

Challenges and lessons learned from environmental approvals for drilling in frontier offshore basins, using the Great Australian Bight as an example

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Abstract. The recent withdrawal of BP Developments Australia Pty Ltd from its exploration drilling efforts in the Great Australian Bight (GAB) has brought focus to the challenges of obtaining environmental approvals for offshore petroleum exploration projects, particularly in frontier, deep-water basins such as the GAB. In preparing the first two environment plan (EP) submissions for the BP GAB drilling exploration project, Aventus Consulting Pty Ltd has come across numerous such challenges, which are summarised in the present paper.

Keywords: bight, Commonwealth Marine Reserves, consultants, deep water, drilling, EIA, environmental impact assessment, environment plan, EP, EPP, exploration, frontier, GAB, modelling, NOPSEMA, oil pollution emergency plan, OPEP, Operational and Scientific Monitoring Program, OSMP, petroleum, spill, seismic, upstream.

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Introduction

The Bight Basin is a large, mainly offshore basin that extends from the southern tip of Western Australia, across the Great Australian Bight (GAB) to the western tip of Kangaroo Island (Geoscience Australia 2017) (Fig. 1). It is a predominantly ultra-deep basin, with waters ranging in depth from 150 to 4500+ m. Over 100 000 line-kilometres of seismic survey data have been acquired in the GAB, and 10 wells have been drilled between 1972 and 2003, all of which were dry holes. All but two wells were drilled in waters less than 200 m deep (Messent 1998; Woodside Energy 2002; DSD 2016).

Since 2011, nine petroleum exploration permits have been awarded to six operators in the GAB (Fig. 2), and include the following:

- Karoon Gas Browse Basin Pty Ltd (2016) – EPP46;
- Santos Offshore Pty Ltd (2015) – WA-517-P;
- Chevron Australia Pty Ltd (2013) – EPP44, 45;
- Murphy Australia Pty Ltd (2013) – EPP43;
- Bight Petroleum Pty Ltd (2011) – EPP41, 42; and
- BP Developments Australia Pty Ltd (2011) – EPP37, 39, 39, 40.

At the time of permit awards, collectively, these companies had committed to a total of AU\$2.5 billion of work programs, comprising geological and geophysical studies, seismic surveys,

exploration drilling and well data analysis (NOPTA 2017). But is this investment at risk because of the inability to secure environmental approvals for drilling, as highlighted by the withdrawal of BP from exploration in the GAB after three environment plan (EP) submissions? The following discussion examines this.

The challenges of obtaining environmental approvals for drilling in an offshore frontier basin relate to several key factors, these being as follows:

- the absence of hydrocarbon samples from the GAB;
- deep water and long distances from shore;
- the sensitivity of the coastal environments;
- an informed and vocal public; and
- politics.

Analogues

The lack of hydrocarbon discoveries in the GAB from the 10 wells drilled means that there are no Australian analogue hydrocarbons on which to base oil spill modelling that feeds into environmental impact assessment (EIA). Reservoir modelling in the GAB has led to predictions that light crudes (API Group II) are most likely to be encountered, with high wax, asphaltene, nickel and vanadium contents. On the basis of this, the most suitable analogues have been determined to be from colder higher-latitude regions, such as North Sea crudes, but these do

