



**Australian Government**

# Offshore Petroleum Safety Regulation

Better practice and the  
effectiveness of the  
National Offshore Petroleum  
Safety Authority

by  
Kym Bills and David Agostini  
June 2009





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# Preface

On 9 January 2009, the Commonwealth Minister for Resources and Energy, the Hon Martin Ferguson AM MP and the Western Australian Minister for Mines and Petroleum, the Hon Norman Moore MLC, formally invited us to form an expert panel to undertake an inquiry into the occupational health and safety and integrity regulation for upstream petroleum operations with reference to the gas pipeline rupture and explosion on 3 June 2008 and, as an addendum, to investigate interfaces between regulatory agencies for offshore petroleum marine operations.

Supported by a team of experts and a secretariat, we have reviewed documentation and information provided to us through consultation with key Australian and international regulatory agencies for offshore petroleum safety and integrity regulation and have also met with a wide range of oil and gas companies in Australia and abroad. The report is based on information generously shared with us by key agencies that we acknowledge with gratitude, with particular thanks to the Western Australian Department of Mines and Petroleum and the National Offshore Petroleum Safety Authority.

We would like to acknowledge the contributions of a number of widely-recognised experts in their fields – Mr Bruce Gemmell, Mr David Lesslie, Mr Robin Stewart-Crompton and Professor Andrew Hopkins – as well as those officers from the Australian Transport Safety Bureau who provided key no-blame safety investigation expertise to this process. We would also like to thank members of our Canberra and Perth secretariat – especially Juliet Lautenbach and Joanna Bunting for their tireless efforts and hard work – as well as David Hope who provided key publishing support to produce several versions of reports during the process, mostly over weekends.

As many of those interested in this inquiry have noted through the media, legal action in the Federal Court in Perth has altered the course of the inquiry and associated investigations on several occasions. It has been a hectic but unforgettable five months, and we sincerely hope that the ensuing reports and recommendations will contribute to improving safety and regulatory effectiveness in Australia's offshore oil and gas industry, and ensure that we move to the forefront of world best practice.

KYM BILLS  
Panel Member

DAVID AGOSTINI  
Panel Member



# Table of contents

Preface	iii
Acronyms and abbreviations	vii
Terms of reference	ix
Recommendations and findings	xiii
Introduction	xix
Chapter 1: Regulatory framework and effectiveness	1
Chapter 2: Safety case regime	19
Chapter 3: Regulatory discretion and compliance-based regulation	41
Chapter 4: Resourcing and staffing a best practice regulator	65
Chapter 5: A better practice functional split	75
Conclusions	83
Annex 1: Legislative framework for offshore and island petroleum activities	85
Annex 2: Commonwealth/WA misunderstandings regarding internal waters	89
Annex 3: Interfaces between DOIR and DOCEP, and DOIR and NOPSA	95
Annex 4: NTSB and TSB investigation reports on gas pipeline explosions involving external corrosion and CSB petroleum refinery reports	99
Annex 5: Report of the Integrity Working Group of September 2007, and Report on the consolidation of Offshore Petroleum Regulations of September 2007	105
Annex 6: Guidance from ICAO on SMS, and the architecture of Australian aviation	109
Annex 7: Possible impacts of the national review into model OHS laws	113
Annex 8: The effectiveness of regulation by NOPSA and DOCEP	123
Annex 9: Learning from major accidents: Cullen, McInerney and Hopkins	131
Annex 10: ATSB reports of relevance to Offshore Safety Regulation	135
Annex 11: Productivity Commission Upstream Petroleum Regulation Review	143
Annex 12: March 2008 review of NOPSA and precursor reports since 1996	145
Annex 13: 2008 draft review of the effectiveness of NOPSA's use of levy revenue	155
Annex 14: Leading and lagging indicators for the offshore petroleum sector	157
Annex 15: Use of standards in the Australian safety case regime for offshore petroleum regulation	161
Annex 16: Buncefield Inquiry in the UK, and Seveso I and II in Europe	173
Annex 17: Relevant regulation and safety cases: US, UK, Netherlands, Norway	177
Annex 18: Developments in, and lessons from, Victoria's safety case law and practice	183
Annex 19: Biographies of panel and inquiry members	191
Annex 20: Submissions, visits and meetings held	197
Bibliography	201



# Acronyms and abbreviations

ALARP	As low as reasonably practicable
ANAO	Australian National Audit Office
APIA	Australian Pipeline Industry Association
ATC	Air Traffic Control
ATS	Air Traffic Services
ATSB	Australian Transport Safety Bureau
CASA	Civil Aviation Safety Authority
CEO	Chief Executive Officer
COAG	Council of Australian Governments
DA	Designated Authority
DITR	Department of Industry, Tourism and Resources
DMP	Department of Mines and Petroleum Resources (WA)
DOCEP	Department of Consumer and Employment Protection (WA)
DOE	Department of Energy (United Kingdom)
DOIR	Department of Industry and Resources (now WA DMP)
DPI	Department of Primary Industries (Victoria)
DPP	Director of Public Prosecutions
EASA	European Aviation Safety Authority
ESV	Energy Safe Victoria
FSA	Formal safety assessment
HAZID	Hazard identification
HAZOP	Hazard and operability
HSE	Health and Safety Executive (United Kingdom); or Health, Safety and Environment
HSR	Health and safety representative
IADC	International Association of Drilling Contractors
ICAO	International Civil Aviation Organization
IRT	Independent Review Team
KPI	Key performance indicator
LTIFR	Lost time injury frequency rate
LTIs	Lost time injuries

MAEs	Major accident events
MAH	Major accident hazard
MCMPR	Ministerial Council on Mineral and Petroleum Resources
MHF	Major hazard facility
MMS	Minerals Management Service (US)
MOSOF	Commonwealth <i>Petroleum (Submerged Lands) (Management of Safety on Offshore Facilities) Regulations 1996</i>
NOPR	National Offshore Petroleum Regulator
NOPSA	National Offshore Petroleum Safety Authority
OECD	Organisation for Economic Co-operation and Development
OGP	International Association of Oil and Gas Producers
OHH	Occupational health hazard
OHS	Occupational Health and Safety
OPA	<i>Offshore Petroleum Act 2006</i>
OPGGSA	<i>Offshore Petroleum and Greenhouse Gas Storage Act 2006</i>
OSHA	Occupational Safety and Health Administration (United States)
PC	Productivity Commission
PHMSA	Pipeline and Hazardous Materials Safety Authority (US)
PIRSA	Department of Primary Industries and Resources of South Australia
PMP	Pipeline Management Plan
PSA	Petroleum Safety Authority (Norway)
PSLA	Commonwealth <i>Petroleum (Submerged Lands) Act 1967</i>
PSMP	Pipeline Safety Management Plan
QRA	Quantitative risk assessment
RET	Department of Resources, Energy and Tourism (Commonwealth)
SCE	Safety critical element
SFAIRP	So far as is reasonably practicable
SMS	Safety Management System
TSI Act	Commonwealth <i>Transport Safety Investigation Act 2003</i>
WA PSLA	Western Australian <i>Petroleum (Submerged Lands) Act 1982</i>
WRMC	Workplace Relations Ministers' Council

# Terms of reference

## **Independent inquiries into occupational health and safety and integrity regulation of offshore petroleum operations**

### *Background*

On 9 January 2009 the Commonwealth and Western Australian Governments through the Minister for Resources and Energy the Hon Martin Ferguson AM MP and the Minister for Mines and Petroleum the Hon Norman Moore MLC announced a joint independent Inquiry into the effectiveness of regulation for upstream petroleum operations. The terms of reference included a focus on the incident at Apache Energy Ltd's facilities on Varanus Island.

A two person expert Panel comprising Mr Kym Bills, Executive Director of the Australian Transport Safety Bureau nominated by Minister Ferguson and Mr David Agostini a former senior executive with Woodside nominated by Minister Moore was appointed to lead the Inquiry. The Commonwealth initially provided \$1 million to cover the costs of the Inquiry.

Apache initiated action in the Federal Court to challenge the Panel's use of documents provided by the Western Australian Department that had been compulsorily obtained under section 63 of the *Petroleum Pipelines Act 1969*. On 22 May 2009 the Federal Court held that provision of the documents by officers of the State of Western Australia, to the Panel for the purposes of the Inquiry, was not for the purposes of the Act and regulations.

In light of the Federal Court decision, Ministers have agreed that the Panel will prepare a report for the Minister for Resources and Energy covering better practice regulation and the role of the National Offshore Petroleum Safety Authority (NOPSA) with associated recommendations. A separate report, with recommendations, will also be provided to the Minister for Resources and Energy on improving the interface between NOPSA and the Australian Maritime Safety Authority in light of two incidents during Cyclone Billy. Both reports will be finalised and provided by 30 June 2009.

In addition, on 8 May 2009, the Minister for Mines and Petroleum announced that Mr Bills and Mr Agostini had been appointed as inspectors under the *Petroleum Pipelines Act 1969* and would coordinate finalisation of the technical investigation into the Varanus Island explosions on 3 June 2008. This separate independent

Western Australian Inquiry will also address the role of Apache (as majority owner and operator) and any regulatory issues involving the Western Australian regulators in the lead up to the incident with associated recommendations. A draft report is to be completed by 10 June with a final report to be provided to the Minister for Mines and Petroleum by 30 June 2009.

### ***Better practice offshore regulation and the role of NOPSA***

Terms of reference for the two member expert Panel comprising Mr Kym Bills and Mr David Agostini are now to:

- *Review Commonwealth offshore petroleum safety regulatory arrangements;*
- *Broadly outline better practice regulatory arrangements including among international offshore regulators and relevant Australian regulators;*
- *Consider the appropriateness for safety and integrity of the Commonwealth offshore duty of care/safety case co-regulatory regime;*
- *Assess the effectiveness of the National Offshore Petroleum Safety Authority;*
- *Make any necessary recommendations to improve the regulatory regime and the safety and integrity of offshore petroleum operations and facilities and the effectiveness of NOPSA.*

The Panel's report is to be delivered to the Minister for Resources and Energy by 30 June 2009.

# Executive summary

In a complex, high hazard industry such as offshore oil and gas, society expects a robust regulatory regime in which operators maintain safety to minimise the risk of a major accident event and regulators provide assurance that this is being done. The duty of care/safety case regime in Australian waters places the onus on operators and provides them with flexibility in how best to manage hazards and minimise risk. But regulatory competence, clarity and scope covering all relevant offshore operations is a fundamental requirement of the regime. It is best categorised as a system of co-regulation. This Inquiry endorses an augmented duty of care/safety case regime as the appropriate means for regulating Australia's offshore industry.

Australia's offshore industry has a good reputation but here, as overseas, not all operators have a mature safety culture or seek to operate at best practice safety levels. Regulators must deal with differences in motivation and culture among operators by targeting scarce regulatory resources to higher risk operators, facilities and activities. Better practice co-regulatory regimes require balance and integration between prescriptive elements and cooperative elements and genuine dialogue, goodwill and pro-activity among participants.

Our examination of the regulatory regime has uncovered a confusing mishmash of jurisdictional, legal, process and regulatory interfaces upon which is overlaid poor relationships among regulators. In such an environment, any serious operator shortcomings are far less likely to be found and addressed to reduce the risk of a major accident event.

From its creation on 1 January 2005 NOPSA has been engaged in a very major build phase. It has developed many creditable systems, competencies and publications. We believe NOPSA has the basis for becoming a world class offshore petroleum regulator within a duty of care/safety case co-regulatory regime and that this regime should apply to safety and integrity for all offshore facilities and pipelines to minimise the type of unnecessary interfaces that can lead to safety issues falling between stools. However, NOPSA is seriously under-resourced, even to fully discharge its current responsibilities, and in our assessment needs more professional staff and broader competencies such as human and organisational factors as well as in offshore production and pipeline corrosion.

We also see NOPSA's regulation within a duty of care/safety case co-regulatory regime as overly hands-off and narrowly legalistic at the expense of better discharging its advisory and cooperation functions or utilising a risk matrix to classify operators and facilities as a basis to target regulatory action. NOPSA works within the boundaries set by internal policy as well as legislation and some of its policies do not enable it to flexibly maximise safety assurance and outcomes in the same mature risk-based way as it expects operators to do. For example, we believe that greater dialogue, input and guidance with individual operators during the development process for a safety case is an area for increased focus. Despite a MOU and sharing regulatory boundaries, NOPSA's lack of interaction with DOCEP is indicative of another area for improvement. NOPSA also told us that it could not challenge safety culture or weak leadership in a safety case because these were not specified in the Commonwealth MOSOF regulations. Since these areas are fundamental to future safety, the MOSOF regulations should be amended. NOPSA's resource constraints have resulted in audits of insufficient depth particularly with respect to pipelines carrying a large inventory of hydrocarbons under pressure in areas where a major accident event is possible.

The legislative environment in WA is a contributing factor to regulatory ineffectiveness and needs to be simplified as soon as possible. In our assessment, conferral of powers to NOPSA to maximise integration of offshore petroleum safety and integrity regulation and a properly resourced regulator in an augmented duty of care/safety case regime is the best option for future safety.

We also strongly recommend the creation of a properly resourced national independent no-blame offshore and petroleum pipeline investigation capacity that can investigate major accident events and near misses in the future with appropriate powers so that learning important safety lessons is not made hostage to legal action.

