingestion, or direct contact with contaminated sediment or water (USEPA, 2000; Moore et al., 2005). Bioavailability and organism exposure pathways strongly influence the uptake and retention of contaminants within the organism.

Regardless of the ecological niche, all biological receptors have the potential to accumulate oil-associated stressors. However, the extent of toxicity from the accumulated oil-associated stressor will depend on the biological receptors ability to metabolise, detoxify, excrete and/or store the contaminant. For example, while ambient concentrations may be below short-term effect thresholds (e.g. acute mortality effects), the continuous physiological effort required to process and detoxify an oil-associated stressor can give rise to chronic effects over longer term exposures (e.g. inhibition of development leading to reduced fecundity).

Appendix 5 Monitoring techniques

5.1 Seabed flora and fauna

There are a number of techniques commonly used to monitoring seabed flora and fauna and a large body of literature available about different techniques. At a large qualitative scale, aerial surveys, remote sensing, bathymetry and other GIS applications are used to define spatial boundaries of habitat types. Ground-truthing of these techniques include quantitative field surveys either using video or in situ using transects and quadrats to quantify individuals or percentage cover. Finally any number of sampling techniques for the various different flora and fauna may be undertaken depending on the type of biota. At this fine scale where intimate knowledge of a particular ecological group is required, recognised taxonomists may be consulted. In the absence of taxonomic specialists, monitoring at a coarse level of taxonomy or functional group may be undertaken. But even at this level, personnel with some level of post-graduate studies, training in biological assessment, or a credible level of experience is usually required. Reference to known and commonly used scientific categories is recommended.

Aside from appropriate indicator species, commonly monitored ecological, population and community based parameters for seabed flora and fauna assemblages include:

- changes in the abundance of ephemeral versus perennial organisms e.g. marine plants such as algae, seagrasses, and salt marsh vegetation (Penela-Aremez 2009, IPIECA 1994), and similarly the polychaete/ amphipod ratio (Gesteira and Dauvin, 2000) have been suggested as an oil spill “bioindicators”; or alternatively simply relative percentage compositions where nature of organisms is as yet unknown.
- species richness, diversity or quantification of species of functional groups of habitat formers or their inhabitants;
- species zonation patterns; and
- abundance, size frequency distribution, density and/or biomass of individual plants and animals including,
  - counts of adults,
  - counts of dead animals e.g. shells or urchin tests washing up on the beach, vacant feeding scars from limpets, and
  - counts of recruits and juveniles.

Monitoring may also be carried out on the health and condition of individuals, for example measurement of growth rates, reproductive outputs or viability, ecotoxicity testing of tissues from crustaceans, bivalves, barnacles etc. Examples of parameters more specific to organism type commonly used to assess health include:

- corals: partial mortality, bleaching, growth rates, reproductive status, prevalence of disease, numbers of breaks, cover of mucous, number of corallivorous snails;
- mangroves: height and diameter of trees, growth rates, density of seedlings, sediment monitoring and litter productivity, stem density, crown density, crab hole density i.e. direct relationship with soil drainage & oxidation; and
- saltmarshes: signs of decay or stress of leaves, stems and roots, growth status and evidence of new growth, reproductive status, abundance and diversity of gastropods on emergent vegetation, plant condition (signs of blackening and defoliation), opportunistic algal cover, and sediment macrofauna diversity (particularly amphipods and polychaetes).

5.2 Fish and fisheries

While an oil spill in open water is unlikely to cause catastrophic impacts in the sense of causing large scale fish kills (see section 8.1.2), it is likely that an oil spill may have sub-lethal effects on individuals and populations of fish and fisheries species. There are techniques available to measure sub-lethal effects of oil, such as biomarker studies, and the results of such studies may inform the need to initiate population level studies on fish growth, disease, reproductive output, recruitment or other features of populations.

The measurement of direct impacts on fish resources may require extractive sampling of fish to conduct, for example, sensory testing of seafood products for hydrocarbon taint (refer further reading in Section 8.1.2) and molecular biomarker analysis (see Kirby et al. 2000). Monitoring techniques for testing levels of petroleum hydrocarbons in fish tissues of commercial species require particular attention as the results will likely be used to inform fishery closure and re-opening decisions, for determining human health risks as well as physiological impacts to fish themselves.

The fish sampling techniques applied will depend on variables such as the life history stage targeted (for example mesh size considerations) or the position of targeted species in the water column (e.g. seabed otter trawls for seabed species as opposed to purse seines for pelagic species). The selection of techniques for these studies should be informed by consultation with the fisheries agencies responsible for management of the potentially effected fisheries, as well as relevant food safety authorities. This form of monitoring requires specialist skills and availability of appropriate facilities and personnel should be identified during the design process.

Measurement of indirect impacts on fish may involve for example, stomach composition analysis for food chain impacts or catch and release studies examining fish for evidence of disease or parasite loads. Seabed habitat condition surveys (e.g. drop camera or diver transect surveys) may also be used to determine levels of adult fish or nursery habitat degradation to infer likely effects on populations of fish and fisheries species. Guidance on the monitoring of seabed habitats that may provide important functions for fish assemblages, such as nursery areas, is provided in Section 10.4.1.

It is important to recognise that measuring effects of oil pollution on parameters such as recruitment success in fishes and invertebrate fisheries species can be very challenging given the degree of natural variability and uncertainty in fisheries science as to all the factors that contribute to the level of recruitment in a given year. This has led some researchers to suggest that modelling studies are the only effective way to estimate the likely impacts of oil pollution of fish recruitment (e.g. Reed et al. 1984). Quantitative data integrating models may provide a practical method of estimating the scale of impacts to inform decisions about the need for long term studies on fish population dynamics and recovery.

5.3 Wildlife

Monitoring techniques commonly employed to collect demographic data on wildlife populations involve direct counts or estimates of numbers of individuals, capture-measure-release of tagged individuals and deployment of remote sensing technology including satellite telemetry. The methods used will depend on features of the animal such as aspects of its life history, movement/migration patterns and its size. For example, while cetaceans are generally considered to be vulnerable to the effects of oil spills, empirical data on effects are few, largely because populations are difficult to monitor and there are only limited data from studies of oil-effects on captive animals that can be used to guide what and how to monitor potential effects.

The numbers of oil-affected and dead animals recorded from within known areas are sometimes used as indicators for assessing the severity of impact to wildlife. However, it is important to be aware that not all animals found deceased around the time of a spill may have died as a result of the spill or response activities. With this in mind titleholders should include procedures such as necropsies to determine cause of death. The advice of veterinary and marine fauna experts should be sought on appropriate necropsy techniques and indicators to be examined. A further consideration is that quantification of fauna mortality based on numbers of recovered/recorded dead animals may significantly underestimate the actual mortality rate if the animals in question sink when they die at sea. While consideration may be given to the application of adjustment factors to take potential underestimation into account, this should only be done with full appreciation of the scientific uncertainty associated with choosing an adjustment factor.