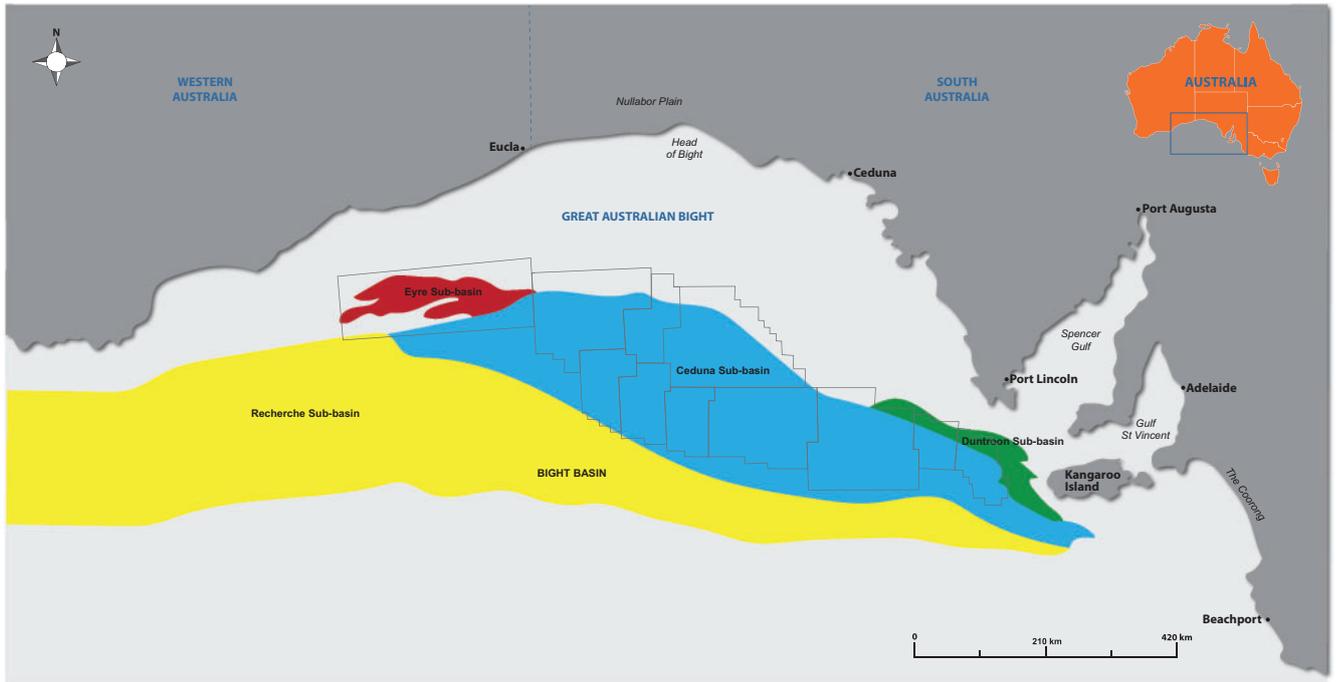


Fig. 1. The Bight Basin and its sub-basins. (Source: adapted from Geoscience Australia 2017).