# Recommendations and findings

- R 1 We recommend that powers should be conferred on NOPSA to enable it to effectively regulate safety and integrity for all facilities and pipelines in the water and the WA islands which export gas by pipeline. NOPSA's authority should extend to the nearest valve on the mainland above the shore crossing. (p. 17)
- R 2 We recommend that MCMPR continue to support a duty of care safety case regime for best practice offshore petroleum industry regulation augmented to include regulation of integrity. Since the safety case is at the centre of the duty of care co-regulatory regime, we consider that the requirement for the implementation of the safety case at facilities involved in the exploitation of petroleum resources should be provided for within the OPGGSA itself. (p. 19)
- R 3 We recommend in relation to safety case development and compliance overall, that NOPSA revise its approach to interacting with operators prior to the safety case assessment process and subsequently and direct more resources into its advisory functions. We further recommend that NOPSA develop and implement a formal plan for supporting and guiding each operator prior to safety case acceptance, as well as for ongoing compliance with that safety case, recognising the unique experience, capabilities and assessed risk of that operator. Each plan needs to include advice, education and liaison meetings with the operators. The plan needs to be continuously reviewed and reassessed based on latest information, including the interaction with the operator. Implementation should be reviewed at a senior level within NOPSA. (p 38)
- R 4 We recommend that NOPSA review the risk assessment of pipelines. NOPSA should focus, in particular, on the efficacy of anti-corrosion systems, and recognise potential interference effects and MAE escalation risks associated with adjacent pipelines and unlicensed pipes even if they fall outside its direct regulatory responsibilities. (p. 39)
- R 5 We recommend that NOPSA develop a robust risk assessment matrix for use in assessing and responding to the changing risk associated with each facility and the operator. Further, we recommend that NOPSA increase auditing frequency and duration to audit each manned facility on average twice per year (covering each staff swing), but more often if the risk matrix indicates this is necessary;

and that audits should average several days actually on major facilities. (p. 54)

- R 6 We recommend that the OPGGSA and its subsidiary regulations be amended to enable NOPSAs to have a broader range of graduated compliance tools including the ability to impose a civil fine on an operator per day of non-compliance with an improvement or prohibition notice. Legislation should also be considered that would enable NOPSAs to make public, with appropriate safeguards, specific information concerning its enforcement actions including the name of the operator, the breach, and the enforcement action required including potential penalties. (p. 61)
- R 7 We recommend that the MOSOF regulations be amended to explicitly enable assessment of safety culture, leadership, and consideration of operator past history, motivation and current capacity in approvals of safety cases. NOPSAs should be able to audit against these criteria and challenge operators on these issues. (p. 69)
- R 8 We recommend that NOPSAs critically review its regulatory manning levels based on its current workload and the recommendations for additional areas of focus and increased auditing presented in this Report. To meet these requirements, we estimate that NOPSAs requires up to 50 inspectors in total plus associated support staff to bring overall staffing from about 55 to 75. RET should help facilitate the necessary ongoing levy funding in consultation with industry. (p. 73)
- R 9 We recommend that MCMPR liaise with Ministers with environmental and planning responsibilities, and if necessary COAG, to ensure that environmental requirements for oil and gas projects are not imposed subsequent to safety assessments and do not increase the risk of major accident events. (p. 76)
- R 10 We recommend that the Commonwealth and States/Northern Territory legislate to establish a properly resourced and empowered independent national safety investigation capacity to investigate serious oil and gas industry (including pipeline) incidents including near miss events that could have led to a major accident event. We further recommend that the regulatory investigatory powers under the OPGGSA be reviewed in the context of powers for the proposed independent national safety investigator, noting that the regulator must retain those investigatory powers necessary in order to fulfil its legislative functions. (p. 82)

## Findings

- F 1 We note that the NOPSA Board should function as envisaged in the legislation and that this function should be clarified in writing by the Commonwealth Minister and reinforced by the Department to the Board and NOPSA CEO. We consider that any lack of clarity in the OPGGSA with regard to the role of the NOPSA Board should be resolved and that a budget be made available by NOPSA to support research related to the Board's advisory role and the holding of four to six meetings annually. We also consider that to avoid confusion with governance Boards, the board should be explicitly renamed an advisory Board. (p. 11)
- F 2 We note that with the relevant division of DOCEP now transferred to DMP, it would be timely to revise the NOPSA/DOIR/DOCEP MOUs. We also note that both parties should be proactive in fulfilling their obligations under MOUs and cooperating closely. (p. 13)
- F 3 We note the importance of further work to improve industry performance on safety critical maintenance and backlogs. NOPSA should drive and monitor industry progress on this through its Facility Integrity national program and through facility audits. (p. 15)
- F 4 We also note that Commonwealth legislative drafting is underway to include overall facility integrity in NOPSA's responsibilities and urge that this be progressed as a matter of urgency. While this is underway, other jurisdictions should prepare to mirror the legislation to enable NOPSA to regulate facility integrity in designated coastal waters as soon as the Commonwealth legislation is passed. (p. 17)
- F 5 We note the recent agreement that separate, industry or hazard specific laws relating to OHS should only be maintained where objectively justified. We believe that separate legislation is justified for the offshore oil and gas industry but that in line with the national OHS review's recommendation, the content and operation of all laws in the petroleum and gas industry that affect OHS should be reconsidered with the aim of achieving as much consistency with the content and operation of the harmonised principal OHS laws as is appropriate. (p. 19)
- F 6 We note that there would be value in undertaking a gap analysis between documentation associated with the UK HSE and its Offshore Division and the material available through NOPSA to assist NOPSA in identifying an appropriate quantum and focus for its own guidance material. (p. 24)

- F 7 We note that NOPSA could consider establishing an appropriate forum for consultants and those personnel within operators that undertake safety case development. This forum could be via APPEA and should be used for education, promotion and discussion of safety case issues. (p. 24)
- F 8 We note that NOPSA/operator liaison meetings have a number of benefits when held at least quarterly. More frequent or less frequent meetings may be appropriate depending on the culture and responsiveness of each operator. We also note that where a facility is managed by a contractor (i.e. who is the operator) and the titleholder or contract holder exerts a strong influence on the health and safety culture and performance of the operators, NOPSA should consider whether they should also be more routinely involved in liaison meetings. (p. 27)
- F 9 We note that where a standard is applied within the safety case regime, the operator should be aware of, and act on, any changes or revisions to the standard. This may include reviewing the safety measures to ensure ALARP continues to be met. Where a new standard becomes less prescriptive good industry practice indicates that the operator should review its systems and define measures as appropriate to meet safety requirements. We also consider that NOPSA should have ready access to all relevant standards and proactively review revisions. (p. 36)
- F 10 We note that if a validation report has been required to support a regulatory approval, the regulator should ensure that the complete report is received and considered as part of the approval process. The regulator should also be able to speak directly to the validation team to discuss further any issues raised within the report. This may require amendment to legislation to ensure that the regulator can engage in confidential discussions with the validator without the operator present. (p. 37)
- F 11 We note that having identified control measures, the onus is on the operator to manage the issue. We consider, however, that NOPSA should expand its assessment policy to require it to use previously gathered information during the assessment process, and that if necessary the legislation should reflect this requirement. (p. 38)
- F 12 We note that it is important to target compliance not only considering the inherent risk of a facility and operational process but also the safety culture of a particular operator. (p. 42)
- F 13 We note that NOPSA should ensure that its inspection activities are appropriately focussed on the operator's effective implementation of its policies and systems and that these concerns should also be addressed in liaison meetings. NOPSA should implement a robust strategy for assuring itself that the operator is complying with its

safety case based on issues raised from previous inspections and meetings with the operator. Corporate and themed audits should also be a part of this approach. (p. 63)

F 14 We note that NOPSA should increase its advisory and promotional functions by engaging with operators more, and in a more targeted fashion, in the early stages of the safety case and PSMP process. (p. 68)

F 15 We note that there is significant merit in a NOPSA position being created in Canberra, closely linked with RET, to handle liaison with Commonwealth stakeholders, assist the Board, and drive the policy agenda, including facilitating legislative change. (p. 71)

F 16 We note that NOPSA has recently added the position of investigator (currently vacant). We support creation of this position and observe that this person needs to be trained and experienced in compliance and enforcement investigations and preparation of evidence briefs to the DPP. (p. 82)



# Introduction

The National Offshore Petroleum Safety Authority (NOPSA) was established on 1 January 2005 to regulate occupational health and safety of persons engaged in offshore petroleum operations. NOPSA's functions are set out in Commonwealth legislation now titled the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGSA). NOPSA's main functions<sup>1</sup> are to:

- promote occupational health and safety;
- develop and implement effective monitoring and enforcement strategies to secure compliance with the Act and the regulations;
- investigate accidents, occurrences and circumstances that affect or have the potential to affect occupational health and safety, and report, as appropriate to responsible Ministers on those investigations;
- advise persons, either on its own initiative or on request on occupational health and safety matters; and to make reports, including recommendations, to Ministers, on issues relating to occupational health and safety; and
- cooperate with Commonwealth, State and Northern Territory agencies having functions relating to offshore petroleum operations and the Designated Authorities of the States and the Northern Territory.

The formation of a single safety authority for offshore petroleum was designed to simplify the regulatory environment, reduce the gaps and overlaps that result from the abundance of legislation, and create a single regulator to ensure a critical mass of competency and consistent application of the legislation. Since NOPSA's creation, there has been significant growth in the petroleum and resources sectors, with an accompanying shortage of skilled workers at a time where several facilities are reaching the end of their original design life.

We note that NOPSA is still in a build phase and overall our findings support the findings of the 2008 Independent Review into NOPSA's operational activities that found NOPSA has made good progress in building a safety regulatory regime and authority of world class, although as expected there are still some aspects of the regime

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1 S.646 *Offshore Petroleum and Greenhouse Gas Storage Act 2006*.

that can be improved on to achieve best practice regulation.<sup>2</sup> Submissions to the Inquiry and discussions with interested parties, including members of the 2008 Independent Review Team, have been broadly supportive of the principles of the regulatory regime that created NOPSA. Most also thought that NOPSA was performing increasingly well but it still had a way to go to reach best practice.

In requesting that we undertake this Inquiry, the Hon Martin Ferguson highlighted that the Inquiry should seek 'to ensure Australia's offshore petroleum safety regulation is world's best practice'. To do justice to this challenging task we have gone beyond the particular documentation available from NOPSA and reviewed some important material published on regulatory theory and better practice, visited and discussed regulatory effectiveness with regulators and operators in Australia and overseas (see Annexes 17 and 18), and looked briefly at offshore petroleum regulation from the perspective of a different industry, civil aviation, through which a number of parallels can be drawn (eg, see Annex 6).

We note that better practice is to some extent specific to the country or jurisdiction in which regulation occurs and its particular features, history and culture. In addition, regulators cited are not uniformly better in all dimensions. Our focus here is on theory and practice of greater relevance to the Australian offshore circumstances and NOPSA in particular. We also reiterate that in some areas NOPSA is already performing well in international terms.

However, the extent of the safety challenge can be seen from data in NOPSA's excellent *Offshore Health and Safety Performance Report 2007–08* released in 2009. NOPSA reports that while there were no reported fatalities between 1 January 2005 and 30 June 2008, serious injuries increased from four in 2005–06 to six in 2006–07 and seven in 2007–08 and 'Overall, the rate of Total Recorded Injuries (TRC) per financial year continues to increase'. The number of dangerous occurrences increased markedly from 174 in 2005–06 and 177 in 2006–07 to 299 in 2007–08. Of the 299, 47 in 2007–08 were assessed as 'could have caused death or serious injury' up from 23 in 2006–07; 14 involved fire or explosion up from five; there were 56 unplanned events in which the emergency response plan was implemented in 2007–08 compared with 24 in 2006–07; and there were 62 instances of reported damage to safety critical equipment compared with 21 in 2006–07.<sup>3</sup>

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2 Review of the National Offshore Petroleum Safety Authority Operational Activities, Report of the Independent Review Team, Commonwealth Government Department of Resources, Energy and Tourism, February–March 2008.

3 NOPSA, *Offshore Health and Safety Performance Report 2007-08 (with summary data from 2005-06, 2006-07): Statistics, Trends and Observations of Health and Safety in the Australian Offshore Petroleum Industry*, Perth, 2009, pp9, 15.

NOPSA notes in its *Annual Report 2007–08*:

*the importance of the national programme on facility integrity, borne out by a series of inspections involving inadequate inspection, repair and maintenance on offshore facilities. A number of gas releases were linked to inadequate inspection, repair and maintenance activity. There are continuing issues with the backlog of safety critical maintenance and the general close-out of maintenance work*.<sup>4</sup>

A root cause analysis of hydrocarbon topside gas releases between January 2005 and June 2008 found the major factors to be inadequate preventative maintenance (16.3%), defective equipment or parts (15.8%), procedures not followed or inadequate (14.0%) and equipment design (12.7%). The next most important factors involved management systems and quality control.<sup>5</sup>

NOPSA states in its Corporate Plan 2008–2011 that Australian offshore ‘figures were above international benchmarks so continued vigilance is necessary’.<sup>6</sup> The Authority correctly highlights that the offshore industry ‘is susceptible to extremely rare but very serious incidents with the potential to result in disaster’ and states that, working with industry it:

*...has identified a range of key risks. Although not exhaustive or mutually exclusive, these risks can be categorized as those that may lead to a major accident event or to an occupational health and safety incident. The prevention of precursors to these risks requires operators to have good managerial control over hazardous activities*.<sup>7</sup>

NOPSA then analyses common causes of both major accident events and OHS incidents. The Authority also notes a series of more general risks including rapid industry change, new technology and growth of the LNG sector, an ageing workforce leading to loss of corporate memory and expertise, a future shortage of staff, poor competency assurance, instances of inadequate supervision, use of facilities well beyond their design life, and ‘new operating arrangements, including contracting out of much of the workforce including offshore senior management positions and provision of offshore facilities by third parties’.<sup>8</sup> NOPSA’s responses include its two national programmes involving Facility Integrity and Lifting Operations.<sup>9</sup>

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4 NOPSA, *Annual Report 2007-08*, Perth, 2008, p19.

5 *ibid.*, pp33-4.

6 NOPSA, *Corporate Plan 2008-2011*, Perth 2008, p9.

7 *ibid.* p13.

8 *ibid.* p14.

9 *Op. cit.* pp16-17.

Our documentary analysis, visits and meetings highlighted a number of important themes and approaches, some of which are in use in one form or another in NOPSA and others of which could be usefully incorporated by that regulator. We offer this information throughout this report in order to incorporate lessons learned from other regulators and operators more easily into our consideration of effectiveness and ‘where to from here’ for NOPSA. These lessons could also be relevant to other regulators in a duty of care/safety case co-regulatory regime.

This report focuses mostly on the opportunities for improvement, recognising that there are many areas where the regulations and NOPSA are working well. Our timescale and focus has not permitted an assessment of all of NOPSA’s regulatory roles such as diving.

As a result of our Inquiry, we consider that the duty of care/safety case co-regulatory regime as regulated by NOPSA remains the most appropriate for the offshore petroleum industry but NOPSA needs to be resourced to allow much more interaction with operators and deeper audits that are focussed on MAEs with appropriate compliance follow-up.

Overall, we believe that NOPSA is broadly effective within the bounds placed upon it by the legislation, other interfaces, resourcing levels, and its own internal policy decisions. NOPSA has emphasised that it is constrained to act within, and stringently within, its legislated functions due to the nature of the cost recovery regime which funds the Authority and contends that the cost recovery regime tightly constrains the extent of its activities and includes legislated industry scrutiny. It is our view however, that while legislative amendment is desirable NOPSA has restricted itself further than such constraints would warrant.

# 1: Regulatory framework and effectiveness

1.1 Fundamentally, regulatory effectiveness refers to correctly addressing an identified problem while regulatory efficiency looks to maximise benefits from a regulatory intervention taking account of the costs.<sup>10</sup> In the 1960s and 1970s societal pressures were broadly to increase regulation in the face of market failure and resolve the perception, especially in the US, that many regulators had become too close to industry and become ‘captured’. In contrast, by the late 1980s and 1990s the limits of prescriptive regulation were being recognised and addressed in a number of sectors. In 1972, Lord Robens had already proposed simplified outcome-based regulation for OHS. In the offshore petroleum industry, Lord Cullen’s final 1990 report into the 1988 Piper Alpha disaster recommended a less prescriptive and more flexible safety case regime (see Annex 9). In order to increase economic efficiency more generally, deregulation became dominant within many OECD governments. However, as major problems and disasters continued to emerge, layers of prescriptive regulation continued to be added in OHS, civil aviation and more generally. In the current decade, the debate over regulation has moved from an idealistic focus on deregulation to a more sophisticated search for the best form of regulation and its governance and enforcement to encourage socially desirable behaviour and minimise unnecessary risk especially the risk of a major accident or disaster.

1.2 The Commonwealth Office of Best Practice Regulation cites approvingly the 2002 OECD report *Regulatory Policies in OECD Countries: From Interventionism to Regulatory Governance*:

*What began in the 1980s and 1990s as ‘deregulation’ evolved into a focus on regulatory reform – encompassing a mixture of deregulation, re-regulation and initiatives to improve the effectiveness of regulatory instruments. These approaches to improving the quality of regulations are, in turn, evolving into a*

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10 Office of Best Practice Regulation, *Best Practice Regulation Handbook*, Australian Government, Canberra, August 2007, p1. For the Administrative Review Council ‘Effectiveness and efficiency are at once distinguishable and interdependent concepts, suggestive of a fine balance between the expenditure of physical and/or financial effort and the achievement of a desired outcome’ Administrative Review Council, *Administrative Accountability in Business Areas Subject to Complex and Specific Regulation*, November 2008, p4.