While monitoring the short term effects of a spill on wildlife is not without its challenges, evaluating the longer term consequences for individual animals and populations is even more challenging. Tissue biopsies of animals that survive the spill can be used to provide information about hydrocarbon exposure and chronic health concerns associated with that exposure. Assessments of animal exposure and health have been made studying the tissue burden of hydrocarbons and associated metabolites and biomarkers (e.g. Ballachey, 1995). Biopsy samples are used to assess the body burdens of selected toxicants and toxicity-related biomarkers in

wild animals. Here too, advice should be sought from veterinary and marine fauna experts on techniques appropriate for various animals where this appropriate is to be part of the OSMP. Biopsies and the measures taken and selection of biomarkers warrants careful consideration, as illustrated by the 2005 assessment of lingering oil from the Exxon Valdez spill. In its final report, Integral Consulting Inc. (2006) details the findings of studies of the polycyclic aromatic hydrocarbon (PAH) content of tissue collected from oiled and control populations of harbour seals. These studies found that while concentrations of PAH in blubber indicated a spill-related signal, similar analysis of brain, liver and muscle tissue returned concentrations near or below limits of detection for all samples. Sampling of aromatic compounds in bile samples from oiled and control harbour seal populations was able to be used to infer spill effects and declining patterns in oil exposure in individual animals.

Observations of the behaviour of animals affected by an oil spill may also provide insight into the spill's effects. This could include collecting animal movement and habitat utilisation data, which can be used to identify potential overlap of important habitat with areas affected by a spill as determined from information collected by operational monitoring (e.g. aerial surveillance of surface slicks). Survey guidelines for Australia's threatened birds have been published (DEWHA, 2010). While the overarching purpose of these DoE guidelines differs from the overarching aim that should be achieved by an OSMP, DoE's survey guidelines offer general advice on considerations that may be relevant to any bird monitoring element of an OSMP.

Titleholders should aim to integrate wildlife response activities with scientific monitoring. Integration could be achieved by aiming to measure some common indicators during both oiled wildlife response activities and scientific monitoring (e.g. tissue biopsy data) and/or track the condition of captured and cleaned animals over time as part of the scientific monitoring. For example, the numbers of recorded deceased and cleaned and released animals can provide context for on-going measures of key indicators of population size during scientific monitoring. Similarly, carefully considered monitoring that is allows patterns of oil-related exposure and health implications in individual animals to be tracked over time while coincidentally measuring population parameters can enhance the understanding of cause-effect relationships. Resultant improved understanding can be applied in the future to make more accurate predictions of impact and inform better decision-making in relation to how and where to allocate environmental management resources to minimise impacts of hydrocarbon spills on wildlife.

Where demonstrable risk to wildlife populations is evident or impacts are likely it is expected that titleholders would commit to monitoring those at-risk/impacted populations to determine, to the extent possible, the impacts. Since population-level impacts may not be immediately obvious following as spill and determining impacts to populations is challenging and not generally something that is achieved in the short term, careful consideration needs to be given to the selection of population-level indicators that will be the focus of monitoring. Population-level indicators should lie along a cause-effect pathway relevant to hydrocarbon effects and hence be likely to show a response to oil-associated stressors. For example, if a cause-effect relationship and associated risk and impact assessment ascertains that hydrocarbon contamination of shorelines affects the quality and quantity of food resources for wading shorebirds, which in turn affects the health of individual adult and hatchling birds, then in addition to indicators of habitat contamination, suitable demographic indicators such as mortality rate, age structure and fecundity along with physiological indicators of health should be considered for inclusion in the monitoring program. Other indicators of populations that might be affected by hydrocarbon spills include measures of breeding success, age-at-first-breeding and rates of transition from one stage in the life history to the next.

Appendix 6 Baseline studies

6.1 Baseline water and sediment quality

The primary advantage of undertaking a baseline evaluation of water and sediment quality is the capacity to delineate contributions from the activity from sources that are either naturally occurring (e.g. natural oil seeps or mineralised phases of metals in sediments) or present as a result of cumulative inputs from neighbouring activities (e.g. planned discharges of drilling muds or produced formation water from nearby exploration activities or production facilities, respectively). This is particularly relevant where the concentration of an oil-associated stressor quantified in the post-spill monitoring program is exaggerated due to the previously existing background levels, which has the additive effect of overestimating the ecological risk and potential for impacts.

Surveying the background levels within the area of interest requires understanding the chemical composition of both the oil-associated stressor and the existing concentrations within the water and sediment. The chemical characterisation should be comprehensive enough to enable oil-associated stressors to be quantified in the water, sediment or biota to inform both the baseline and emergency monitoring activities. Characterising the chemical composition of an oil or condensate identifies the hydrocarbon and non-hydrocarbon contaminants of concern which effectively minimises the replication of unnecessary chemical analyses in the monitoring program by targeting specific analytes in the water, sediment or biota.

The identification of hydrocarbon and non-hydrocarbon oil-associated stressors within an oil or condensate may be undertaken on the whole oil, or a representative fraction of the whole oil which has relevance to the receiving environment, e.g. the water accommodated fraction (WAF, discussed further below). Given a broad range of hydrocarbon and non-hydrocarbon analytes will be present within a range of variable water, sediment, biological tissue and whole-oil matrices, the appropriate analytical method should be carefully selected. General considerations may include:

- Suitable analytical instrumentation (e.g. GC-MS, ICP-MS)
- Sample processing methods (e.g. solvent extraction and clean-up)
- Practical quantification limits
- Matrix interferences and method limitations
- Quality assurance and quality control (e.g. instrument calibration, reference standards, drift correction, blanks and triplicates)
- Laboratory accreditation (e.g. NATA, GLP).

While undertaking a chemical characterisation of the oil, an extension to include both diagnostic chemical (e.g. PAH isomer profile, aromatic sulphur heterocyclic compound profile, vanadium/nickel ratio) and biological (e.g. acyclic terpenoids or isoprenoids such as pristine/phytane ratio) fingerprinting analyses may also be beneficial. The primary advantage of undertaking fingerprinting is the ability to delineate the source oil from that observed in the receiving environment during an unplanned release. This is particularly useful when attempting to define the spatial distribution (i.e. area of interest) for ongoing scientific monitoring activities which may be corrupted by detection of naturally occurring seeps or cumulative impacts from neighbouring petroleum activities.