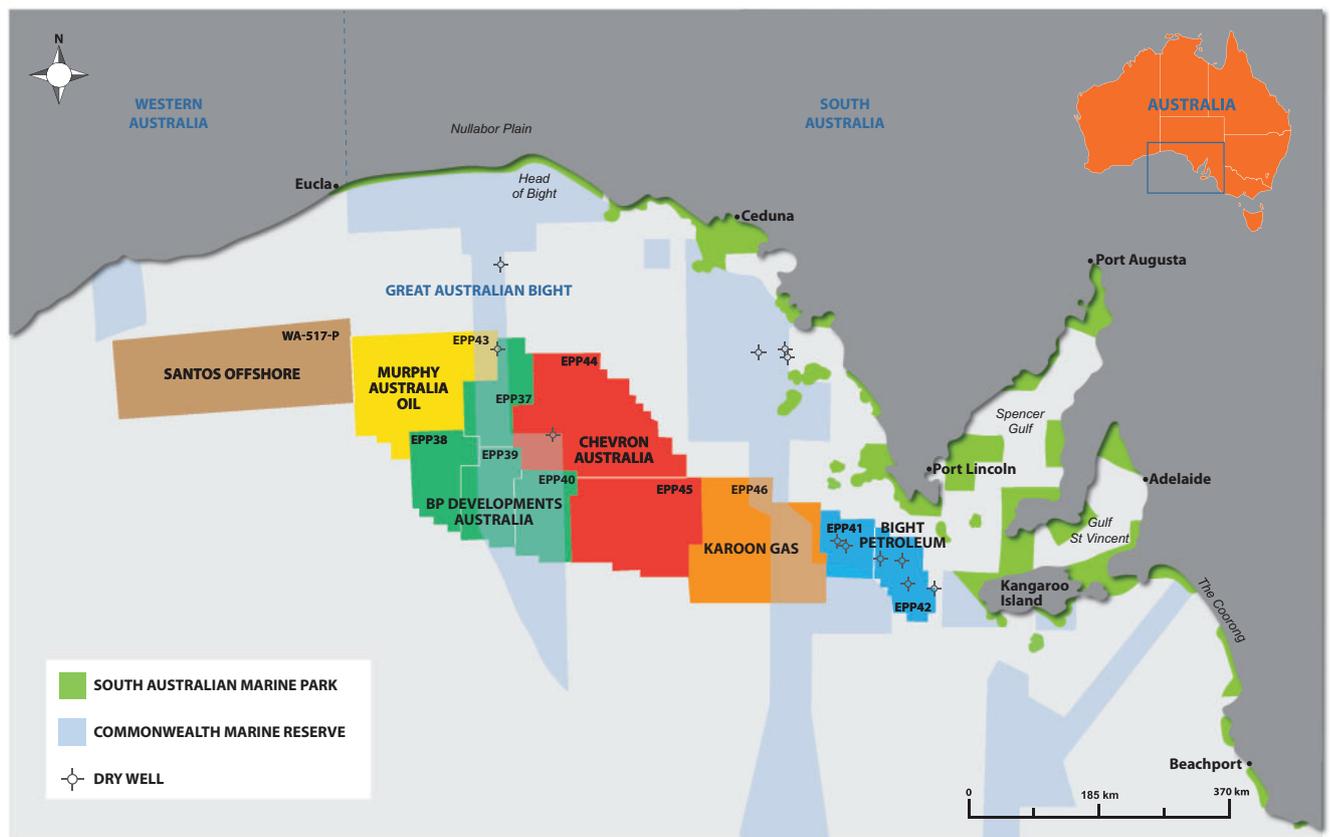


Fig. 2. Petroleum exploration permits in the Great Australian Bight.

not match the predicted reservoir conditions in all aspects. Hence, modelling these analogues can lead to inherent inaccuracies if not undertaken properly. For example, some modelling software is not able to accurately account for the rapid emulsification associated with the predicted crudes when it comes to determining shoreline oil loadings.

Given that a hydrocarbon spill (especially in the form of a well blowout) is one of the most critical hazards assessed in the EIA process, the absence of local analogue data introduces a higher degree of uncertainty when determining the inputs to oil spill trajectory modelling (OSTM), including, for example:

- what is the most credible well flow volume and duration;
- what is the likely hydrocarbon composition; and
- how do the hydrocarbons weather?

The answers to these questions have a critical bearing on the outputs of the OSTM, such as the extent of sea surface oil, extent of and time to shoreline contact, shoreline loadings, amenability to dispersants, and so forth. These answers influence the quality of the EIA and the assumptions used to formulate oil spill response strategies.

Deep water and distance from shore

The deep waters of the GAB and long distances from shore affect oil spill behaviour and have a great impact on the oil spill response technologies that can be deployed. This makes it difficult to develop demonstrations of 'as low as reasonably practicable' (ALARP) and 'acceptability' required in an EP. Deep waters mean that:

- it takes longer for hydrocarbons to reach the surface, and, so, there is a greater element of entrained and dissolved hydrocarbons in the water column; this is harder to detect using surveillance mechanisms, making it difficult to predict where to deploy response resources ahead of hydrocarbons reaching the sea surface; and
- it is very difficult (but not impossible) to deploy source control equipment such as well-capping stacks or to source suitable rigs for relief well drilling.

The long distance from shore means that:

- it takes longer to deploy response equipment from suitable shore bases (these may not necessarily be at the closest port); and
- there is a limited ability to rapidly deploy aerial surveillance or apply dispersant because of the smaller fuel capacities (and, therefore, shorter flight times) of the fixed-wing and rotary aerial services locally available (until larger fixed-wing services are chartered from overseas).