*wider notion of 'regulatory governance', embracing wider issues of transparency, accountability, efficiency, adaptability and coherence.<sup>11</sup>*

- 1.3 Part of a more sophisticated approach to regulation involves using industry arrangements in areas where risks are not major, where safety cultures are better developed and where complexity is high or greater innovation is desirable. According to the Administrative Review Council 'soft law' self-regulation occurs where members of a market sector voluntarily bind themselves by a mutually agreed set of rules, whereas self-regulation in cooperation with government or 'co-regulation' is an important supplement to black letter law in complex regulatory areas. It is argued that:

*A typical co-regulatory framework will involve a legislative framework that sets minimum standards and that is supplemented by industry codes or other mechanisms developed by industry bodies or other non-government entities. These codes and other mechanisms might be monitored or validated by a government regulator. In this way co-regulation seeks to combine the advantages of the predictability and binding nature of legislation with a more flexible self-regulatory approach. A further advantage of this form of regulation is the extent to which it permits harnessing of stakeholder expertise beyond the reach of most government agencies.<sup>12</sup>*

- 1.4 The Office of Best Practice Regulation states with respect to co-regulation that:

*Sometimes legislation sets out mandatory government standards, but provides that compliance with an industry code can be deemed to comply with those standards. Legislation may also provide for government-imposed arrangements in the event that industry does not meet its own arrangements.<sup>13</sup>*

- 1.5 In his influential book on better practice operational regulation, Harvard Professor Malcolm Sparrow argues that:

*...the nature and quality of regulatory practice hinges on which laws regulators choose to enforce, and when; on how they focus their efforts and structure their uses of discretion; on their choice of methods for procuring compliance ... Regulators do much more than administer laws. They also deliver services, build partnerships, solve problems, and provide guidance. ...*

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11 Office of Best Practice Regulation, *Best Practice Regulation Handbook*, Australian Government, Canberra, August 2007, p3.

12 Administrative Review Council, *Administrative Accountability in Business Areas Subject to Complex and Specific Regulation*, November 2008, pp7, 9.

13 Office of Best Practice Regulation, *Best Practice Regulation Handbook*, Australian Government, Canberra, August 2007, p66.

*Three core elements – distinct but interrelated – capture the emerging strategies...*

*1. A clear focus on results...*

*2. The adoption of a problem-solving approach...*

*3. An investment in collaborative partnerships.<sup>14</sup>*

Sparrow believes the third is most advanced among regulators, followed by the first, with the second lagging considerably behind. Hence he considers that 'regulators need to move beyond the competencies of functional expertise and process management and improvement to compliance management and problem solving.'<sup>15</sup> However, he emphasises that all three core elements are crucial.

## **Beyond ALARP and lessons from the HSE**

- 1.6 In the UK, the Health and Safety Executive (HSE) has responsibility for regulation (including compliance) of occupational health and safety across the country and includes specialised divisions dealing with high hazard sectors such as offshore petroleum. The Australian offshore regulatory arrangements owe much to the HSE both through adoption of the duty of care/safety case approach and legal framework and through key staffing appointments within NOPSA from the HSE including NOPSA's first (and current) CEO. The HSE is a much larger organisation than NOPSA and has had a longer period of time in which to create and refine its policies and guidance documents for industry. It is, however, the closest comparator regime to ours and provides a wealth of material for consideration in further developing the Australian offshore regulatory regime and NOPSA.
- 1.7 Among its many excellent documents, the HSE in May 2003 published *Assessing compliance with the law in individual cases and the use of good practice* to provide guidance on what constitutes good practice and on how relevant application of good practice contributes to the duty to reduce risks 'so far as is reasonably practicable' (SFAIRP) or demonstrate that risks have been reduced to 'as low as reasonably practicable' (ALARP). It is said to complement *Principles and Guidelines to assist HSE in its judgements that duty-holders have reduced risk as low as reasonably practicable* and *Policy and guidance on reducing risks as low as reasonably practicable in Design*. All three documents support the HSE's *Reducing Risks, Protecting People*.
- 1.8 The HSE considers that duties to ensure health and safety SFAIRP and duties to reduce risks to ALARP call for the same set of tests

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14 Malcolm K, Sparrow, *The Regulatory Craft: Controlling Risks, Solving Problems, and Managing Compliance*, Washington DC: Brookings Institution Press, pp3, 6, 100.

15 Ibid, p122. This is discussed further below.

to be applied. The HSE notes that there is little guidance from the courts on the meaning of ALARP beyond the key 1949 case of *Edwards v The National Coal Board* in which the Court of Appeal held that:

*...in every case, it is the risk that has to be weighed against the measures necessary to eliminate the risk. The greater the risk, no doubt, the less will be the weight to be given to the factor of cost ... 'Reasonably Practicable' is a narrower term than 'physically possible' and seem to me to imply that a computation must be made by the owner in which the quantum of risk is placed on one scale and the sacrifice involved in the measures necessary for averting the risk (whether in money, time or trouble) is placed in the other, and that, if it be shown that there is a gross disproportion between them – the risk being insignificant in relation to the sacrifice – the defendants discharge the onus on them.*

The HSE notes that the assessment of risk is confined to those matters with which the legislation in question is concerned such as risks to health, safety and welfare, or major hazards. It is noted that environmental protection requirements may constrain the options for controlling health and safety risks and that risks should be assessed by duty-holders in an integrated manner.<sup>16</sup>

1.9 The HSE states that in judging and recognising good practice, it must be satisfied that, inter alia, it takes account of:

*...individual risk, societal risks and societal concerns; the sacrifice and benefits; the technical feasibility of proposed control measures and the level of risk control they achieve; maximises the use of: inherent safety and the elimination of hazards; the avoidance of risk; the control of risk by the use of physical engineering controls; whilst it, minimises the need for: procedural controls; and, personal protective equipment; and is in a form that: clearly defines the scope of the good practice and the circumstances where it is relevant; and can be clearly specified, eg it is either written down or is a well-defined and established practice adopted by an industrial/occupational sector.<sup>17</sup>*

1.10 The HSE's move beyond ALARP has been a process of incremental change in response to recognition of issues. Initially, the *Offshore Installations (Safety Case) Regulations 1992* were introduced for the

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16 HSE, *Principles and Guidelines to assist HSE in its judgements that duty-holders have reduced risk as low as reasonably practicable*, London, December 2001.

17 HSE, *Assessing compliance with the law in individual cases and the use of good practice*, London, May 2003.

UK offshore petroleum industry to incorporate key recommendations made by Lord Cullen in his 1990 final report on the Piper Alpha disaster. These regulations were later evaluated and replaced with effect from 6 April 2006 by the *Offshore Installations (Safety Case) Regulations 2005* which now apply to approximately 250 offshore installations, both fixed and mobile. The Explanatory Memorandum for the new regulations states that they 'continue the requirement for those responsible for offshore oil and gas installations to submit safety cases' to the HSE for acceptance as a condition of operating in UK waters and note that a hierarchical approach to risk reduction is still required. The updated requirements 'take account of changes in the offshore industry, including the increasing reliance on contractors, and streamline the process of preparing and assessing safety cases', and respond to an earlier review's criticism of excessive bureaucracy. Under the new regulations, operators 'cannot avoid their health and safety responsibilities by delegating them to a contractor'.<sup>18</sup> There is also increasing safety case consultation required with safety representatives during the five yearly (or earlier) revision of a safety case.<sup>19</sup>

- 1.1.1 The HSE notes that the reason for the change from 1992 offshore regulation requirement for an ALARP demonstration to the 2005 regulation requirement for a compliance demonstration recognises that 'to have a requirement for an overall demonstration of ALARP in a safety case is in fact contradictory where there are certain legal requirements in relevant legislation that are absolute'.<sup>20</sup> The HSE cites approvingly industry guidance in 'A Decision Support Framework for Major Accident Hazard Safety' as illustrated below.<sup>21</sup>

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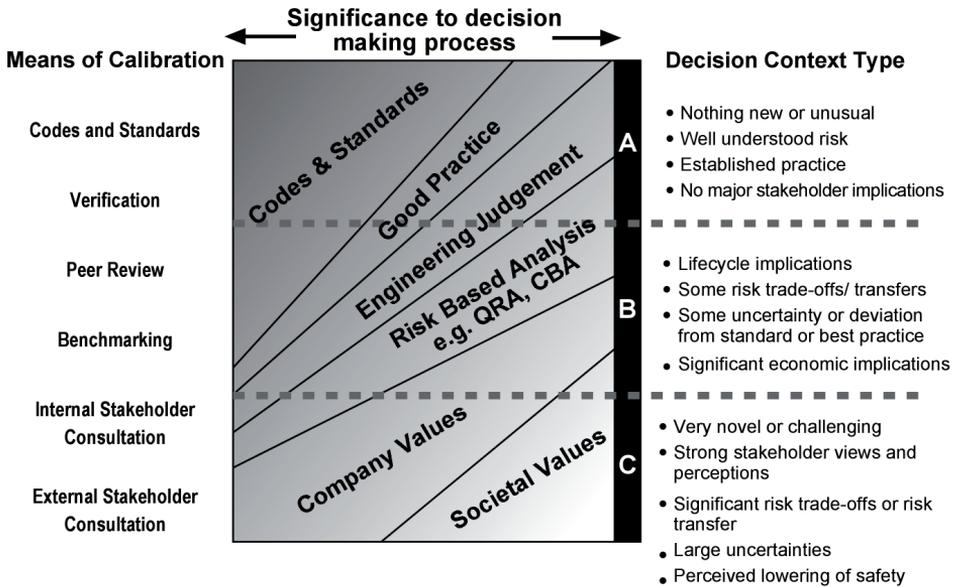
18 Regulation 12 states that the duty holder who prepares a safety case shall include sufficient particulars to demonstrate that his management system is adequate to ensure that the relevant statutory provisions will, in respect of matters within his control, be complied with (a compliance demonstration) and the satisfactory management of arrangements with contractors and sub-contractors; he has established adequate arrangements for audit and for the making of reports thereof; all hazards with the potential to cause a major accident have been identified; and all major accident risks have been evaluated and measures have been, or will be, taken to control those risks to ensure that the relevant statutory provisions will be complied with. In this regulation, 'audit' means systematic assessment of the adequacy of the management system to achieve the purpose carried out by persons who are sufficiently independent of the system (but who may be employed by the duty holder) to ensure that such assessment is objective.

19 HSE, *Guidance on Risk Assessment for Offshore Installations*, Offshore Information Sheet No. 3/2006.

20 HSE, *The Role [of] Offshore Installations (Safety Case) Regulations 2005 Regulation 12*, Offshore Information Sheet No. 2/2006.

21 Ibid.

**Figure 1: Decision support framework for major accident hazard safety**



1.12 The HSE notes that where the law requires that risks to people have been reduced ALARP:

*...the application of relevant good practice may be acceptable as a sufficient demonstration of part (or all) of the risk v. sacrifice computation. Good practice may change over time because of technical innovation, or because of increased knowledge and understanding ... Guidance ... provides information on the benchmark standards ... currently considered to represent good practice.*

However, the HSE notes a common misunderstanding that risks being 'tolerable' and being 'ALARP' mean the same thing; this is not the case including because a risk that is considered as being reduced to ALARP may remain intolerable.<sup>22</sup> This also seems relevant to the legal framework in Australia.

1.13 The HSE Offshore Division also issued revised *Assessment Principles for Offshore Safety Cases* in March 2006 just before the new regulations took effect. The 40 listed principles highlight, inter alia, that the new regulations simplify requirements for combined operations safety cases, remove specific requirements for Quantitative Risk Assessment (QRA), and do not require a demonstration that risks to people from major hazards have been

22 Ibid.

reduced to ALARP as 'this has been replaced by a requirement to demonstrate compliance with the relevant statutory provisions for the control of major accident risks'. However, ALARP remains relevant to general OHS duties under UK law. In addition, all major accident scenarios must be considered, including those that may affect only a few people. While an individual risk of death of 1:1000 per year has typically been used within the offshore industry as the maximum tolerable risk, the principles note that 'care is also needed where risks appear to be low solely because of low occupancy of the hazardous areas'. Further, 'if a measure is practicable and it cannot be shown that the cost of the measure is grossly disproportionate to the benefit gained, then the measure is considered reasonably practicable'.<sup>23</sup> Importantly, the 'major accident risk evaluation should take account of human factors', recognising the potential for human error to contribute to MAEs.<sup>24</sup>

- 1.14 The period over which the concept of ALARP has been in use in the UK system, and the changes over time in the HSE's consideration of how it is used in the duty of care/safety case regime in the UK offshore petroleum industry, provides a valuable basis for consideration in the Australian system.

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23 A typical implied cost of averting a statistical fatality (ICAF) value used by the offshore industry is around GBP6m.

24 HSE, *Assessment Principles for Offshore Safety Cases*, March 2006. The HSE Hazardous Installations Directorate Offshore Division also issued *Guidance for the Topic Assessment of the Major Accident Hazard Aspects of Safety Cases* in April 2006 which stated, inter alia, that 'A safety case should contain sufficient information to indicate that a clearly defined safety management system is in place for the installation, which complies with current good practice'. There is also a HSE book *L30 A Guide to the Offshore Installations (Safety Case) Regulations 2005*, HSE Books 2006. Underpinning these in terms of human factors are HSE reports such as R. Flin, K. Mearns, M. Fleming & R. Gordon *Risk Perception and Safety in the Offshore Oil and Gas Industry*, 1996 and K. Mearns, R. Flin, M. Fleming & R. Gordon *Human and Organisational Factors in Offshore Safety*, 1997.

## The Australian legislation

- 1.15 NOPSA's powers are conferred by the OPGGSA and some of its subsidiary regulations including:
- Schedule 3 to the OPGGSA;
  - *Petroleum (Submerged Lands) Management of Safety on Offshore Facilities Regulations 1996* (the MOSOF Regulations);
  - *Petroleum (Submerged Lands) (Diving Safety) Regulations 2002*;
  - *Petroleum (Submerged Lands) (Occupational Health and Safety) Regulations 1993* (OHS Regulation); and
  - *Petroleum (Submerged Lands) (Pipelines) Regulations 2001*, to the extent that these relate to occupational health and safety.
- 1.16 It has been agreed by MCMPR that this legislation be mirrored by the Northern Territory and by those States with offshore petroleum activities in their jurisdiction in order to create a consistent regulatory environment. Western Australia mirrored the relevant legislation under its *Petroleum (Submerged Lands) Act 1982* (WA PSLA) in March 2007 but other WA legislation has yet to be finalised with accompanying regulation.
- 1.17 The OPGGSA emphasises that the person with a duty of care under this legislation must 'take all reasonably practicable steps' to safeguard safety but recognises that it is not possible to remove all risk entirely.<sup>25</sup> The Act outlines the general duties of the operator of a facility, emphasising that the operator must take all reasonably practicable steps to ensure that the facility is safe and without risk to the health of any person at or near the facility, and requiring all work and other activities on the facility be carried out in a manner that is safe and without risk to the health of any person at or near the facility.<sup>26</sup> ALARP is referenced in the MOSOF regulations, based on the wording of the legal duty in the United Kingdom. For the most part, it is the operator which defines the standards and other practices that apply to a facility, although the OHS Regulations outline some specific prescriptive requirements regarding issues such as noise and hazardous substances.<sup>27</sup>
- 1.18 NOPSA's responsibilities under Commonwealth law include accepting or rejecting the nomination of the operator and the safety case and providing a level of assurance that the health and safety risks

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25 *Petroleum (Submerged Lands) Amendment Bill 2003 Explanatory Memorandum*, The Parliament of the Commonwealth of Australia House of Representatives.