The oil-associated stressors identified in the chemical characterisation may then be targeted to establish pre-spill background levels in water, sediment and biota. The field sampling program should adequately represent the area of interest, and be designed considering key principles outlined in Section 3. If a sample analysis plan (SAP) has been developed for the baseline area of interest, the structure may be readily modified and applied in an emergency monitoring response. Examples of key principles for inclusion within a field SAP may include details outlining:

- Location and timing
- Sampling program design (e.g. randomised or targeted)
- Sample collection techniques for water sediment and biota

- Field records, measurements and observations
- Field processing, transport and storage (e.g. preservation of sample integrity)
- Quality assurance and quality control (e.g. triplicate samples, field blanks, holding times)
- Key personnel and subcontractor services
- Turn-around-time and reporting arrangements

In addition, physico-chemical properties which are known to modify the bioavailability of dissolved or particulate contaminants should also be measured in the baseline study to enable comparison with available guideline values (e.g. normalisation of sediment-associated petroleum hydrocarbons to 1% organic carbon).

In situations where the field survey identifies locally elevated background levels of an oil-associated stressor in water, sediment or biota (by comparison with relevant guideline trigger values or background levels for the broader survey area), the baseline assessment can proceed to an ecotoxicological investigation to determine the bioavailability of the contaminants. Alternatively, it may also be possible to determine if the existing oil-associated stressors have affected the community structure where a concurrent ecological community baseline survey has been undertaken.

6.2 Simulated weathering studies with dispersant efficacy testing

The potential for a crude-oil or condensate to persist in the marine receiving environment will depend on the extent of natural weathering and spill response interventions, e.g. the application of chemical dispersants. Subsequently, these factors may also influence the spatial and temporal distribution and bioavailability of an oil-associated stressor within the area of interest.

Existing literature and computer simulation models based on a representative crude oil or condensate spill parameters (e.g. volume, composition, slick thickness and metocean conditions) provide useful estimations for the behaviour and fate of the spill, which is of importance when planning appropriate operational response strategies. However, under circumstances where greater certainty is required (e.g. probable contact sensitive environmental receptors), laboratory-based simulated weathering studies and dispersant efficacy tests provide an understanding of the persistence and transformation for the specific oil-associated stressors within the receiving environment.

For example, oil weathering studies involve introducing a representative sample crude oil or condensate into seawater under the abiotic and physico-chemical conditions expected in-situ, e.g. Mackay MNS test apparatus, (Mackay and Szeto, 1982; AMSA, 2012). Generally, the hydrocarbon content of the whole oil and/or water accommodated fraction (WAF) is monitored over a designated period of time to assess the extent of natural weathering with results reported in terms of percentage composition evaporated to the atmosphere, dissolved or dispersed in the water column or remaining at the water surface. A reduction in the concentration of hydrocarbons over a period of time is indicative of persistence within a designated compartment of the receiving environment.

Dispersant efficacy tests are fundamentally similar to weathering studies in terms of assessing the composition, behaviour and fate of hydrocarbons, though a dispersant is added to the crude oil or condensate to assess the appropriateness of the dispersant type, ability to disperse oil into the water column and to identify the timeframe for which a dispersant will be effective. Under amenable oceanic conditions, dispersants are usually applied as an operational response strategy to prevent shoreline contact and oiling of wildlife. While dispersant efficacy testing is useful for informing the operational response strategy, an acknowledgement of the impacts and risks from dispersed or entrained hydrocarbon is often neglected.

Simulated weathering studies and dispersant efficacy tests are generally limited to an understanding of changes in chemical composition of the whole oil and water accommodated fraction, from which little information can be ascertained with respect to the bioavailability of the oil-associated stressors following natural weathering and dispersant use. However, in keeping with the key concepts required to assess the distribution and bioavailability of an oil-associated stressor, the simulated weathering studies and dispersant efficacy tests can expand to include considerations for the bioavailability. Ideally, this would include a suite of toxicity tests (selected in accordance with criteria outlined in Section 8.1.2) to demonstrate the changes in the

bioavailability of an oil-associated stressor in the simulated WAF following natural weathering and dispersant application. From this, an enhanced understanding of any potential change in chemical composition could be directly related to the toxicity of an oil-associated stressor to better inform the relationship between persistence and potential impacts to organisms residing in the receiving environment.

For example, simulated weathering studies will likely indicate a reduction in the total mass of hydrocarbons over time, with lighter fractions in the whole oil and WAF dissipating rapidly. Alternatively, the application of a chemical dispersant may initially increase the load of hydrocarbons within the water column, followed by gradual weathering. An assessment of bioavailability over this time scale aims to validate assumptions that a change in chemical composition is associated with a reduced risk to sensitive biological receptors within the receiving environment.

Key benefits for undertaking expanded simulated weathering studies and dispersant efficacy tests may include:

Estimating the rate of weathering for a representative crude oil or condensate to validate trajectory modelling parameters and inform spill response Net Environment Benefit Analysis (NEBA),

Understanding the oil-associated stressor fate and persistence to inform scientific monitoring program design within the area of interest (e.g. distribution from sea surface to dissolved and entrained phases may focus monitoring efforts toward sub-surface features within the water column),

Demonstrating changes in oil-associated stressor toxicity over time following natural weathering, as well as an assessment of additive effects from combined dispersant and oil-associated stressor mixtures,

Determining spray zone boundaries within the area of interest by evaluating risk of dispersing oil into the water column,

Identifying the presence and bioavailability of non-hydrocarbon oil-associated stressors generally not measured in standard simulated weathering and dispersant efficacy tests.

6.3 Deriving a reliable species protection trigger value

The water and sediment quality monitoring component of the scientific monitoring program should at a minimum aim to identify and quantify the distribution of oil-associated stressors within the receiving environment. However, a comparison of water and sediment quality data (collected during the emergency response monitoring) with guideline trigger values or background levels may not be sufficient for evaluating the ecological risk from the oil-associated stressors identified. This is primarily due to the presence of co-occurring contaminants and the many physico-chemical factors known to influence the bioavailability of an oil-associated stressor. Understanding the bioavailability of an oil-associated stressor prior to an unplanned release greatly assists with validating cause-effect linkages between the oil-associated stressor and the ecological indicators within the area of interest.

For example, as part of the initial scientific monitoring response to an oil spill, a water and sediment quality assessment may be undertaken within the area of interest to better define the distribution. Where an oil-associated stressor has been identified at concentrations exceeding the guideline trigger values and/or background levels, further assessment of the bioavailability can be undertaken to determine the risk of adverse biological effects occurring (e.g. toxicity testing). However, determining the bioavailability of an oil-associated stressor for multiple sites exceeding guideline trigger values and/or background may not always be practical or useful due to the many constraints associated with logistics (including the initial analysis, confirmation of the exceedance, resampling of a remote site, followed by dispatch to a service provider), during which time the chemical composition (and bioavailability) may have changed significantly from that initially detected. Furthermore, it may be cost prohibitive to assess the bioavailability of many samples in situations where the oil-associated stressors are broadly distributed.