Until recently, the deep waters of the GAB have had limited environmental investigation, especially the seabed. Recent studies undertaken in the GAB are being partly funded by the petroleum industry to fill these gaps. Without the results from such research, the description of the 'existing environment' in an EP will be deemed as insufficient by the Commonwealth petroleum regulator, the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA). These

studies cost millions of dollars and can take years to complete. Such timeframes often do not align with approval schedules and permit work programs.

Sensitive shorelines

Much of the South Australian coastline is sensitive and declared as state marine parks. Iconic sheer vertical cliffs around the Head of Bight (Fig. 3), biologically important areas (BIAs) for southern right whale breeding, Australian sea-lion breeding colonies and foraging areas, great white shark aggregation areas (important tourism drawcards), isolated stands of regionally rare mangrove and saltmarsh communities (important nurseries for commercial fish species) and inshore aquaculture operations (i.e. oyster farms) are just some of the region's coastal sensitivities.

The uncertainty regarding the nature of hydrocarbons in the GAB, the paucity of oil spill response equipment along the GAB coastline, the deep waters and distances from shore bases means that in general, the community has little confidence that these sensitivities will be protected in the event of a large-scale hydrocarbon spill.

There are eight Commonwealth Marine Reserves (CMRs) in the Bight Basin (see Fig. 2). Two of these CMRs intersect 7 of the 11 petroleum exploration permits in the GAB. Despite the areas of overlap being almost entirely within multiple-use zones (where 'mining operations' are permitted), pressure from the public and environmental lobby groups to remain outside these protected areas can create a negative public image for petroleum exploration projects.

Consultation and vocal stakeholders

During 2015 and 2016, the Department of Industry, Innovation and Science (DIIS) and NOPSEMA took steps to review the consultation and transparency requirements in place under the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009. This culminated with NOPSEMA publishing updated consultation guidance in November 2016. While the additional clarity regarding stakeholder consultation is welcome, it also presents new challenges. For example, the requirement to provide 'sufficient information' to stakeholders can be fraught with danger. There is often a fine line between not enough and too much information ahead of an EP being approved, and, in mischievous hands, this information has the potential to derail projects before they have had the chance to be formally assessed by the regulator. In the GAB drilling project, for example, oil spill modelling results were frequently demanded by green groups. Providing this information to stakeholders who are unlikely to have the technical knowledge to properly interpret the results makes it likely that the peddling of 'alternative facts' would have been even greater than it already was. Additionally, providing the technical assumptions on which the modelling results were based may provide an undue advantage to competing titleholders.

Balancing the need to provide relevant information to stakeholders during the planning phase with the need to demonstrate to NOPSEMA that stakeholders have had an opportunity to assess information and provide objections or claims in a timely fashion is, thus, a tight-rope act. Is holding



Fig. 3. The Bunda Cliffs near the Head of Bight. (Photo credit: G. Pinzone).

back the provision of some information (especially that deemed ‘commercial in confidence’) during EP development likely to demonstrate unreasonable consultation and, therefore, result in an EP not being accepted?

Local communities (e.g. Kangaroo Island), eNGOs (environmental non-government organisations, e.g. The Wilderness Society), commercial fisheries associations and the general public with interests in the GAB have demonstrated a strong involvement in energy politics and a not-in-my-back-yard (NIMBY) philosophy, and have applied political pressure at the local, State and Commonwealth levels, as well as directly with titleholders and NOPSEMA, with the aim of preventing the BP exploration project from proceeding. They promise that the same pressure will be applied for other GAB exploration projects.

While some communities unaccustomed to offshore oil and gas activity (such as Kangaroo Island) have opposed the industry coming to their ‘backyard’ (generally, because they have tourism or fishing industries perceived to be at threat by the petroleum industry), other towns (such as Ceduna) are welcoming of the industry because of the economic and employment benefits of creating and operating new, or expanding existing infrastructure such as aviation facilities, drilling mud plants, accommodation and so forth.