26 S.9 *Ibid.*

27 S.4A-G (*Petroleum (Submerged Lands) (Occupational Health and Safety) Regulations 1993.*)

are properly managed by the operator. This type of regime is best described as a duty of care/safety case co-regulatory regime. Key factors to its success include NOPSA's governance structures, its interaction with State and Territory jurisdictions, and development, assessment, implementation and audit of safety cases. NOPSA's major responsibilities, also include assessment of Pipeline Safety Management Plans under both Commonwealth and State law (eg. the WA PSLA).

### ***The NOPSA Board***

- 1.19 NOPSA's governance is outlined in the OPGGSA. NOPSA is headed by a CEO appointed by the responsible Commonwealth Minister on recommendation from the Ministerial Council on Mineral and Petroleum Resources (MCMPR). The CEO must request advice from the NOPSA Board on strategic matters relating to the performance of NOPSA's functions, and must have regard to all Board advice.<sup>28</sup>
- 1.20 The NOPSA Board was established under the Commonwealth *Petroleum (Submerged Lands) Act 1967* (PSLA) and continues under the OPGGSA to give advice and make recommendations to the CEO, relevant Ministers and the MCMPR about the operational policies and strategies to be followed by NOPSA in the performance of its functions. It is an unusual type of Board in being legally separate from the Authority itself and lacking normal board governance roles. The OPGGSA specifies that the Board may advise on policy or strategic matters relating to NOPSA's functions, NOPSA's performance, and 'such other functions as are specified in a written notice by the responsible Commonwealth Minister to the Chair of the Board.'<sup>29</sup> Further provisions cover advice sought by other Ministers or NOPSA's CEO. In sum, this involves the provision of advice by the Board on its own initiative as well as on request from the CEO, or a State/NT or the Commonwealth Minister. A well functioning Board can provide an additional means to bolster the effectiveness of the Authority.
- 1.21 We were told that the Board was an important instrument in the development and establishment of NOPSA, providing both strategic and more detailed advice and direction. The Authority has matured over time, however, and as a result of this the Board's role and purpose has become less clear to some stakeholders. The Independent Review of NOPSA's operational activities in 2008 noted that 'most stakeholders did not understand the role of the advisory

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28 S.667 *Offshore Petroleum and Greenhouse Gas Storage Act 2006*.

29 S.654 *Offshore Petroleum and Greenhouse Gas Storage Act 2006*.

board’ and ‘some stakeholders stated that they could not see the need for a board.’<sup>30</sup>

- 1.22 The 2008 Review made several recommendations regarding the NOPSAs Board which the Board believes were made without a full appreciation of the function of the Board as laid out in the legislation.<sup>31</sup> In particular, the Review stated that:

*The role of the advisory Board, namely to give advice to Ministers and NOPSAs when asked, should be made clear to Board members and all stakeholders.*<sup>32</sup>

This does not reflect the range of the legislated functions as outlined above.

- 1.23 The Department of Resources, Energy and Tourism appears to have been concerned that the early Board was too interventionist and has sought to encourage a more strategic approach that may be more helpful to the Authority.

- 1.24 In its submission to this Inquiry, the NOPSAs Board has stated that the Minister for Resources and Energy had recently confirmed that the role of the Board is as laid out in the OPGGSA. The Board is seeking to receive this confirmation in writing and has indicated that ‘clarity regarding the role of the Board needs to be communicated consistently in writing by the Minister, RET, NOPSAs and the Board itself.’<sup>33</sup>

- 1.25 It is equally important for the operations of the Board that it cultivates and experiences a positive working relationship with the NOPSAs CEO. The relationship between the Chair of the NOPSAs Board and the NOPSAs CEO needs to be close, collaborative and constructive. An effective relationship helps to ensure that relevant advice is more freely sought and provided and that the CEO takes due regard of it. An annual budget should be provided by NOPSAs that is sufficient to support the Board’s role including research and the holding of four to six meetings annually.

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30 Ognedal, Griffiths & Lake: Report of the Independent Review Team, *Review of the National Offshore Petroleum Safety Authority Operational Activities*, February–March 2008. Aspects of the Report are outlined in Annex 12.

31 NOPSAs Board Submission.

32 Review of the National Offshore Petroleum Safety Authority, February–March 2008.

33 NOPSAs Board Submission to the Inquiry, March 2009.

F 1 We note that the NOPSA Board should function as envisaged in the legislation and that this function should be clarified in writing by the Commonwealth Minister and reinforced by the Department to the Board and NOPSA CEO. We consider that any lack of clarity in the OPGGSA with regard to the role of the NOPSA Board should be resolved and that a budget be made available by NOPSA to support research related to the Board's advisory role and the holding of four to six meetings annually. We also consider that to avoid confusion with governance boards, the Board should be explicitly renamed an advisory Board.

### ***Legislative interface***

1.26 Legislative interfaces have the potential to impact on NOPSA's ability to operate effectively. State and Territory mirroring of the NOPSA legislation has not yet resolved inconsistencies between jurisdictions, resulting in an overly complex legislative environment. For example:

- not all State legislation relevant to offshore operations refers to or gives any legal force to a full Safety Case regime; and
- there are differences in enforcement actions and penalties across jurisdictions.

1.27 There is additional complexity in WA related to the internal waters and islands (see Annexes 1, 2 and 3).

1.28 Any legislative interface may represent a potential point of weakness. The underlying concerns identified by the national OHS review relate to the inefficiencies caused by too many sources of regulation (see Annex 7). The OHS review also notes considerable potential for difficulties to arise from the interaction of different regulations given the differing provisions and regulatory practices associated with these. This comes on top of many of the other issues we have cited.

1.29 Managing a petroleum production system from the reservoir through to a sales point can include both onshore and offshore components and cross between Commonwealth and State jurisdictional boundaries. Pipelines and wells, in particular, tend to

cross legislative boundaries and the many confusing interfaces are described elsewhere.<sup>34</sup>

- 1.30 These boundaries can result in numerous regulatory interface points across a production system. The APPEA submission to our Inquiry notes that:

*Problems can also arise where there is conflict between different jurisdictional requirements, where there is an unintentional gap in coverage by the different jurisdictions and/or where the need to report or seek approval at multiple points across governments causes confusion and delays.*

- 1.31 Some of the complications in the Australian legal and administrative framework that led to the creation of NOPSA<sup>35</sup> still remain and others have been introduced through NOPSA's interfaces with existing State legislation. Regulatory interfaces mean that NOPSA is prevented from effectively regulating operators' management of safety across whole facilities and fundamental differences between State and Commonwealth legislation add to confusion. Operators can, and do, confuse which body is the regulator and under what legislation.

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- 34 We are pleased to cite the Productivity Commission's overview text regarding offshore occupational health and safety:

*Regulation of most offshore activities has been harmonised with the creation of the National Offshore Petroleum Safety Authority (NOPSA), while onshore operations are regulated under the OHS regimes applying in each State and Territory. Although the establishment of NOPSA in 2005 significantly improved the efficiency and effectiveness of offshore petroleum regulation, study participants raised concerns about the unnecessary duplication arising from shared responsibility between NOPSA and the DAs in some areas. Particularly in Western Australia, there remains a complex position in regard to powers not being conferred on NOPSA for State internal waters and some islands (which in some cases contain upstream petroleum facilities that are contiguous with coastal waters that are the responsibility of NOPSA). This increases the risk of interface problems between safety regulators and can contribute to unnecessary regulatory burdens. Some also raised concerns about a drift away from the desired objective-based regulation towards greater prescription in some OHS areas, such as through the release of prescriptive guidelines. The Commission agrees with the views of most participants that the move to establish NOPSA and the use of safety cases has been a useful step forward, albeit that further improvements are possible and desirable. Such improvements include that the legislated coverage of NOPSA be extended to include the integrity of offshore pipelines, subsea equipment and wells. Subject to the outcomes of the current Australian and WA Governments joint inquiry into the 2008 Varanus Island explosion, States and Territories should consider conferring powers to regulate OHS on NOPSA for all State and Territory waters seaward of the low tide mark, including islands in those waters. NOPSA should remain a focussed independent safety regulator.*

Productivity Commission, *Review of Regulatory Burden on the Upstream Petroleum (Oil and Gas) Sector*, Research Report, Canberra, April 2009, ppxxi-xxiii.

- 35 *Creating a New Offshore Petroleum Safety Regulator*, Presentation to IADC, APPEA Conference 25 March 2003 – Peter Wilkinson, Department of Industry, Tourism and Resources.

- 1.32 NOPSA's key functions include cooperation with Commonwealth and State agencies and the DAs. To assist in this NOPSA has 19 MOUs<sup>36</sup> in place which, while not legally binding, represent an intent and a framework for working cooperatively. NOPSA should be acknowledged for putting these MOUs together. While we did not consider all NOPSA's MOUs, we found that under the DOIR/NOPSA MOU discussions between the parties tended to be based around letters and written correspondence associated with approvals, information requests and audits and inspections under service contracts. We believe that dealing with issues arising from audits and inspections only in written form is not in the spirit of the MOU and has not assisted in achieving the best regulatory outcome for all stakeholders. NOPSA has stated that it was initially proactive in seeking more engagement with DOIR but that this was not reciprocated.
- 1.33 In relation to other MOUs, in some cases we could not find evidence of any meetings between NOPSA and the other party such as DOCEP.
- F 2 *We note that with the relevant division of DOCEP now transferred to DMP, it would be timely to revise the NOPSA/DOIR/DOCEP MOUs. We also note that both parties should be proactive in fulfilling their obligations under MOUs and cooperating closely.*

### **Broader integrity regulation**

- 1.34 International safety regulation in those countries we visited assumes that integrity of the facility is an integral part of management of risk to safety. The legislation currently controlling NOPSA's activities in managing integrity per se is more restricted than in some of those international systems. In Norway, for instance, the PSA definition of 'safety' has been expanded to include human life, health and safety, environment, protection of assets/financial investments, security of supply and the overall integrity of the facility. The Dutch regulator, the State Supervision of Mines (SODM) is slightly more restricted, but still regulates health and safety, incidents, environment and facility integrity. Similarly, in Australia, for PIRSA, 'environment' denotes a wide context including safety, integrity and security of supply as well as environmental issues.
- 1.35 While environment is outside the HSE's normal regulatory scope, the HSE continues to address overall integrity through its 2008–09 Priority Work Areas, part of which is an Asset Integrity Program with corrosion and verification as major focus areas.<sup>37</sup> A major HSE

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36 A complete list is available on the NOPSA website.

37 <[www.hse.gov.uk/offshore/workareas.htm](http://www.hse.gov.uk/offshore/workareas.htm)> accessed on 27 March 2009.

Offshore Division report in November 2007 defined asset integrity as:

*... the ability of an asset to perform its required function effectively and efficiently whilst protecting health, safety and the environment. Asset integrity management is the means of ensuring that the people, systems, processes and resources that deliver integrity are in place, in use and will perform when required over the whole lifecycle of the asset... Essential for the integrity of any installation are the safety-critical elements (SCEs). These are the parts of an installation and its plant (including computer programmes) whose purpose is to prevent, control or mitigate major accident hazards (MAHs) and the failure of which could cause or contribute substantially to a major accident.<sup>38</sup>*

1.36

The main findings and lessons learned of the detailed HSE report were disturbing and included:

- a wide variation in the performance of management systems across the industry;
- considerable variation in performance between assets in the same company as well as between companies;
- lack of understanding of the state of the plant because of the complexity of categorising and recording equipment which was defective or overdue for maintenance;
- lack of understanding across the industry of potential impact of degraded, non-safety-critical plant and utility systems on safety-critical elements in the event of a major accident;
- lack of understanding of the role of asset integrity and concept of barriers in major hazard risk control;
- lack of control of the use of operational risk assessments to compensate for degraded SCEs ;
- a need to strengthen the technical authority role in many companies;
- lack of effective sharing of good and best practice within industry, particularly evident as companies were not learning the well-publicised lessons gained during the life of KP3;
- a need to improve cross-organisational learning processes and mechanisms to secure corporate memory;
- a need for companies to work better with verifiers using their collective skills and knowledge to aid improvement;

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38 HSE, *Key Programme 3 Asset Integrity Programme*, November 2007, p5.

- a need for better key indicators of performance for the most senior management levels to inform decision making and to focus resources;
- a tendency to overly bias many management monitoring systems toward occupational risk data at the expense of major hazard precursors;
- inadequate use of integrity management data by many senior managers and a failure to give ongoing maintenance sufficient priority;
- a need for a common understanding and definition of maintenance backlog and the use of deferrals; and
- a failure to use audit and review arrangements effectively to deliver organisational learning and continuous improvement.

1.37

The report also found that significant improvement in maintenance systems could be achieved without major capital expenditure by better planning, improved training and clear statement of performance standards in testing and maintenance routines. Overall, the HSE found that maintenance aspects more likely to perform badly included maintenance of safety critical elements, backlog, deferrals, measuring compliance with performance standards, and corrective maintenance. Underlying the poor performance was leadership by senior management, lack of authority given to the engineering function, and lack of sharing and embedding learning. Developing better leading indicators for integrity was also regarded as a priority by the HSE including use of a common definition of backlog.<sup>39</sup> It is no surprise to find a number of common integrity and maintenance factors between the UK and Australia, as is evidenced by, for instance, NOPSAs root cause analysis of hydrocarbon topside gas releases which found inadequate preventative maintenance a major factor in 16.3 per cent of releases between January 2005 and June 2008.

F 3

We note the importance of further work to improve industry performance on safety critical maintenance and backlogs. NOPSAs should drive and monitor industry progress on this through its Facility Integrity national program and through facility audits.

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<sup>39</sup> Ibid, pp6-8, 27.