An effective alternative is to derive a species protection trigger value which is specific to the crude oil or condensate of interest. The species protection trigger value is analogous to the water and sediment quality guideline trigger values outlined in ANZECC/ARMCANZ (2000), in which a threshold concentration is intended to be predictive of adverse biological effects occurring, and protective of the aquatic organisms residing in the marine environment. The application is also similar; in that water and sediment quality parameters measured

during the spill event can be directly compared to a more predictive and protective trigger value derived from the representative oil-associated stressors.

An appropriate species protection trigger value reduces the need to assess bioavailability for every sample exceeding guideline trigger values and/or baseline levels, and provides valuable insight with respect to establishing cause-effect relationships between the oil-associated stressor and supporting observations of potential ecological impacts. Species protection trigger values for a crude oil or condensate can be derived for both water and sediments. The derivation of a species protection trigger value is a laboratory-based baseline study using a statistical a comparison of biological effects from a range of representative toxicity test species exposed to the chemically characterised oil-associated stressors which have been artificially introduced into a water or sediment medium.

Given the species protection trigger value is intended to be used as a reference in the event of an unplanned release of oil, the crude oil or condensate should therefore be sufficiently characterised prior to undertaking this approach to ensure the predictors of chemical bioavailability are well established. This is particularly important for complex petroleum hydrocarbon mixtures that often contain co-occurring contaminants (i.e. additive toxicity from non-petroleum classed contaminants) which may also undergo natural weathering processes (i.e. biodegradation that reduces toxicity over extended periods of exposure).

For example, preparation of a WAF is more suitable for the purposes of deriving a trigger value for dissolved oil-associated stressors, compared to sediment spiking approaches which are more appropriate for deriving a sediment quality trigger value. In both cases, careful documentation of the preparation techniques, physico-chemical properties, equilibration time and chemical characterisation of oil-associated stressors is required for interpretation of the WAF and spiked sediment toxicity testing results. Suitable methods for the preparation of an artificially contaminated WAF and spiked sediments may be found in the 'Guidance for testing of poorly soluble substances' (GHS, 2010) and 'Handbook for sediment quality assessment' (Simpson et al., 2005), respectively.

The selection of appropriate toxicity tests is discussed in Section 8.1.2, though it is noted that one bioassay result will not be sufficient for deriving a biological effects threshold. In accordance with ANZECC/ARMCANZ (2000), the species protection trigger value should be derived using the EC10 data (i.e. 10% biological effect) from a minimum of five representative species from four taxonomic groups. The biological effects data is then statistically analysed (Campbell et al., 2000) to derive a desired level of species protection, i.e. usually 99% for pristine ecosystems, 95% for moderately-slightly disturbed ecosystems. For example, organisms exposed to the artificially prepared WAF or spiked sediment concentration at or below the 95% species protection trigger value (based on EC10 values) will theoretically result in <5% of the exposed organisms showing <10% biological effect (i.e. <10% inhibition of the biological effect endpoint). Confidence in the trigger values ability to predict adverse biological effects increases with the number and diversity of test species utilised, and sensitivity of the test species endpoint (e.g. sub-lethal and chronic endpoints will be more sensitive than acute endpoints).

The limitation of the species protection trigger value for predicting adverse biological effects will be influenced by the toxicity testing exposure regime selected. For example, sessile or site attached organisms residing in the receiving environment are more likely to be exposed to an oil-associated stressor over longer-term durations than mobile organisms, which may potentially avoid areas of degraded water and sediment quality. For sessile and site attached organisms, a species protection trigger value derived using a continuous-exposure regime will be more appropriate, though will overestimate the potential toxicity to mobile organisms. For mobile organisms, assessing the toxicity after a short-term exposure to an oil-associated stressor may be undertaken using standardised pulsed-exposure toxicity testing methods. By comparison, the pulsed-exposure regime may underestimate the potential toxicity to sessile and site attached organisms.

Given the intended application of a derived water or sediment quality trigger value, it is strongly recommended that specialist technical advice be obtained. However, the key advantage of deriving an appropriate species protection trigger value is to providing greater confidence in validating the presence or absence of impacts from ecological monitoring observations, while eliminating the need to undertake bioavailability testing for all samples exceeding guideline trigger values and/or background levels.

NOPSEMA Attachment 7: Submission to the Senate Inquiry into the potential environmental, social and economic impacts of BP's planned exploratory oil drilling project, and any future oil or gas production in the Great Australian Bight

NOPSEMA

Guidance note

N-04750-GN 1565 Rev 0 26/11/2015

Activities within Commonwealth Marine Reserves

Core concepts

- The Commonwealth Marine Area (CMA) is a matter of national environmental significance protected under Part 3 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- Commonwealth marine reserves (CMR) are areas within the CMA that are proclaimed under the EPBC Act for the purpose of protecting and maintaining biological diversity and which contribute to a national representative system of marine protected areas. There are five networks of CMRs plus the stand-alone Coral Sea CMR (but for the purposes of this Guidance Note the Coral Sea is treated as the sixth CMR network). Activities within the CMRs are governed by the EPBC Act and CMR management plans created under that Act.
- The EPBC Act defines 'mining operations'. Offshore petroleum activities are within the definition of mining operations.
- During the preparation of an Environment Plan (EP), titleholders must demonstrate that impacts and risks on the CMA more broadly and relevant CMRs from both planned petroleum activities and emergency response activities will be reduced to As Low As Reasonably Practicable (ALARP) and will not result in unacceptable impacts to the environment of the CMA, including CMRs.
- Titleholders must continue to demonstrate throughout an activity that impacts and risks to CMRs are not unacceptable, reduced to ALARP and consistent with relevant CMR management plans and any associated requirements.
- If there is no CMR management plan in place, titleholders should ensure that their activities are consistent with the Australian IUCN reserve management principles for the IUCN category to which the reserve or reserve zone was assigned by the proclamation.
- The Australian Government commissioned an independent review of the new CMR networks established in 2012. Until this review is complete and new management plans come into effect, transitional management arrangements are in place.
- Transitional arrangements and the 'no changes on the water' policy means that offshore petroleum activity is not restricted in new reserves first proclaimed in November 2012. In these newly proclaimed reserves, any restrictions according to zone type will start once management plans come into effect, following completion of the independent review.
- In reserve areas that predated the 2012 proclamation and where transitional management arrangements apply, 'no changes on the water' means that the management arrangements that used to apply before November 2012 continue to be applied now. This is to ensure that the reserve's long-term protection is maintained.
- This guidance note has been prepared by NOPSEMA in consultation with the Director of National Parks, the Australian Government authority responsible for managing Commonwealth reserves under the EPBC Act.