Politics

Pressure from The Australian Greens resulted in a Senate Inquiry into ‘Oil or Gas Production in the GAB’ in April 2016 (this lapsed because of the dissolution of the Senate in May 2016, but later resumed in November 2016). Eighty-five (85) submissions into the Inquiry have been received, with

the resultant report having been delayed several times, and most recently slated for release in early May 2017. The attention such Inquiries garner can lead to perceptions from multi-national companies that there is a sovereign risk in doing business in Australia.

Indeed, in mid-September 2016, the GAB Environment Protection Bill 2016 was introduced by The Australian Greens and sought to ban oil and gas activities in the GAB. Incredulously, the bill claimed that even without a spill, seismic exploration and drilling in the GAB will deter southern right whales and Australian sea-lions from birthing in the area. Common sense prevailed when in late March 2017, the Senate Committee rejected the bill.

Despite this, in October 2016, BP announced that it was withdrawing from its exploration activities in the GAB, citing their focus on other frontier exploration opportunities.

Conclusions

So, what lessons are there for the management of future drilling environmental approvals in frontier basins?

- It’s difficult! Invest in strong project management and leadership.
- Assemble a reputable team and allow as much time as possible for the environmental approval process.
- Be guided by ‘value’ rather than ‘cost’ in the environmental approval process. Environmental approvals are often on the critical path for any petroleum activity schedule, but the costs of preparing your approvals are a ‘drop in the ocean’ (pun intended) compared with the cost of a seismic survey vessel

sitting in dock or a drill rig sitting on location chewing up the project budget if your approvals are late. Invest in the right people for the job.

- Embrace the experience of your external consultants. Reputable consultants will harness the lessons learned from previous projects and apply them to new projects so as to save their client (and themselves) pain (and cost) previously borne.
- Invest early in high-quality predictive modelling – oil spill, drill cuttings, underwater noise – using independent specialist consultancies.
- Engage stakeholders (including regulators) early and often, and involve environmental and technical personnel so that stakeholder issues of concern can be addressed in real time and be well reflected in the EP.
- Collaborate with other titleholders to share insights and learnings and save time and costs when it comes to research and the development of spill-response strategies and capabilities (e.g. well capping and relief well solutions, shoreline spill-response logistics and management, and so forth).
- Engage with oil spill preparedness and response agencies/partners early – their feedback into what is and is not technically or logistically feasible in remote locations has a very strong bearing on the content and credibility of the oil pollution emergency plan (OPEP).
- Do not isolate the functions of EIA and oil spill preparedness and response. That is, the EP, OPEP and Operational and Scientific Monitoring Program (OSMP) are part of the one submission and are intricately linked. Authors need to be across each document.

Conflicts of interest

There are no financial or personal relationships with organisations or people that could inappropriately influence this work.

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The author



Giulio Pinzone is the Director and Principal Environmental Consultant for Aventus Consulting Pty Ltd. Giulio has spent 17 years working in the areas of environmental impact assessment (EIA), management and auditing, with experience consulting to, and on staff with the upstream petroleum industry. This provides Giulio with the ability to not only undertake EIA using the insight of industry knowledge and experience, but also the practical experience to oversee environmental management in the field, whether this be for onshore or offshore drilling, pipeline installation, seismic surveying, or at a production platform or plant.

Since the establishment of the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), Aventus has consistently been responsible for the preparation of ~6% of EPs submitted to the authority, giving Giulio great insight into the ever-changing offshore environmental regulatory regime.

Giulio is a qualified Lead Auditor in the EMS Auditor Scheme (Exemplar Global) and has undertaken over 50 environmental compliance audits. A good working knowledge of the oil and gas industry ensures that he can 'talk the talk' with industry personnel and come to quick determinations of compliance or otherwise.

Giulio prides himself on developing good working relationships with stakeholders, including government regulators, and understanding key environmental and resource legislation. Giulio derives a deep sense of job satisfaction in obtaining timely project approvals for his clients and values spending time in the field (e.g. auditing and site visits) to continually expand his industry knowledge and expertise.