- 1.38 One excellent industry response to these issues is an OGP initiative that focuses on asset integrity to prevent major accidents/incidents that:
- ...are typically the result of the failure of multiple safety barriers, often within complex scenarios. These are difficult to identify using simple experience-based hazard identification and risk assessment processes [but] have severe consequences for people, the environment, assets and company reputation.<sup>40</sup>*
- The publication focuses on asset integrity and risk management process, barriers, integrity throughout the asset lifecycle, human factors, competencies, and monitoring and review.<sup>41</sup>
- 1.39 From its inception, NOPSA oversaw integrity issues that had an impact or a potential to impact on health and safety under Commonwealth legislation. Because a major accident event had significant potential to impact on people, many aspects of facility integrity were therefore analysed and regulated by NOPSA. However, where a potential integrity issue was considered unlikely to impact on people, such as where it involved an isolated section of pipeline, NOPSA had no regulatory authority and therefore did not undertake an oversight role.
- 1.40 Much of the risk analysis work done in the development of a safety case looks at integrity as a factor affecting human safety. It is only when the consequence of an integrity failure is analysed, that it becomes clear which failures present a risk to people. There is nonetheless more work involved in reviewing a safety case for safety and integrity than in reviewing it for safety issues alone.
- 1.41 During the processes leading up to the creation of NOPSA, WA became concerned that, while NOPSA would have responsibility for occupational health and safety matters, it would not have responsibility for overall facility integrity.<sup>42</sup> There was much discussion and variation in views on this issue. However it was not until after NOPSA's enabling legislation was drafted and NOPSA itself was in operation that senior officers in the Department of Industry and Resources (DOIR), the offshore regulator in WA, became aware that NOPSA was not going to have responsibility for facility integrity where integrity did not impact on health and safety. This was a significant concern for WA particularly as the resources and capability that could have been utilised to undertake this responsibility were lost to NOPSA and subsequently the Department of Consumer and

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40 OGP, *Asset Integrity – the key to managing major incident risks*, Report No. 415, London, International Association of Oil and Gas Producers, December 2008, p3.

41 Ibid, pp4-16.

42 This concern was not shared by other States.

Employment Protection (DOCEP) to which onshore OHS regulation was transferred in July 2005.<sup>43</sup> DOIR first raised the issue of integrity at a national level at the Upstream Petroleum Subcommittee of the MCMPR of 18–19 August 2005 and in other Commonwealth/State forums.

- 1.42 The issue of inclusion of overall integrity regulation was considered by the Integrity Working Group (IWG) formed under the Upstream Petroleum and Geothermal Subcommittee of MCMPR in 2006–07 (see Annex 5). The outcome of this work was a decision in 2007 to amend the legislation to give NOPSA responsibility for pipeline integrity issues. When done, this will remove the integrity ‘gap’ with minimal resource impacts on NOPSA. While legislative drafting is currently underway at the Commonwealth level (which would need to be mirrored by the States and NT), at the time of this report the drafting of the necessary legislation had not been completed and introduced into the Commonwealth Parliament.
- 1.43 Our view is that NOPSA represents the future direction for offshore petroleum safety regulation and that efforts must be made to further consolidate and improve the regime. As a result, we make the following recommendation.
- R 1 We recommend that powers should be conferred on NOPSA to enable it to effectively regulate safety and integrity for all facilities and pipelines in the water and the WA islands which export gas by pipeline. NOPSA’s authority should extend to the nearest valve on the mainland above the shore crossing.<sup>44</sup>**
- F 4 We also note that Commonwealth legislative drafting is underway to include overall facility integrity in NOPSA’s responsibilities and urge that this be progressed as a matter of urgency. While this is underway, other jurisdictions should prepare to mirror the legislation to enable NOPSA to regulate facility integrity in designated coastal waters as soon as the Commonwealth legislation is passed.

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43 WA raised this issue in Commonwealth/State forums on a number of occasions. A Commonwealth/State Integrity Working Group was established to address the issue, the outcomes of which are further discussed below.

44 This would currently not include Barrow Island (which does not export gas) or the North West Shelf Joint Venture, unless WA sought this inclusion and conferred appropriate powers.



## 2: Safety Case Regime

- 2.1 Overwhelmingly, the submissions to this Inquiry were supportive of the safety case and the appropriateness of the co-regulatory OHS regime in the Australian offshore industry. However, while safety cases were a legislative requirement prior to the introduction of the OPGGSA, and its precursor the *Offshore Petroleum Act 2006* (OPA), the importance of the ‘safety case’ has not been enshrined within this legislation. The OPGGSA<sup>45</sup> provides provision for the collection of ‘safety case levies’ but does not actually define a safety case.<sup>46</sup> Furthermore, the Act does not require safety cases to be implemented, describe their importance in the offshore petroleum industry OHS regime, or outline the basic contents of such a document. Instead, the MOSOF regulations outline the safety case provisions, originally drafted in 1996 under the PSLA.
- 2.2 Annex 7 summarises key aspects of the National Review into model OHS laws that we believe are relevant to offshore oil and gas regulation.
- F 5 We note the recent agreement that separate industry or hazard specific laws relating to OHS should only be maintained where objectively justified. We believe that separate legislation is justified for the offshore oil and gas industry but that in line with the national OHS review’s recommendation, the content and operation of all laws in the petroleum and gas industry that affect OHS should be reconsidered with the aim of achieving as much consistency with the content and operation of the harmonised principal OHS laws as is appropriate.
- R 2 **We recommend that MCMPR continue to support a duty of care safety case regime for best practice offshore petroleum industry regulation augmented to include regulation of integrity. Since the safety case is at the centre of the duty of care co-regulatory regime, we consider that the requirement for the implementation of the safety case at facilities involved in the exploitation of petroleum resources should be provided for within the OPGGSA itself.**

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45 *Offshore Petroleum and Greenhouse Gas Storage Act 2006*; Chapter 6; Part 6.9.

46 This was highlighted to the Inquiry by the MUA submission, which stated that ‘the OPA (Schedule 3) provides, *inter alia*, for the establishment and operation of NOPSA, the scheme of OHS for the offshore petroleum sector and for the making of associate regulations. Nowhere in the Act is there a requirement for the statutory arrangement to be based on the safety case.’

## The Safety Case

- 2.3 Offshore oil and gas companies range from global oil and gas majors to smaller operators with one facility. Operators have different cultures and business models with some, for instance, focussing on full field development from exploration through to abandonment while others specialise in taking over and operating fields towards the end of the field life. The nature of these operations ranges from large gas projects underpinned by long term contracts which require high reliability through to short term oil fields that are near or at the end of field life where the approach is to 'wring the assets'.
- 2.4 Service companies can hold contracts for a year or more or they may be involved in short term projects of a month or so. These service companies range in size from global drilling companies with more than 150 rigs worldwide to small companies servicing specialist niches such as cathodic protection or diving. Overseas contractors commencing work in Australian waters may not have operated in a safety case environment before.
- 2.5 An operator's culture can be either proactive or reactive in relation to health and safety. Experienced regulators overseas have described the contrast between proactive and reactive operators operating in a safety case or safety management system environment as 'those who get it, and those who don't.' In both cases, the relevant documentation will be in place and basic legislative requirements will be met. In reactive cases, however, these documents may not be implemented in keeping with their intention.
- 2.6 As an initial point of contact with any new operator, NOPSA accepts the nomination of an operator for a facility or a proposed facility. Under MOSOF regulations, NOPSA must accept the nomination if it is satisfied that the operator has, or will have, the day-to-day management and control of the facility or proposed facility; and operations at the facility or proposed facility. In contrast to this approach, the Norwegian offshore safety regulator, the PSA, screens all prospective operators to qualify them for operation within the sector.<sup>47</sup> This process establishes whether the company has the systems required to be a prudent operator. It also has the added benefit that the prospective operator will be educated on the requirements of the regime prior to beginning operations.
- 2.7 A key component of the regulatory regime is the safety case which is outlined in the MOSOF regulations<sup>48</sup>. The operator is responsible

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47 While it has never been tested, the PSA also has the ability to request their Minister to remove that qualification.

48 This section draws information from the *Petroleum (Submerged Lands) Management of Safety on Offshore Facilities Regulations 1996*.

for submitting the safety case to NOPSA and NOPSA is responsible for accepting it or not where it has jurisdiction. The safety case for a facility must contain a description of that facility, and detailed descriptions of its formal safety assessment and ensuing safety management system.

- 2.8 Safety Cases must include the following matters in relation to the health and safety:
- the identification of hazards, and assessment of risks;
  - the implementation of measures to eliminate the hazards, or otherwise control the risks;
  - a comprehensive and integrated system for management of the hazards and risks;
  - monitoring, audit, review and continuous improvement; and
  - assurance that the risks to the health and safety of persons at the facilities are reduced to a level that is as low as reasonably practicable.
- 2.9 The formal safety assessment gives particular focus to MAEs, which are defined as events connected with a facility, including a natural event, having the potential to cause multiple fatalities of persons at or near the facility. A safety management system, however, must provide for all hazards and risks to persons at the facility, not just risks of major accident events.
- 2.10 From construction through installation, operation, modifying and decommissioning work on a facility must comply with the safety case. In addition, a person on a facility must comply with the safety case. The safety case is the mechanism by which the described methods, standards and procedures for managing the health and safety risks on a facility become a legal requirement.
- 2.11 A second key safety-related component in the offshore regulatory regime is the Pipeline Management Plan (PMP).<sup>49</sup> Licensees of pipelines in Commonwealth waters were required to have in force a PMP for a pipeline by 1 November 2006, five years after the introduction of the Commonwealth *Petroleum (Submerged Lands) (Pipelines) Regulations 2001*.<sup>50</sup> A component of the PMP is the Pipeline Safety Management Plan (PSMP) which provides for the

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49 Unless otherwise noted, this section draws on the Commonwealth *Petroleum (Submerged Lands) (Pipelines) Regulations 2001*.

50 NOPSA had no powers within WA State and internal waters before March 2007, instead providing advice to DOIR on the safety aspects of facilities. In March 2007 WA conferred powers on NOPSA as the Safety Authority for the offshore facilities in WA coastal waters under the WA PSLA and WA MOSOF Regulations and for pipelines (phased in by March 2008). NOPSA still does not have any powers in WA internal waters per se or on the islands (see Annexes 1 and 2).

health and safety of persons at or near the pipeline. The PSMP is in essence a safety case for a pipeline or group of pipelines.

2.12 A PMP covers the design, construction, operation, modification and decommissioning of a pipeline and must include:

- a statement of the licensee's strategic health and safety objectives for the pipeline;
- a comprehensive description of the pipeline;
- a comprehensive description of the pipeline management system;
- a statement about the standards applied; and
- arrangements for reporting to the Designated Authority (DA), not less often than annually.

2.13 The description of the pipeline management system must include a comprehensive assessment of the risk of significant pipeline accident events and other risks to the integrity of the pipeline and must demonstrate the effectiveness of:

- measures that have been, or will be, implemented to reduce the risks to levels that are as low as reasonably practicable;
- the systems used to identify, evaluate and manage the risks and measures; and
- the arrangements for monitoring, auditing and reviewing those systems.

2.14 NOPSA, as the Safety Authority, accepts the PSMP component and notifies the DA who is responsible for other regulatory assurance including approval of the overall PMP.<sup>51</sup> In doing this NOPSA reviews pipeline integrity but, as previously noted, only as it relates to the health and safety risks of persons at or near the pipeline.

## **Developing a safety case**

2.15 NOPSA's legislated safety case role requires it to balance its advice and promotion functions with its monitoring and enforcement functions. In discussions with, and submissions to, our this Inquiry industry considered that NOPSA was not providing enough advice including in the safety case development process. This is consistent with the 2007 NOPSA stakeholder survey which noted:

*...while 60 per cent of stakeholders overall believe that NOPSA performs well as an industry information sharing and learning resource, industry stakeholders are less satisfied with 44 per*

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51 See Annex 1 for the legislative framework for offshore petroleum activities.

*cent showing satisfaction. Lack of contact outside safety audits was the main criticism provided in this regard.*<sup>52</sup>

- 2.16 Industry has found it difficult to understand NOPSAs expectation and we were told of cases where operators prepared safety cases without being able to access significant advice from NOPSAs. We were also advised of cases where operators sought advice and/or guidance from NOPSAs on specific aspects of safety case documentation during development, but were rebuffed by the regulator, and told to refer to the MOSOF regulations and then submit the safety case for review. While NOPSAs provides general advice at a number of levels, it does not readily respond to specific requests in the development phase of safety case or pipeline safety management plan documentation. NOPSAs insists that the MOSOF regulations are sufficient for an operator to develop an appropriate safety case and that little further advice or guidance should be required. NOPSAs also noted the danger in providing such advice or guidance in that the process could become quasi-prescriptive if NOPSAs determines what should be in the documents.
- 2.17 NOPSAs appears strongly opposed to engaging with companies during the safety case development process to avoid 'regulator capture'.<sup>53</sup> It also seems to be so preoccupied with avoiding any de facto ownership or any risk of the operator presupposing approval that it largely waits until the safety case is submitted before addressing whether the operator is competent to develop that safety case. The Authority has already taken several years in a process to redefine the level of information to be provided to companies through guidelines or guidance notes. This process is still not finalised.
- 2.18 In contrast the HSE Offshore Division has a range of current publications on its working methods, plans and priorities. The publications share inspection priorities with industry, stating that during offshore visits HSE inspectors will be seeking to ensure that management systems are in place to address health and safety issues and operational work including through: safety case assessment; inspection; investigation; enforcement; provision of advice, guidance and information; research and development; influencing technical standards; operational policy and systems; and operational support to frontline activities.

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52 NOPSAs Stakeholder Survey, May 2007.

53 NOPSAs Relationship Management Liaison with Operators Policy, Rev 0, PL202, 4 March 2005.

- F 6 We note that there would be value in undertaking a gap analysis between documentation associated with the UK HSE and its Offshore Division and the material available through NOPSAs to assist NOPSAs in identifying an appropriate quantum and focus for its own guidance material.
- 2.19 While operators generally see value in the safety case process, they can become disenchanted with the process of gaining acceptance when effort is expended on a safety case which is subsequently rejected or requires significant, time-consuming amendments, particularly where the operator considers such rejection or amendment could have been avoided had NOPSAs been more responsive and active in its advisory role.
- 2.20 A number of companies use consultants to develop the safety case. The quality of such safety cases can be variable. We have heard of instances where safety cases have been submitted with the wrong facility name and others where the operator has clearly not realised that the safety case should be a living document that guides operations on a facility, instead producing a shallow examination without engaging the correct people within the company. NOPSAs has seen instances where operators and their consultants have 'cut-and-pasted' other approved safety case text and then complained when it was not accepted for a new facility.
- 2.21 Given the nature of the industry, particularly with regard to use of consultants for specialised work, we consider that consultants will always be part of the safety case process and that it is preferable to engage and educate them. At present there is no process for consultants, as a group, to engage with NOPSAs and any discussions are on an individual and ad hoc basis. As a result, an opportunity for improving consistency of understanding and approach and resolving common issues is being missed.
- F 7 We note that NOPSAs could consider establishing an appropriate forum for consultants and those personnel within operators that undertake safety case development. This forum could be via APPEA and should be used for education, promotion and discussion of safety case issues.
- 2.22 As noted above, a number of operators would welcome increased involvement from NOPSAs in the safety case development stage, particularly during the formal safety assessment (FSA). The FSA is the foundation on which the hazards associated with a facility or pipeline are identified, assessed and the approach to the risk management of the hazards determined. It is imperative that this process is robust in order for the operator to produce a meaningful and living safety case document.