Table of contents

Abbreviations/acronyms

ALARP	As Low As Reasonably Practicable
CMA	Commonwealth Marine Area
CMR	Commonwealth Marine Reserve
CMRs	Commonwealth Marine Reserves
DNP	Director of National Parks
DoE	Department of the Environment
EP	Environment Plan
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EPBC	Environment Protection and Biodiversity Conservation
Emergency response	Actions taken in accordance with the accepted EP/OPEP, including environmental monitoring and remediation, to respond to an oil pollution incident resulting from a petroleum activity
IUCN	International Union for Conservation of Nature
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
OPEP	Oil Pollution Emergency Plan
Program	NOPSEMA Program endorsed under part 10 of the EPBC Act for streamlining offshore petroleum environmental approvals

1 Introduction

1.1 Intent and purpose

The purpose of this guidance note is to outline the management status of Commonwealth Marine Reserves (CMRs) and the implications of this for the management of petroleum activities in and around CMRs. Guidance is also provided regarding other approvals that may be required from the Director of National Parks (DNP) to assist in the preparation of environment plans (EPs). This guidance note remains current until management plans come into effect for the new CMR Networks.

1.2 Background

Commonwealth Marine Reserves are areas established by proclamation under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) for the purpose of protecting and maintaining biological diversity in the reserves and contributing to the objectives of the national representative system of marine protected areas. Australia has six CMR networks that contain proclaimed marine reserves (Figure 1). The DNP is the statutory authority responsible for the administration, management and control of Commonwealth reserves under the EPBC Act.

The Australian Government has adopted the International Union for Conservation of Nature (IUCN) protected area categories for defining the broad management principles relevant to each CMR. At the time of proclamation, the reserves are assigned an IUCN category. These categories have been given legal effect in relation to CMRs under the EPBC Act[1] and management must be in accordance with the Australian IUCN reserve management principles in the *Environment Protection and Biodiversity Conservation Regulations 2000* (EPBC Regulations).[2] CMRs can be divided into two or more zones with an IUCN protected area category applied to each zone. For further information on IUCN categories, please refer to the EPBC Regulations 2000 (Schedule 8) and Australian Reserve Management Principles for Commonwealth Marine Protected Areas (http://www.environment.gov.au/resource/australian-iucn-reserve-management-principles-commonwealth-marine-protected-areas).

Specific management requirements for CMRs are detailed in management plans made under the EPBC Act. These plans give effect to the broad reserve management principles and define what activities are allowed to occur without the need for authorisation from the DNP, allowed to occur following authorisation by the DNP, or not allowed, within the CMR. Each CMR must have a management plan in operation as soon as practicable after the reserve is declared.[3] The content of the management plan is prescribed in the EPBC Act[4]. Among other things, the Act requires that management plans detail how each zone of the reserve is to be managed and include specifications for any 'mining operations' that may be carried out in the reserve, as well as the conditions under which these operations may be carried out. A management plan comes into effect after it has been approved by the Minister and registered on the Federal Register of Legislative Instruments (or on a later date specified in the plan approved by the Minister).[5] The DNP and other Commonwealth agencies must act consistently with the in force management plan[6].

The EPBC Act defines 'mining operations.'[7] This terminology is used in CMR management plans and approvals issued by the DNP. The definition of mining operations under the Act includes all petroleum activities, including associated emergency response activities.

[1] EPBC Act, section 346.
[2] EPBC Regulations, schedule 8
[3] EPBC Act, section 366
[4] EPBC Act, section 367
[5] EPBC Act, section 370 and *Legislative Instruments Act 2003*, section 12
[6] EPBC Act, section 362
[7] EPBC Act section 355

The establishment of CMRs, and the EPBC Act requirements for activities in CMRs, do not affect activities under a seabed 'usage right' issued prior to their establishment, but renewal or extension of the term of the 'right' requires consent from the Minister for the Environment[8].

Australia's system of marine reserves includes six CMR networks, comprising the South-east network, proclaimed in 2007, and five new networks being the South-west, North-west, North, Coral Sea and Temperate East. The Australian Government set aside management plans for the new CMRs that were due to come into effect in July 2014 and commissioned an independent review of the new CMRs that were first proclaimed under the EPBC Act) in 2012 and re-proclaimed in 2013. While this review is underway, and until management plans for the new reserves are in operation, there are 'transitional management arrangements' in place for these CMRs.

Transitional management arrangements are described in further detail in Section 2.2 of this document and further information on the marine reserves review is available at http://www.environment.gov.au/marinereservesreview/home.

The South-east CMR Network has a current management plan in place and is not subject to the review or transitional management arrangements.

The EPBC Act requires that when a management plan is not in operation for a CMR, the DNP must manage the CMR, and zones within the CMR, in accordance with the Australian IUCN reserve management principles for the IUCN category assigned to the CMR/zone. Mining operations proposed to occur in the CMRs between proclamation of the reserve and implementation of a management plan, require DNP approval issued under section 359B of the EPBC Act. In addition, other Commonwealth agencies including NOPSEMA, must not exercise their powers or functions in relation to the CMR or zone of the reserve inconsistently with the applicable Australian IUCN reserve management principles[9].

2 Current management status and transitional arrangements

2.1 Current management status of CMRs

To provide guidance to petroleum titleholders and for this document only, CMRs have been categorised into three broad 'types', based on the management arrangements in place at the time this guidance note was prepared. Attachment 1 lists CMRs adjacent to the Australian mainland by network, 'type', their management status and information regarding DNP approval of petroleum activities in CMRs. The reserves and their type are also shown in Figure 1.

Type A: CMRs that form part of the South-East Commonwealth Marine Reserves Network proclaimed in 2007.

These CMRs are operating as per the requirements of the current management plan and are not included in the current Government CMR review or subject to transitional management arrangements.

Type B: New CMRs that were first proclaimed in 2012 and then re-proclaimed in 2013.

These CMRs do not have a management plan in place. They are subject to transitional management arrangements and are part of the Government review. Some Type B CMRs (e.g. the new Great Australian Bight CMR) include a Type C CMR area (e.g. the former Great Australian Bight Marine Park (Commonwealth Waters)) within their boundaries. The description of Type C CMRs below further explains this arrangement.

Type C: CMRs that were proclaimed before 2012 and re-proclaimed in 2013.

Type C CMRs consist both of reserves that have continued, being:

[8] EPBC Act, sections 350(7) and 359
[9] EPBC Act, section 357

- Ningaloo
- Mermaid Reef
- Ashmore Reef
- Cartier Island

and the areas of the following reserves and conservation zone that had been declared before 2012 but were revoked and the areas incorporated in one of the new (Type B) reserves:

- the former Great Australian Bight Marine Park (Commonwealth Waters) – incorporated into the new Great Australian Bight CMR
- the former Coringa-Herald National Nature Reserve, Lihou Reef National Nature Reserve and the former Coral Sea Conservation Zone - incorporated into the new Coral Sea CMR
- the former Lord Howe Island Marine Park (Commonwealth Waters) and Elizabeth and Middleton Reefs Marine National Nature Reserve – incorporated into the new Lord Howe CMR
- the former Solitary Islands Marine Reserve (Commonwealth Waters) – incorporated into the new Solitary Islands CMR
- the former Cod Grounds Commonwealth Marine Reserve – incorporated into new Cod Grounds CMR.

All of the Type C CMRs, except the former Cod Grounds CMR and Coral Sea Conservation Zone, had management plans, which had expired before they were incorporated in a Type B reserve in 2012. The Cod Grounds CMR and Coral Sea Conservation Zone never had a management plan. The transitional management arrangements for these CMRs continue the pre-2012 arrangements.

NOPSEMA Attachment 7: Submission to the Senate Inquiry into the potential environmental, social and economic impacts of BP's planned exploratory oil drilling project, and any future oil or gas production in the Great Australian Bight

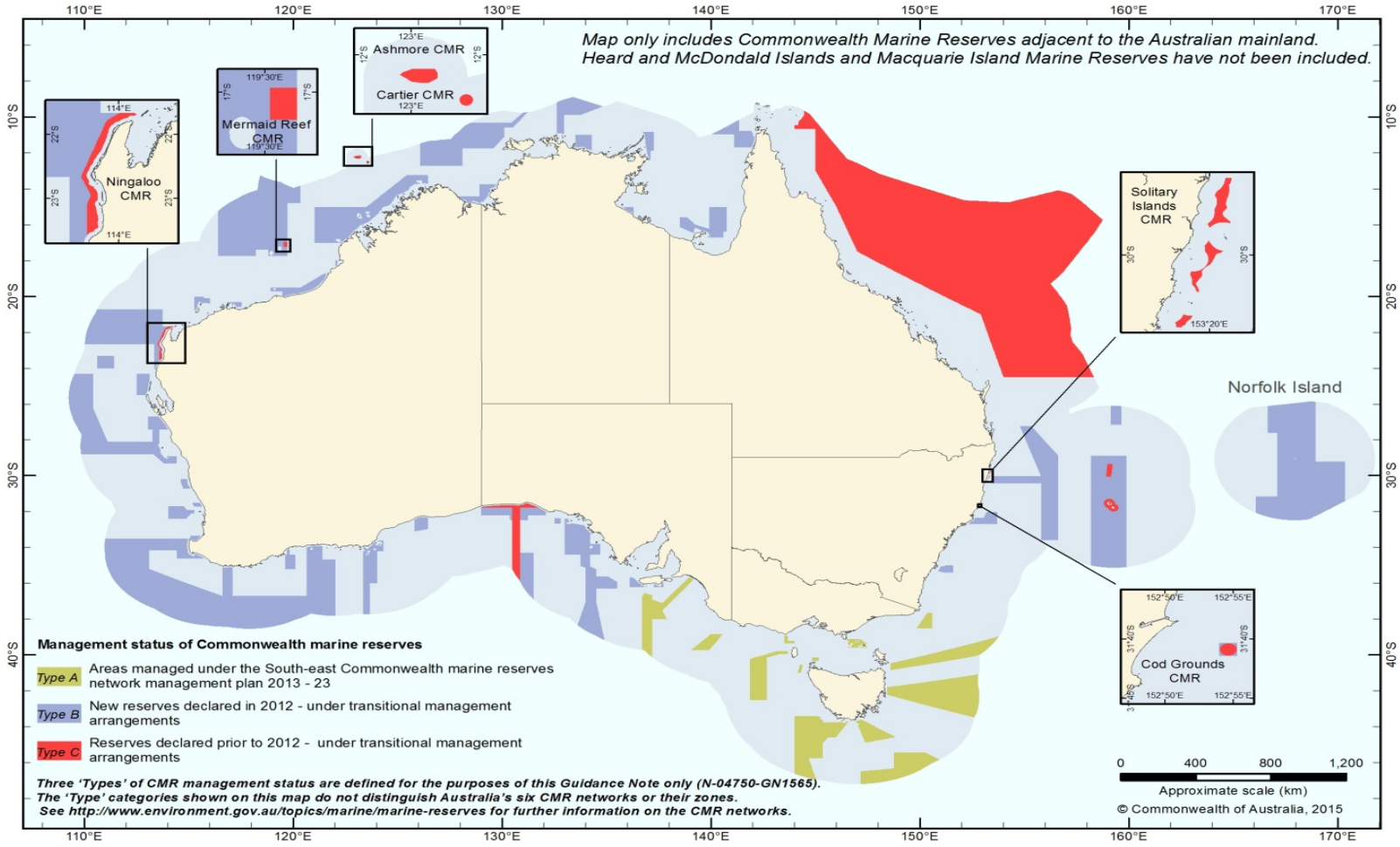


Figure 1: Commonwealth marine reserves adjacent to the Australian mainland and their 'type'.

NOPSEMA Attachment 7: Submission to the Senate Inquiry into the potential environmental, social and economic impacts of BP's planned exploratory oil drilling project, and any future oil or gas production in the Great Australian Bight

2.2 Transitional management arrangements

As part of the transitional arrangements for **Type B** CMRs, the DNP has issued a general approval under section 359B of the EPBC Act allowing a range of activities, including mining operations. The approval does not replace the need for titleholders to have an accepted EP for all petroleum activities, including those activities that may occur in or potentially impact on a CMR, but it does not place any additional requirements on titleholders such as securing individual DNP approvals. The general approval will cease when management plans come into effect for Type B CMRs.

Type C CMRs are being managed, and section 359B approvals issued, in accordance with the pre-existing management arrangements (and for administrative consistency, the same way as under the last management plan for any of those CMRs).

3 Implications for petroleum titleholders

For all petroleum activities, titleholders are required to ensure that the EP for the activity demonstrates that the environmental impacts and risks of the activity (including emergency response activities) will be reduced to ALARP and to an acceptable level before NOPSEMA can accept the EP. This includes specific consideration of relevant matters of national environmental significance, including the CMA. This requirement also applies to revisions of existing EPs submitted to NOPSEMA.

When establishing the external context used to define acceptable levels of impact and risk to the environment in CMRs and when selecting management measures, titleholders should describe the environmental management arrangements that exist for these areas. They should also demonstrate in their EPs how they reflect relevant management plans, or act consistent with management principles if there is no plan, and have regard to the representative values of the reserves and other information published by the DoE that is relevant to the reserve. Titleholders must also describe relevant DNP approvals and how they will ensure the requirements of these are met.

For ongoing activities that have an EP in place, titleholders are required to ensure that impacts and risks to the marine environment, and to CMRs, continue to be managed to an acceptable level and reduced to ALARP for the life of the activity. Titleholders should monitor progress of the CMR review and be prepared for any potential implications associated with the commencement of new management plans for CMRs. Updates from the Government's independent CMR review, can be received through a subscription service at http://www.environment.gov.au/marinereservesreview/marine-reserves-updates/subscribe. Once management plans come into effect, activities being carried out under accepted EPs will need to be consistent with the requirements of those plans, unless the petroleum activities are authorised by titles issued before 14 December 2013. The process by which titleholders will manage potential implications of any change to CMR management that may occur during the life of the activity should be detailed in the implementation strategy of the EP.