- 2.23 NOPSA was, in its very early days, involved in sitting in on some operators' Hazard Identification (HAZID) / Hazard and Operability (HAZOP) workshops (which contribute to developing the FSA). NOPSA has since determined, however, that this could compromise the function of the regulator and has developed a specific policy controlling NOPSA's interactions with operators.<sup>54</sup> Although this policy gives a general approach to dealing with operators most of the document relates to:
- ...attendance by NOPSA OHS inspectors at formal project hazard identification and risk assessment meetings, such as HAZID/HAZOP meetings and the possible impact such attendance may have on stakeholders perception of NOPSA's independence and its ability to provide assurance that risks are properly controlled in Australia's offshore safety regime.*
- 2.24 NOPSAs states that:
- ...although there are potential benefits of attending [HAZID/HAZOP] meetings as noted above (process guidance and regulatory understanding), these benefits can be realised by other means, for example by a careful assessment of the safety case and supporting documents.*
- 2.25 The outcome of the policy was that general attendance of NOPSA OHS inspectors at operator project hazard identification and risk assessment sessions should not take place with attendance only as an exception on the basis of 'observation only' status.
- 2.26 NOPSAs has since indicated to the Inquiry that 'established methodologies for these workshops may not be as rigorously implemented as good practice would provide' and that 'there may be scope for targeted observation to provide a level of assurance of rigour in the application of Hazard Identification.' NOPSAs continues to be concerned, however, that closer involvement in these workshops could lead to adverse outcomes through reduced proactive consideration of the issues by operator staff or even regulatory capture. It is understandable for NOPSAs to not wish to compromise its assurance and enforcement functions. However, we consider that attendance at these workshops with observer status could be crucial for NOPSAs to assure itself that the operator is indeed conducting a robust process and to enable it to witness potentially valuable cultural information about an operator which may not be gained from reviewing documents.

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54 NOPSAs Relationship Management Liaison with Operators Policy, Rev 0 , PL202, 4 March 2005.

- 2.27 Staff from Energy Safe Victoria (ESV), WorkSafe Victoria, and the Department of Primary Industries and Resources SA (PIRSA) engage in similar workshops in the development phase and are able to provide information at the outset to enable the company to develop a robust SC which also meets the regulations. As was pointed out during our meeting with them, ESV notes the risks but engages extensively in the safety case development process. ESV acknowledges that the regulator will be blamed for a major accident, so chooses a route which better enables it to understand the risks and actively help operators to improve safety. The Victorian Department of Primary Industries (DPI) also takes a pragmatic approach, again acknowledging the dangers but noting that the answer is not to disengage. The DPI usefully drew a distinction between ethical separation (NOPSA's perceived approach), ethical intimacy (the ESV/DPI approach) and unethical intimacy (regulatory capture).<sup>55</sup> These agencies see critical value in a higher level of interaction with industry both to assure themselves of the operators' risk assessment processes, and also to foster a more successful relationship where the operator and regulator work together.
- 2.28 Liaison meetings are an important tool for NOPSA. They provide a valuable forum for NOPSA to remain abreast of the safety culture of the operator and can also encourage the operator to engage in a productive and educational dialogue with the regulator. The content of these meetings may include operator presentations, discussion of main health and safety issues and plans to address these and progress on close out of NOPSA inspection recommendations. The Inquiry endorses the regular occurrence of these meetings as an essential aspect of NOPSA's role as regulator.
- 2.29 NOPSA seeks to hold quarterly liaison meetings with operators as part of the monitoring process. This frequency has varied in practice, with one operator having eight meetings over four years, while another had meetings at least once per month. NOPSA has indicated that it considers these extreme examples.

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55 Sparrow attributes this concept to papers published by David Kennedy in 1997 and uses the terminology 'principled intimacy' as contrasted with 'principled distance and mistrust that accompanies the regulatory style of legalistic enforcement [and] ... unprincipled intimacy associated ... with the 'capture; of a regulatory agency by its regulated community', Malcolm K, Sparrow, *The Regulatory Craft: Controlling Risks, Solving Problems, and Managing Compliance*, Washington DC: Brookings Institution Press, p177.

- F 8 We note that NOPSA/operator liaison meetings have a number of benefits when held at least quarterly. More frequent or less frequent meetings may be appropriate depending on the culture and responsiveness of each operator. We also note that where a facility is managed by a contractor (i.e. who is the operator) and the titleholder or contract holder exerts a strong influence on the health and safety culture and performance of the operators, NOPSA should consider whether they should also be more routinely involved in liaison meetings.

## Developing a safety culture

- 2.30 With a significant proportion of the upper levels of management in some organisations now coming from corporate, rather than technical, streams, the difficulty faced in focussing upper management attention on safety is widely acknowledged as a critical issue in improving safety outcomes. Middle management, with the background which gives them a good understanding of risk management, can have difficulty persuading their senior managers of the need for corrective action. Another issue was a lack of influence of middle managers of safety on senior executives who may be more efficiency and profit focussed. This was perhaps best expressed by the US Pipeline and Hazardous Materials Safety Authority (PHMSA) noting:
- The people in middle management will sometimes beg us to fine the company to draw attention to safety issues...*
- 2.31 Senior managers don't necessarily understand the systems in place on a facility, or the critical importance of these systems in safeguarding the integrity and safety of that facility. Senior managers may have bonuses which are linked to cost-cutting, efficiency and financial success, rather than safety outcomes<sup>56</sup> yet it is from the top levels within the organisation that the safety culture must flow.
- 2.32 Regulators have developed various ways to address this issue. The HSE has instigated a one-day seminar for upper managers and for board members covering major hazard events, process safety and safety management issues.<sup>57</sup> PHMSA, on the other hand, requires annual sign off on safety issues and meets with senior managers if safety issues are not being adequately addressed. Similarly, SODM in the Netherlands always sends information to the Managing

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56 The Texas City BP workforce received bonuses in 2004 linked to the good results on personal safety at the Texas City refinery prior to the 2005 incident; yet the organisation had completely failed to focus on the high consequence/low probability MAEs. cf Annex 9 and Hopkins, *Failure to Learn*, p 51ff.

57 APPEA is developing a somewhat similar approach for Australia.

Director. The PSA in Norway goes so far as to make a sound safety culture a requirement under regulation:

*Section 11: Sound health, environment and safety culture*

*The party responsible shall encourage and promote a sound health, environment and safety culture comprising all activity areas and which contributes to achieving that everyone who takes part in petroleum activities takes on responsibility in relation to health, environment and safety, including also systematic development and improvement of health, environment and safety.*<sup>58</sup>

2.33 The HSE's priority work areas for 2008–09 are stated to be safety culture, leadership, asset integrity and competence noting:

*Industry needs to do more to involve the offshore workforce in the promotion of safety improvements and in embedding of a positive safety culture across the industry ... Strong leadership improves safety and business performance and good safety leadership leads to exemplary leadership ... An asset (which includes structure, process plant and connected wells and pipelines) has integrity when it meets design performance standards for effective control of risks and when the management systems effectively support those standards ... the high level of activity worldwide is placing considerable strain on the oil and gas industry in the sourcing of the right resource with the relevant competency and skills ... more needs to be done in making sure the complex working relationship between the Dutyholder and the contractor is addressing competency issues.*

2.34 The HSE Offshore Division's 2008–09 Business Plan provides further detail including on the role of senior management as highlighted in

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58 *Regulations Relating to Health, Environment and Safety in the Petroleum Activities, Norway*, <[www.ptil.no/framework-hse/category403.html#\\_Toc138663144](http://www.ptil.no/framework-hse/category403.html#_Toc138663144)> 24 March 2009. Section 9 of the Norwegian Framework regulations also include an analogue of ALARP: 'Harm or danger of harm to people, the environment or to financial assets shall be prevented or limited in accordance with the legislation relating to health, the environment and safety, including internal requirements and acceptance criteria. Over and above this level the risk shall be further reduced to the extent possible. Assessments on the basis of this provision shall be made in all phases of the petroleum activities. In effectuating risk reduction the party responsible shall choose the technical, operational or organisational solutions which according to an individual as well as an overall evaluation of harm and present and future use offer the best results, provided the associated costs are not significantly disproportionate to the risk reduction achieved. ... Factors which may cause harm, or nuisance to people, the environment or to financial assets in the petroleum activities shall be replaced by factors which in an overall evaluation have less potential for harm, or nuisance.' Jan Erik Vinnem, *Offshore Risk Assessment*, 2nd edn, 2007, p6.

the Texas City accident and in the Division's November 2007 Key Programme 3 Asset Integrity Programme report (KP3).

- 2.35 Leadership is also a major theme for the OGP. We note that NOPSAs are currently working with APPEA to address this safety culture and leadership issue through the CEO Safety Leadership Forum.

## Dialogue and transparency

- 2.36 In a September 2008 speech, Minister for Finance and Deregulation, the Hon Lindsay Tanner, stated that:

*At its core the Rudd Government's deregulation agenda is about making government regulation as efficient, adapted and responsive as we can to achieve our policy goals. ... A crucial part of making regulation more responsive is paying more attention to the experience and insights of those regulated. This means deepening our current means of consultation and building a culture of continuous regulatory improvement.*

- 2.37 This requires a significant effort to combine guidance, advice, promotion and consultation with the harder edge of regulatory compliance enforcement. The Australian National Audit Office (ANAO), for instance, argues that:

*...increasing the transparency of, and regulated entities' confidence in, the regulatory regime, can be expected to increase the level of voluntary compliance. This has the potential to reduce administrative costs for regulators and compliance costs for regulated entities. ...a regulator must manage its relationships to ensure that it retains fully its ability, and preparedness, to exercise its regulatory authority independently and objectively in the public interest.<sup>59</sup>*

- 2.38 More specifically for the offshore petroleum industry, in 2002 MCMPR notes as one of its regulatory principles that:

*The regulator must demonstrate an independent approach in implementing its legislative responsibilities and in its dealings with industry. The structure and governance of the regulatory agency must promote independence, transparency and openness.<sup>60</sup>*

- 2.39 Norway provides an excellent model for the use of dialogue as a transparency tool not only in effectively regulating industry, but in

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59 Australian National Audit Office, Administering Regulation: Better Practice Guide, Canberra, March 2007, pp25-6.

60 See Annex 12 for more information on these principles.

building the competence and confidence of the regulator.<sup>61</sup> The Norwegian Petroleum Safety Authority (PSA) places a high level of importance on national and international safety forums and this is typical of their focus on dialogue and transparency as powerful tools for building an industry-wide safety culture. Dialogue is their first (and preferred) method to resolve safety issues identified during audits. In addition, the PSA holds seminars in which they raise issues with the expectation that industry will then take the initiative and work through the issues raised to a solution. There is also a high level of dialogue in the lead up to the submission of a consent to operate, the overarching document which contains the current state of the company's Safety Management System (SMS) and a number of binding commitments which, if accepted, will enable the company to operate the facility. The knowledge gained through these discussions during the development process is a key input to the approval process. Despite this, the PSA never seems to fear inadvertently developing any ownership over the SMS and is confident that not only the company, but the public, accept that safety remains the responsibility of the company.

2.40

As noted previously, the other regulators, both Australian and international, we spoke to confidently interact with industry at a range of levels and use that regular interaction to improve safety outcomes. Firstly, and most importantly, other regulators acknowledge that poor performing companies require far higher levels of interaction with the regulator than the good performers. In Australia, under the duty of care/safety case regime, staff from ESV, WorkSafe Victoria and PIRSA engage in the workshops used to assess the risks associated with a Major Hazard Facility and are able to provide information at the outset to enable the company to develop a robust safety case which also meets the regulations. The PSA starts this process even earlier by pre-qualifying a company to operate in Norwegian waters and uses the knowledge gained through this process to tailor their approach to that company with regard to safety right from the start. The Victorian DPI takes a pragmatic approach, again acknowledging the dangers, but noting that the answer is not to disengage.

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61 The PSA is required by its Minister to collaborate with peer organisations – nationally and internationally – such as employers, unions and other regulators. The PSA chairs a Safety Forum, established six years ago, consisting of industry and worker representatives who must be empowered to make decisions for their organisations. This Forum meets six times a year to raise issues relevant to safety and holds, in addition, an annual conference to involve other stakeholders and provide networking opportunities. NOPSA is currently developing a similar forum, the Safety Liaison Group. The PSA also participates in a Regulatory Forum with the other organisations with responsibility for regulating industry, primarily to discuss legislation and regulatory development.

- 2.41 Effective regulation in a duty of care/safety case regime relies on the operators being able to develop a knowledge base over time<sup>62</sup>. Provision of more specific and targeted information to the novice or poorer performing operator prior to and during the development of a safety case may enable a well-motivated operator to develop an adequate safety case which meets the regulatory baseline and is clearly owned by that operator.
- 2.42 In this context, it is interesting to consider whether interaction *before* or *after* the submission of the safety case is more likely to be seen by the company as transferring some level of ownership for the document to the regulator. Guidance and suggestions made after submission of the safety case might be seen as requirements which must be met before the safety case will be accepted and could move the interaction unhealthily towards unthinking compliance. The Dutch model solves this issue to some extent by asking questions rather than making suggestions following submission of the safety case. We suggest that guidance prior to submission of the safety case remains preferable.
- 2.43 The Organisation for Co-operation and Economic Development (OECD) argues that in a co-regulatory regime:
- Transparency is of crucial importance ... since the close relationships required between industry groups and government regulators under the co-regulatory model necessarily implies a higher than normal risk of 'regulatory capture' developing.*
- 2.44 The OECD notes further that it is vitally important the target group has a good knowledge of and understanding of the rules and notes the common problem of regulators assuming that meeting legislated publication requirements will be sufficient to assure the required level of understanding within industry. The OECD also noted the UK HSE approach (also evident in Australia) 'towards more risk-based enforcement, with a lighter touch for well performing businesses and greater help toward compliance for more problematic ones'.<sup>63</sup>

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62 A useful analogy might be a university student being provided, in the early years of their degree, with extensive guidance through lectures, reading lists, tutorials and opportunities to question the lecturer. Initial essays and exam responses will be clearly derivative, yet as that same student gains a depth of understanding in the subject, more original analysis and thought may become evident. Some students never 'get it' while others will go on to excel – but all those who obtain a pass mark should have at least reached a basic benchmark of knowledge and ability. NOPSAs submitted that 'a duty of care/safety case regime relies on operators managing facilities safely in accordance with legislation rather than the development of a 'knowledge base over time'. NOPSAs do engage in early contact with new operators to discuss the regime and its processes.

63 Organisation for Co-operation and Economic Development, *Regulatory Policies in OECD Countries*, 2002, pp137, 77.

- 2.45 PIRSA's regulatory compliance principles include 'facilitating public access to the licensee's compliance reports and decisions relating to approval and enforcement'; 'assessing the credibility of the licensee's reporting of compliance'; and 'assessing the likelihood that licensees will continue to comply'. Under SA regulation, licensees are required to submit annual reports summarising the year's activities and declaring their level of compliance with the Act and other relevant material. In quarterly compliance meetings regulatory and compliance issues are discussed, reviewed and monitored. Major fitness-for-purpose reviews are undertaken and published for transparency. Annual compliance summaries are published by PIRSA for the operators it regulates. PIRSA also notes that a 'key component to any preventative measure is the need for regulators to effectively educate and advise industry on regulatory requirements to support their efforts in achieving compliance'.
- 2.46 While emphasising the importance of maintaining tough compliance options and enforcing them when necessary, Sparrow notes that newer regulatory strategies and tools include:
- tripartism – involving non-government entities to mitigate the dangers of agency capture;
  - information strategies – communicating risk and risk factors to bring pressure to act in more socially responsible ways;
  - allowing more trustworthy parties to conduct and report on their own audits and inspections subject to verification; and
  - positive incentives such as government praise, prizes and awards.<sup>64</sup>
- 2.47 He also emphasises that 'a risk orientation draws upon a much richer variety of data sources, many of them outside the agency'.<sup>65</sup>

## How much is too much information?

- 2.48 We regularly asked the question of how regulators judged the amount of information required to make a decision on whether to accept a safety case. The Dutch regulator, SODM expects to see a short document outlining systems and commitments which the regulator is then able to delve into, 'asking questions' until there are 'no further questions'. The Norwegian PSA system has a similarly short document for the consent to operate, with much of the supporting information already understood by the regulator through pre-submission discussions and dialogue.