Some specific considerations for each 'type' of CMR are outlined below and summarised along with the DNP approval requirements in Attachment 1.

Type A: Titleholders preparing EPs that involve activities within, or with potential to impact on this type of CMR should have regard to the management plan that is in effect and ensure that their EP is not inconsistent with the management plan. Class Approvals have been issued by the DNP under the South-east Commonwealth Marine Reserves Network management plan allowing mining operations in zones with IUCN category VI, where the operations are assessed and approved as 'controlled actions' under Part 9 of the EPBC Act (including EPs accepted by NOPSEMA under the Program) and those that are authorised to be undertaken in a particular manner under Part 7 of the EPBC Act.[10] Emergency response activities that may be required in other zones will be accepted by the DNP if conducted in the same manner as described

[10] http://www.environment.gov.au/resource/class-approval-mining

in the s359B approval for emergency response for the Type C North-west, South-west and Temperate East CMRs.

Type B: General approvals have been issued by the DNP allowing mining activities in these reserves until management plans come into effect. Titleholders preparing EPs that involve planned or emergency response activities within, or with potential to impact on, this CMR type should have regard to the Australian IUCN reserve management principles relevant to each zone within the CMR. They should also consider their activity impacts and risks in the context of the representative values of the reserve and information contained in relevant marine bioregional plans, conservation advice(s) and other relevant documentation on the DoE website. No additional DNP approvals are required.

Type C: Titleholders preparing EPs that involve planned petroleum activities within this type of CMR [with the exception of the Benthic Protection Zone of the former Great Australian Bight Marine Park (Commonwealth Waters) and the general use zone of the Solitary Islands CMR] should be aware that these EPs cannot be accepted by NOPSEMA (as 'mining operations' are not approved in these CMRs).

Titleholders preparing EPs that involve planned activities outside of the boundary but with potential impacts on this CMR type, or emergency response activities that may be required inside the boundary, should have regard to the Australian IUCN reserve management principles relevant to each zone within the CMR that may be affected by the activity. They should also consider their activity impacts and risks in the context of the representative values of the reserve and information contained in relevant marine bioregional plans, conservation advice(s) and other relevant documentation on the DoE website. Only emergency response activities inside the CMRs are approved if carried out in accordance with the s359B approval (for emergency response) issued for the North-west, South-west and Temperate East CMRs. Titleholders should note the approval requires observing any requirements advised by DNP about minimising potential impacts of emergency response activities on CMR values.

Titleholders preparing EPs that involve activities within, or with the potential to impact on, the former Great Australian Bight Marine Park (Commonwealth Waters) or the general use zone of the Solitary Islands CMR should have regard to the Australian IUCN reserve management principles relevant to the area. They should also consider information contained in the former Great Australian Bight Marine Park management plan, as these management arrangements continue to be applied as part of the transitional arrangements. Activities may be allowed in the Benthic Protection Zone of the former GAB CMR under an individual approval issued by the DNP under section 359B of the EPBC Act.

Early consultation with the DNP[11] in the event that an approval for petroleum activities is required may assist titleholders to ensure that all relevant documentation is considered.

[11] The Director of National Parks may be contacted via email at marinereserves@environment.gov.au

Attachment 1 – Overview of existing CMRs by 'Type' and requirements for DNP approval

The following table summarises the current arrangements for CMRs in the CMR networks. See http://www.environment.gov.au/topics/marine/marine-reserves and NOPSEMA EP Content Requirements Guidance Note (http://www.nopsema.gov.au/environmental-management/environment-plans/) for other information that may be relevant to the management of CMRs and the preparation of an EP.

In a number of places, the table below refers to DNP approvals. Where titleholders determine that these approvals are relevant to their activity, they should review the approval and any conditions that apply by visiting the website for the reserve of interest or contacting the DNP, and demonstrate in the EP how the requirements will be met.

Network	Commonwealth marine reserve	Current status of CMRs and their zoning	Management plan status	Status of, and requirements for, DNP approvals relevant to petroleum activities
SOUTH EAST CMR NETWORK	Apollo; Beagle; Boags; East Gippsland; Flinders; Franklin; Freycinet; Huon; Macquarie Island; Murray; Nelson; South Tasman Rise; Tasman Fracture; Zeehan	**CMR Type A** – CMRs declared 2007, boundaries in place **Current zoning**: IUCN Categories 1a (Sanctuary), II (Marine National Park), IV (Habitat Protection, Recreational Use), and VI (Special Purpose, Multiple Use).	**Current management plan:** in effect South-east Commonwealth Marine Reserve Network Management Plan 2013-23	Class approvals have been issued by the DNP under the management plan for mining operations in IUCN category VI network management zones where the operations are: a. carried on in accordance with approval given under Part 9 of the EPBC Act (including under the endorsed NOPSEMA Program) b. carried on in accordance with a specified manner decision notice under Part 7 of the EPBC Act; or c. subject to a not controlled action decision under section75 of the EPBC Act. Note: • Mining operations not covered by the class approvals may be carried on in IUCN category VI network management zones in accordance with a permit issued by the DNP. • Mining operations other than emergency response and environmental monitoring activities are not allowed in IUCN category 1a, II and IV network management zones under the management plan. • Emergency response activities that may be required in IUCN category 1a, II and IV network management zones will be accepted by the DNP if conducted in the manner described in the s359B approval issued for emergency response in the Type C North-west, South-west and Temperate East CMRs.

Network	Commonwealth marine reserve	Current status of CMRs and their zoning	Management plan status	Status of, and requirements for, DNP approvals relevant to petroleum activities
NORTH WEST CMR NETWORK	Carnarvon Canyon; Shark Bay; Gascoyne; Montebello; Dampier; Eighty Mile Beach; Argo-Rowley Terrace; Roebuck; Kimberley	**CMR Type B** – New CMR boundaries and zoning reproclaimed **Current zoning**: IUCN Categories II (Marine National Park & Recreational Use), IV (Habitat Protection) &, VI (Multiple Use)	**No current management plan**: refer to IUCN reserve management principles	General approval has been issued by the DNP allowing mining operations.
	Mermaid Reef	**CMR Type C** – CMR boundaries and prior zoning has been re-proclaimed **Current zoning**: IUCN category Ia – (Sanctuary)	**Expired management plan:** Zoning and approach from last management plan applies Mermaid Reef Marine National Nature Reserve Plan of Management 2000-2007	A general approval is provided for emergency response activities. Approval will not be issued for planned mining operations within the CMR.
	Ashmore Reef and Cartier Island	**CMR Type C** – CMR boundaries and prior zoning has been re-proclaimed **Current zoning**: IUCN Category Ia, (Sanctuary) and II (Recreational Use Zone)	**Expired management plan**: Zoning and approach from last management plan applies Ashmore Reef National Nature Reserve and Cartier Island Marine Reserve Management Plans 2002 (expired 2009)	A general approval is provided for emergency response activities. Approval will not be issued for planned mining operations within the CMR.