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64 Malcolm K, Sparrow, *The Regulatory Craft: Controlling Risks, Solving Problems, and Managing Compliance*, Washington DC: Brookings Institution Press, pp42-3.

65 Ibid, p271.

- 2.49 The dangers inherent in the regulator holding too much information are two-fold:
- a very long and complex safety case document can obscure the really key safety critical issues; and
  - the more information that is held by the regulator, the easier it is for the operator to seek to transfer a significant portion of risk to the regulator on the basis that if the safety case has been accepted, it can be implied that the regulator has read and accepted all the information in that safety case and could therefore be considered partly culpable if something goes wrong.
- 2.50 The latter strikes at the heart of the safety case regime and is, understandably, something which makes safety regulators very concerned about the perception of accountability transference. How can a safety case be assessed without reams of information and how, conversely, can the regulator step away from the culpability associated with this ‘guilty knowledge’.
- 2.51 The answer would appear to be in the assessment of the risk associated with that facility and with that particular operator. Once the regulator has satisfied itself that the FSA has identified major risks, the safety case of an operator with a good safety record for a state-of-the-art facility would require very little additional information. To audit this facility, the regulator must be willing to step away from a box ticking approach using the safety case as essentially a listing of commitments to be dipped into and assessed. Instead the regulator must be able to walk onto the facility and assess management of potential for major accident events, management of personal safety and the overall safety culture and leadership in that facility.
- 2.52 Conversely, a company with a poor safety record no matter how state-of-the-art the facility, should be required to provide additional information to support the claims made in the overarching document; not to provide the regulator with a tick box against which to audit, but instead to show that the company itself understands how it is managing the risk. The emphasis is then on the company’s approach and understanding, not on the actual tools, and this would be followed up on during audits.
- 2.53 We note a particular strength of the Dutch approach where the regulator prompts the operator to seek more information independently by asking questions such as ‘why are you doing it this way’, ‘what do you intend to achieve with this approach’, ‘how are you going to deal with this risk’. These questions drive the operator forward in terms of meeting its regulatory obligations but it also constantly reinforces the company’s ultimate responsibility for the safety case and the information and principles underlying it.

- 2.54 The length of some safety cases may be in response to lack of specific guidance<sup>66</sup> from NOPSA so operators may feel that ‘more’ is ‘better’ and more likely to decrease the approval time. Given the dangers of too much information, we feel that this problem could be mitigated by an increase in NOPSA’s advisory role.

## Use of standards

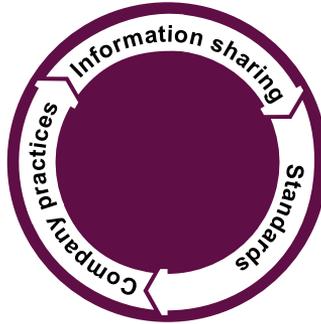
- 2.55 Australian and international standards must be referenced in a safety case as an additional means of assuring the regulator of the safety and integrity of facilities without providing excessive additional information in the document. Where an operator chooses to include a standard in its safety case and this is accepted, the operator is then legally required to comply with this standard. In the duty of care/safety case regime, the regulator generally does not verify the operator’s adherence to specific standards applied within that safety case. Rather, the regulator reviews the applicability of the standards applied in a safety case to ensure the operator demonstrates good practice.
- 2.56 Standards are developed through a collaborative process, providing benefit for the industry in the form of information sharing and providing benefit for the regulators through assurance that operators are involved in a dialogue on good practice.<sup>67</sup> Standards should also form the baseline for an organisation’s own standards, which in turn inform a company in their information sharing practices. Good practice, information sharing and standards development therefore form part of an ongoing cycle which could be depicted as in Figure 2.

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66 NOPSA provides many levels of advice and guidance to industry in general. Our comment here, however, relates to that advice or guidance that could be provided during the safety case development phase whereby the operator may ask questions of NOPSA on specific issues relating to content.

67 Presentation by a representative from Infield Systems, at the *Integrity Management Summit*, Houston, 11 February 2009

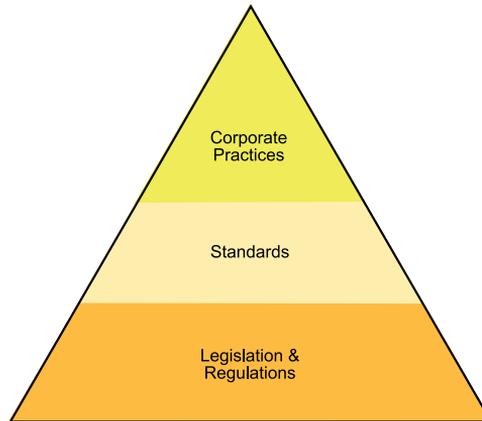
**Figure 2: Using information from industry and within**



2.57

Many operators develop their own company practices or standards. For instance Santos Ltd has published a company 'Environment, Health and Safety Management System Guide', which refers to and builds on external codes and standards where relevant. ExxonMobil also emphasised to the Inquiry the importance of using standards as a basis for their company practice, describing a pyramid where legislation and regulations were the baseline for safe operations, to be built upon by relevant and appropriate standards, and then further augmented by company practices.

**Figure 3: Hierarchical impression of requirements for effective safety management**



2.58

Further detail on the use of standards in the Australian safety case regime for offshore petroleum regulation is provided in Annex 15. We found that NOPSA does not currently have access to a number of important standards.

F 9 We note that where a standard is applied within the safety case regime, the operator should be aware of, and act on, any changes or revisions to the standard. This may include reviewing the safety measures to ensure ALARP continues to be met. Where a new standard becomes less prescriptive good industry practice indicates that the operator should review its systems and define measures as appropriate to meet safety requirements. We also consider that NOPSA should have ready access to all relevant standards and proactively review revisions.

## Validation

- 2.59 The use of classification societies is a mixed blessing for regulators. The first problem to be resolved is that the client of the validator is actually the operator, not the regulator, yet the regulator needs frank and honest advice from the validator in order to satisfy its own requirements prior to accepting that a facility is fit for purpose and/or 'safe' in ALARP terms. The inherent conflict of interest is apparent: is the validator aiming to fulfil the requirements of the regulator or is it aiming to please its customer, the operator, by ensuring that the regulator is satisfied. As suggested in industry meetings and in other information provided to us, it would seem that some validators may solve this conundrum by producing a basically positive executive summary covering a report which contains detail on issues which are of concern.
- 2.60 The only agency visited which was not grappling with this issue was the PSA which used to require validation reports in the 1970s, but which realised that by doing this, the classification societies were building competence while the PSA was losing it. As a result they took on more and more of the validation role internally and now use classification societies primarily for one-off projects and to help set standards.
- 2.61 SODM, on the other hand, seeks to control the potential conflict of interest by approving which validators are able to operate in the Netherlands; biannual meetings with each classification organisation to discuss general trends and any issues which have been noted during validation audits; and requiring the validators to report any safety critical breaches noted during audits. If SODM was not satisfied with the work of a validator, SODM could remove it from the list of approved classification societies, essentially removing its right to operate in the Netherlands. We were told that Canada also accredits three or four classification societies for validation work.
- 2.62 In Australia, ESV uses a route tried by the US Minerals Management Service (MMS) some years ago and directs and pays consultants to validate integrity management and safety regimes of liquid fuel

pipelines. While the Victorian legislation has the scope to require reimbursement from the operator, ESV believes that this can lead to a biased validation document.

- F 10 We note that if a validation report has been required to support a regulatory approval, the regulator should ensure that the complete report is received and considered as part of the approval process. The regulator should also be able to speak directly to the validation team to discuss further any issues raised within the report. This may require amendment to legislation to ensure that the regulator can engage in confidential discussions with the validator without the operator present.

## Safety case assessment

- 2.63 NOPSAs approach to safety case assessment is laid out in its policy.<sup>68</sup> While the information in the safety case may be questioned and verified if there are doubts or concerns as to its accuracy, a fundamental assumption in the assessment policy is that the information in the safety case is correct.<sup>69</sup> While NOPSAs may seek additional information from the operator and may take into account information drawn from previous facility inspections, audits and assessments, its own policies do not require it to do so. Furthermore, NOPSAs considers that it may be risking stepping outside its own legislative boundaries if it takes previous information into consideration. NOPSAs decision to accept the safety case is then based on the three criteria contained in the MOSOF regulations: that it is appropriate to the facility and activities; that it complies with the content requirements of a safety case; and that any scope of validation for the facility is agreed and meets requirements.
- 2.64 Whether the safety case is appropriate to the facility and the activities conducted at the facility is assessed by selecting a sample of subject areas, MAEs and/or Occupational Health Hazards (OHH) and the associated controls, and assessing these against the safety measures and emergency responses. For new safety cases, NOPSAs protocol requires assessment of a minimum of two MAEs and one OHH. More may be assessed depending on the assessor's view of the adequacy of the safety case. Revised safety cases are not necessarily assessed in the same depth as new ones and the focus is more on the changes from the previous safety case. Overall

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68 *NOPSAs Safety Case Assessment Policy*, Version 5.1, PL0052, February 2008.

69 This contrasts with the Dutch system. SODM has its own assessment of the relative risk of various aspects of a facility and uses this as a starting point for assessing the adequacy of the operator's risk assessment process.

NOPSA's safety case assessment is a risk-based sampling approach rather than a complete verification.

- 2.65 NOPSA has highlighted to our Inquiry that as one part of the safety case consideration, the MAE assessment looks at systems and processes rather than going into detail. We noted in our research and consultation, however, that NOPSA does not currently tailor its assessment to respond to a more complex or ageing facility, nor does it have any formal regard for which operators present a higher or lower risk.
- F 10 We note that having identified control measures, the onus is on the operator to manage the issue. We consider, however, that NOPSA should expand its assessment policy to require it to use previously gathered information during the assessment process, and that if necessary the legislation should reflect this requirement.
- R 3 **We recommend in relation to safety case development and compliance overall, that NOPSA revise its approach to interacting with operators prior to the safety case assessment process and subsequently and direct more resources into its advisory functions. We further recommend that NOPSA develop and implement a formal plan for supporting and guiding each operator prior to safety case acceptance, as well as for ongoing compliance with that safety case, recognising the unique experience, capabilities and assessed risk of that operator. Each plan needs to include advice, education and liaison meetings with the operators. The plan needs to be continuously reviewed and reassessed based on latest information, including the interaction with the operator. Implementation should be reviewed at a senior level within NOPSA.**
- 2.66 Once confident that all risks have been captured, we support a risk-based sampling approach to assessing a safety case, however we believe that, when overall facility integrity becomes part of NOPSA's remit, pipelines should be given a higher priority than they have at present. The PSMP assessment process used by NOPSA is similar to that for the safety case.<sup>70</sup> It is a sampling approach which hinges on the assumption that the information provided by the operator is correct, and the pipeline safety assessment must demonstrate the risks are managed to ALARP.
- 2.67 Consistent with our comments above regarding NOPSA's involvement in the HAZID/HAZOP process for safety cases, we note that similar workshops were held for the purposes of the PMP and that NOPSA does not attend these workshops identifying pipeline hazards. Again,

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70 NOPSA Policy – Pipeline Safety Management Plan (PSMP) Assessment, Rev2, February 2009, PL0053.

we believe the benefits in attending workshops and interacting with the operator (and its contractors) outweigh any perceived risk to the robustness of the workshops and related regulatory process.

2.68

With the exception of pipelines directly underneath a platform, NOPSAs system does not consistently encourage consideration of the impact a pipeline adjacent to a facility could have on the facility itself, nor its potential to initiate or contribute to a MAE.

**R 4**

**We recommend that NOPSAs review the risk assessment of pipelines. NOPSAs should focus, in particular, on the efficacy of anti-corrosion systems, and recognise potential interference effects and MAE escalation risks associated with adjacent pipelines and unlicensed pipes even if they fall outside its direct regulatory responsibilities.**



# 3: Regulatory discretion and compliance-based regulation

## 3.1

Identification of risk is a key issue in regulatory discretion in a co-regulatory duty of care regime. The NSW Better Regulation Office cites Sparrow for further guidance with respect to its argument that ‘a risk-based compliance approach enables resources to be targeted to the areas where they are most needed and will prove most effective.’<sup>71</sup> The Queensland Ombudsman also cites Sparrow as ‘a leading author in the field of regulatory practice’ who argues that a regulator may exercise four types of discretion: the right to set the mission (regulatory strategy), the right to choose what to work on, the right to choose how to work on it, and the enforcement discretion. While the first is not within the scope of the report, the Ombudsman argues that in exercising the other three:

*regulators must ensure that the decisions they make are:*

- *effective – the regulator achieves the objectives of the regulatory scheme;*
- *consistent – the regulator fairly and equitably interacts with potential offenders;*
- *transparent – the regulator administers the regulatory scheme in a way that is open to external scrutiny; and*
- *accountable – the regulator implements and complies with appropriate procedures that govern how the regulatory scheme is administered.*<sup>72</sup>

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71 Better Regulation Office, *Risk-Based Compliance*, Sydney, NSW Government, September 2008, pp2-3.

72 Queensland Ombudsman, *Tips and Traps for Regulators*, Brisbane, November 2007, p17.

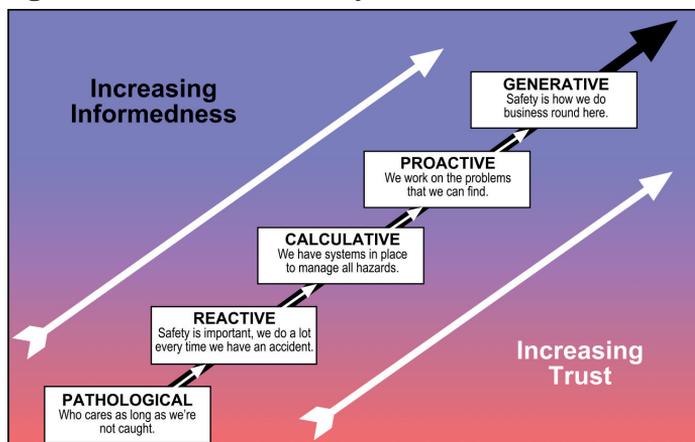
- 3.2 The Australian National Audit Office states that:
- Regulatory risk is an actual or potential event or circumstance that interferes with the achievement of a regulation policy objective or administrative outcome. It can be categorised into two broad groups:*
- *risk that affects a regulator’s ability to effectively administer regulation;*
  - *risk that decreases a regulated entity’s ability or willingness to comply with regulatory requirements. ...*
- Based on its assessment of the level of regulatory risk, a regulator can decide:*
- *which compliance strategy is appropriate, such as education, encouragement, enforcement or some combination of these;*
  - *how and when it will assess compliance;*
  - *what the nature and extent of its response to non-compliance will be;*
  - *whether contingency response planning is needed for unexpected and residual risk events.*<sup>73</sup>
- 3.3 The OECD argues that ‘a mix of policy instruments may be necessary to deal with both compliance ‘leaders’ and ‘laggards’ [and] ... Monitoring compliance is a relatively new activity in OECD countries.’<sup>74</sup>
- F 12 We note that it is important to target compliance not only considering the inherent risk of a facility and operational process but also the safety culture of a particular operator.
- 3.4 The latter was highlighted in a series of aviation safety presentations for CASA by Leiden University Professor Patrick Hudson in 2001<sup>75</sup> but his diagram below has more general application.