Network	Commonwealth marine reserve	Current status of CMRs and their zoning	Management plan status	Status of, and requirements for, DNP approvals relevant to petroleum activities
	Ningaloo	**CMR Type C** – CMR boundaries and prior zoning has been re-proclaimed **Current zoning**: IUCN Category II (Recreational Use Zone)	**Expired management plan**: Zoning and approach of last management plan applies Ningaloo Marine Park (Commonwealth Waters) Plan of management 2002 (expired 2009)	A general approval is provided for emergency response activities. Approval will not be issued for planned mining operations within the CMR.
SOUTH WEST CMR NETWORK	Great Australian Bight	**CMR Type B and C** – New CMR that includes the area of the former Great Australian Bight Marine Park (Commonwealth Waters) **Current zoning**: IUCN categories II (Marine National Park), VI (Multiple Use and Special Purpose Zones)	**Expired management plan**: zoning and approach of former plan of management applies Great Australian Bight Marine Park (Commonwealth Waters) Management Plan 2005-2012	Type B areas – general approval has been issued by DNP allowing mining operations in these areas. Type C areas – individual approval required in Benthic Protection Zone. Mining activities prohibited in the area corresponding to the former Marine Mammal Protection Zone and the area is closed to all access from 1 May to 31 October. DNP manages in accordance with the Australian IUCN reserve management principles and referring to specific provisions in last in-force management plan for guidance when interpreting the intent of the principles as they relate to the reserve or zone of interest. A general approval is provided for emergency response activities.

Network	Commonwealth marine reserve	Current status of CMRs and their zoning	Management plan status	Status of, and requirements for, DNP approvals relevant to petroleum activities
	Abrolhos; Jurien; Two Rocks; Perth canyon; Geographe; South-west Corner; Eastern Recherche; Twilight; Bremer; Murat; Western Eyre; Western Kangaroo Island; Southern Kangaroo Island	**CMR Type B** – New CMR, boundaries and zoning re-proclaimed **Current zoning**: IUCN categories II (Marine National Park), IV (Habitat Protection) and VI (Special purpose, Special Purpose (Oil and Gas Exclusion) & Multiple Use).	**No current management plan**: refer to IUCN reserve management principles	General approval has been issued by DNP allowing mining operations.
NORTH CMR NETWORK	Arafura; Arnhem; Gulf of Carpentaria; Limmen; Joseph Bonaparte Gulf; Oceanic Shoals; Wessel; West Cape York	**CMR Type B** – New CMR, boundaries and zoning re-proclaimed **Current zoning:** various including IUCN Categories II, VI (Special Purpose) and VI (Multiple Use)	**No current management plan**: refer to IUCN reserve management principles	General approval has been issued by DNP allowing mining operations.
CORAL SEA CMR	Coral Sea Conservation Zone	**CMR Type C** –Boundaries revoked and the area incorporated into the Coral Sea CMR	**No current management plan**: Zoning and former management arrangements applies	All mining operations are prohibited in the area of the former zone. An approval is required for emergency response activities.

Network	Commonwealth marine reserve	Current status of CMRs and their zoning	Management plan status	Status of, and requirements for, DNP approvals relevant to petroleum activities
	Coringa-Herald National Nature Reserve	**CMR Type C** –CMR boundaries and zoning has been revoked and the areas incorporated into the Coral Sea CMR	**Expired management plan**: zoning and approach of former plan of management applies Coringa-Herald National Nature Reserve and Lihou National Nature Reserve Management Plan (2001-2008)	All mining operations are prohibited in the area of the former reserve. An approval is required for emergency response activities.
	Lihou Reef National Nature Reserve	**CMR Type C** – CMR boundaries and zoning has been revoked and the areas incorporated into the Coral Sea CMR	**Expired management plan**: zoning and former plan of management applies Coringa-Herald National Nature Reserve and Lihou National Nature Reserve Management Plan (2001-2008)	All mining operations are prohibited in the area of the former reserve. An approval is required for emergency response activities.
TEMPERATE EAST	Gifford; Norfolk, Central Eastern; Hunter; Jervis	**CMR Type B** – New CMR, no statutory plan of management in place **Current Zoning:** various including IUCN Categories II (Marine National Park Zone), IV (Habitat Protection Zone), VI (Multiple Use Zone, Special Purpose Zone)	**No current management plan**: refer to IUCN reserve management principles **Relevant bioregional plan**: Temperate East Marine Bioregional Plan	General approval has been issued by DNP allowing mining operation.

Network	Commonwealth marine reserve	Current status of CMRs and their zoning	Management plan status	Status of, and requirements for, DNP approvals relevant to petroleum activities
	Elizabeth and Middleton Reefs	**CMR Type C** – CMR boundaries and zoning has been re-proclaimed **Current zoning**: IUCN Category 1a (Sanctuary Zone) and IUCN II (Habitat Protection Zone)	**Expired management plan**: zoning and former plan of management applies Elizabeth and Middleton Reefs Marine National Nature reserve Management Plan 2006 - 2013	All mining operations are prohibited in the Reserve. A general approval is provided for emergency response activities.
	Lord Howe	**CMR Type C** – CMR boundaries and zoning has been re-proclaimed **Current zoning**: IUCN Category 1a (Sanctuary Zone) and IUCN II (Habitat Protection Zone)	**Expired management plan**: zoning and former plan of management applies Lord Howe Island Marine Park (Commonwealth Waters) Management Plan 2002-2009	All mining operations are prohibited in the Reserve. A general approval is provided for emergency response activities.
	Solitary Islands	**CMR Type C** – CMR boundaries and zoning has been re-proclaimed **Current zoning**: IUCN Category 1a (Sanctuary Zone); IUCN IV (Habitat Protection Zone); IUCN VI (General Use Zone)	**Expired management plan**: zoning and former plan of management applies Solitary Islands Marine Reserve (Commonwealth Waters) Management Plan 2001 - 2008	Mining operations are prohibited within IUCN 1a and IUCN IV zones of the reserve. Approval must be sought from the DNP for any mining operation proposed within the IUCN VI. A general approval is provided for emergency response activities.

Network	Commonwealth marine reserve	Current status of CMRs and their zoning	Management plan status	Status of, and requirements for, DNP approvals relevant to petroleum activities
	Cod Grounds	**CMR Type B and C** – New CMR that includes area of the former Cod Grounds CMR **Current zoning**: IUCN Category 1a (Sanctuary Zone)	**Expired management plan**: Zoning and former management arrangements applies	Type B areas – general approval has been issued by DNP. Type C areas – All mining operations are prohibited in the Reserve. A general approval is provided for emergency response activities.