73 Australian National Audit Office, *Administering Regulation: Better Practice Guide*, Canberra, March 2007, p8.

74 Organisation for Economic Co-operation and Development, *Regulatory Policies in OECD Countries*, 2002, p80.

75 This builds upon the three stages of organisational culture outlined in 1985 by Ron Westrum - OGP ‘20 critical HSE elements’, <<http://info.ogp.org.uk/hf>> accessed on 27 April 2009.

**Figure 4: The evolution of a safety culture**



- 3.5 The London-based International Association of Oil and Gas Producers (OGP) ran a workshop in 2000 that used this material from Professor Hudson and released a booklet in 2005 which argues that achieving a step-change in safety requires moving beyond engineering and current health, safety and environmental management systems (HSEMS)<sup>76</sup> to properly incorporate human factors. OGP's 'HSE Culture' ladder comprises Hudson's five rungs illustrated above.<sup>77</sup>
- 3.6 The US Center for Chemical Process Safety highlights the importance of safety culture as a significant element of human factors:
- ...seen as critical to improving performance due to the findings from investigations into major disasters in the process industries (eg Flixborough and Piper Alpha), other industries such as nuclear power (eg Three Mile Island and Chernobyl) and transportation (Exxon Valdez and Space Shuttle). ... Taking inappropriate risks, not following procedures and a belief that 'productivity is the most important thing in our business' are all indicators of a weak safety culture which invariably negates the benefits that good engineering practices, procedures, training and management systems provide.*<sup>78</sup>

<sup>76</sup> A better practice example of an HSEMS is the Santos summary published in September 2007 as its *Environment, Health and Safety Management System Guide* (or EHSM), Adelaide, Santos Limited.

<sup>77</sup> OGP, *Human Factors: a means of improving HSE performance*, Report No. 368, London, International Association of Oil and Gas Producers, 2005.

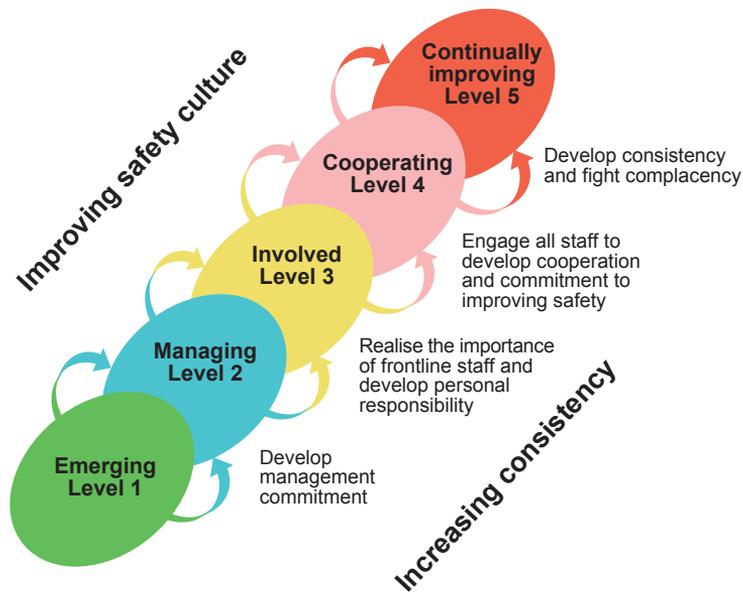
<sup>78</sup> Dan Crowl (ed), *Human Factors Methods for Improving Performance in the Process Industries*, Center for Chemical Process Safety, Wiley-Interscience, 2007, p125.

3.7 The Center cites the HSE approvingly that the most widely accepted and comprehensive safety culture definition<sup>79</sup> was produced by the UK Advisory Committee on the Safety of Nuclear Installations:

*...the product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine commitment to, and the style and proficiency of, an organization's health and safety management. Organizations with a positive safety culture are characterized by communications founded on mutual trust, by shared perceptions of the importance of safety and by the efficacy of preventative measures<sup>80</sup>.*

3.8 The Keil Centre's Safety Culture Maturity Model has been used by the HSE Offshore Division which published material on the Model in 2001 as well as a range of other helpful human factors material (see bibliography). The Model has five levels like Patrick Hudson's and can be seen as complementary:

**Figure 5: Safety culture maturity model**



79 The Center also cites an earlier definition of safety culture by Uttal in 1983 involving shared organisational values (what is important) and beliefs (how things work) which interact with an organization's structure and control systems to produce behavioural norms (the way we do things around here), Ibid.

80 Ibid.

The Model includes ten key elements or dimensions of safety culture derived from both theory and industry experience: visible management commitment, safety communication, productivity versus safety, learning organisation, health and safety resources, participation in safety, risk-taking behaviour, trust between management and frontline staff, industrial relations and job satisfaction, and competency.<sup>81</sup>

- 3.9 Sparrow emphasises the desirability of moving beyond a 'balanced' to an 'integrated' compliance strategy. Balance involves a search for an optimal allocation of resources

*...that retains a credible deterrent, while garnering the public relations benefits and resource efficiencies of more cooperative methods ... [but] it does not normally coordinate or integrate the work of the different tools, nor organize them around any specific risk...*

whereas:

*An integrated compliance strategy (problem-solving approach) organizes the tools around the work, rather than vice versa. It identifies important risks and then it develops coordinated, multifunctional responses. ... It goes beyond the functional orientation of the balanced approach and encourages an executive focus on strategic innovation using a ... tricky combination: tight on methodology, and loose on operational methods and structures. Most of the regulatory enforcement world has it the other way around ... Tool selection, within the context of a craft, is a field-level tactical decision, not a high-level strategic one.*<sup>82</sup>

## A dynamic risk matrix

- 3.10 According to the Australian National Audit Office:

*Risk management is crucial for effective regulatory administration. It guides the development and implementation of strategies and activities that maximise administrative effectiveness subject to the resources available to the regulator. Using structured and systematic risk management methodologies a regulator can: identify, analyse, evaluate and monitor regulatory risk; prioritise risk, based on assessments*

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81 Safety Culture Maturity Model – The Keil Centre – Edinburgh Chartered Psychologists, <<http://www.keilcentre.co.uk>>; see also Dan Crowl (ed), Human Factors Methods for Improving Performance in the Process Industries, Center for Chemical Process Safety, Wiley-Interscience, 2007, pp129-130.

82 Malcolm K, Sparrow, *The Regulatory Craft: Controlling Risks, Solving Problems, and Managing Compliance*, Washington DC: Brookings Institution Press, pp 200-2, 222-3.

*of likelihood and consequences; plan and conduct activities to mitigate risk. ...The effectiveness of risk management in a regulatory organisation is enhanced when:*

- risk management policies and procedures are fully documented and endorsed by the head of the regulatory organisation;*
- a culture of risk-based management and decision making is encouraged throughout the organisation;*
- responsibility for assessing, reporting and managing regulatory risks is clearly understood by staff, and delegations of responsibility are regularly reviewed to ensure they remain appropriate;*
- staff are knowledgeable about the organisation's risk management policies and procedures and are trained in their application; and*
- senior managers encourage and support staff to apply the policies and procedures.*

*... [moreover] The schedule is a key risk management tool for most regulators. ... To effectively respond to changing risks, the scheduling process needs to:*

- be integrated with the regulator's risk monitoring processes to provide timely advice on changing risks to the schedule's managers; [and]*
- facilitate adding, deleting or modifying compliance assessment activities to reflect changing risk priorities.<sup>83</sup>*

3.11 Some of the better practice regulators we met in the course of our Inquiry used a relatively formal risk matrix which guided how often they audited facilities and what issues they focussed on as part of those audits. Risk matrices compared the risk associated with a particular operating company against the risk inherent in a particular facility. The risks associated with the company related to the quality of risk management systems they had in place, information from auditing staff regarding the safety culture and understanding, and the company's historic compliance levels. The risk associated with the facility was related to age, condition, location, nature, output, culture, compliance history, complaints, any financial issues and staffing levels.

3.12 Offshore regulators had also developed various types of annual focus, additional to the basic facility audits, with the overall intention of advancing current industry practice with regard to key identified risks. The US MMS's system is perhaps simplest with the use of

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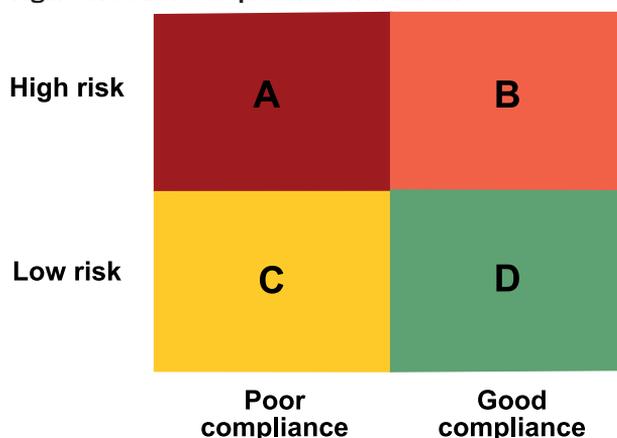
83 Australian National Audit Office, *Administering Regulation: Better Practice Guide*, Canberra, March 2007, pp8, 57.

'blitz' audits where as many facilities as possible are audited on a single safety-critical issue (such as cranes), in a short period of time. The Dutch SODM and Norwegian PSA approaches are more complex, involving a consultative development process for the annual plan based on industry trends, signals from other agencies, and input from Ministers and the regulator's own staff.

3.13 Outcomes of these additional focus areas are analysed and generic data is then fed back to industry in a continuous learning process. This annual focus not only improves overall industry process, but it provides valuable data to the regulator if standards are dropping in safety critical areas and enables them to drive change within the industry.

3.14 SODM uses a four-quadrant matrix based on level of risk and level of compliance. Its regulatory focus includes risks associated with the project itself, an operator's compliance history, size, earlier inspections, the company's own inspection/audit programme etc. For quadrant A with both high risk and poor compliance, there is high inspection pressure with immediate disciplinary intervention where possible.<sup>84</sup> For quadrant B with high risk but good compliance, compliance is encouraged by inspection pressure and involving the industry association. For quadrant C with low risk but poor compliance inspection is occasional and focussed on infringers and there is an emphasis on increasing awareness of legislation and industry initiatives. Quadrant D operations with low risk and good compliance involve no supervision except in the event of complaints.

**Figure 6: SODM four-quadrant risk matrix**



84 SODM noted that they currently had no facilities which they considered fell into quadrant A.

3.15 WorkSafe Victoria's Major Hazards team told us that they had recently developed a risk matrix to better target enforcement. Factors considered included compliance history, incidents, complaints and potential response to the tougher economic conditions. The Petroleum and Geothermal Group in PIRSA uses a commendable ten factor matrix as a guide to determine surveillance of operators and regulatory decision-making. The factors are surveillance status (low supervision, low but unproven, or high supervision), ground disturbance, public safety consequence, worker safety consequence, security of supply consequence, environmental consequence, routine/non-routine activity, stakeholder scrutiny, track record, and political scrutiny.

3.16 According to Sparrow, central to a required regulator focus on regulatory compliance management and problem solving is:

*...the capacity to identify significant risks, problems, or patterns of noncompliance and to design solutions that eliminate or mitigate those problems ... [involving] each of the following elements:*

- *a systematic identification of important hazards, risks, or patterns of noncompliance;*
- *an emphasis on risk assessment and prioritization as a rational and publicly defensible basis for selecting among identified risks;*
- *a project-based approach, offering the opportunity to design and implement creative, tailor-made solutions for each selected risk;*
- *the utilization of a broad range of tools (including, but not limited to, enforcement) in fashioning tailor-made responses to specific risks;*
- *a periodic evaluation of the outcomes or impacts of the designed intervention; and*
- *flexible resource allocation, enabling the agency to open and close projects in response to changing conditions and priorities.*<sup>85</sup>

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85 Malcolm K, Sparrow, *The Regulatory Craft: Controlling Risks, Solving Problems, and Managing Compliance*, Washington DC: Brookings Institution Press, p131.

- 3.17 The Queensland Ombudsman also argues that:  
*Regulators should develop and implement policies that ensure: cases are effectively prioritised across priority ratings ... [and] Wherever possible (and subject to the regulator's legislation) cases with the lowest priority ratings are addressed in less formal and more cost effective ways.*<sup>86</sup>
- 3.18 The Queensland Ombudsman is generally supportive of regulators undertaking proactive work but argues for the need to identify, describe and document the reasons for doing so, rank risks to set priorities and appropriately monitor by supervisors.<sup>87</sup>

## Auditing

- 3.19 In response to our questions regarding the frequency for auditing, senior regulators spoke at length about the importance of auditing being 'risk based' not 'calendar based' and that nuts and bolts auditing, while sometimes useful with poor compliance companies, is generally less effective than systems auditing. While most had a general underlying requirement for auditing each facility at least once every year, it was noted that higher risk facilities (based on a formal risk matrix) required a higher level of attention and had more frequent audits scheduled. In the HSE, each team is responsible for a number of facilities and judges where to devote resources while other agencies appear to make this judgement at a higher level. Where the major annual focuses come into play, the PSA noted that the audit team composition depended heavily on the nature of the audit, not on any team's 'possession' of that particular facility. In addition to its own auditing priorities, SODM transfers part of the responsibility to operators which are required to provide an annual priority plan showing their internal safety priorities for the year. The regulator then follows through on this, focussing on how the company intends to use the information produced from its internal inspection plan. This is typical of the SODM desire to avoid being drawn into the details, instead focussing on the outcomes and the uses for data.
- 3.20 The length of time spent auditing a given facility also differed across regulators but the general feeling was that several days actually on a manned facility (ie not including travel time to and from) was better practice, with appropriate time spent on desktop reviewing of documents and designing the audit beforehand. Team size varied from two upwards depending on the scale and complexity of the

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86 Queensland Ombudsman, *Tips and Traps for Regulators*, Brisbane, November 2007, p20.

87 Ibid, p22.

task and specialist knowledge required. The consistent message was that the audit team should be tailored to the facility being audited, and that the team leader must be able to provide a strong, effective interface between the regulator and the company, including senior management. The balance between MAE prevention and OHS auditing was discussed with all organisations and generally regulators felt that if the MAE prevention strategies were well managed, then personnel safety was more likely to be adequately covered.<sup>88</sup> However, the reverse did not apply as a strong OHS focus did not correlate with a strong focus on process safety and MAEs.

3.21 NOPSA has finite resources and, consistent with the co-regulatory nature of the safety case/duty of care regime, undertakes only a limited sampling of the operator's implementation of the safety case. Essentially, because NOPSA is not at or on the facilities each day, its inspections are snapshots in time. As a result, it is vital that each operator has a strong commitment to implementing its own assurance process and that this process is robust. This should provide greater coverage and safety assurance, with the operator having a better understanding of the risks and ownership of the risk mitigation strategies as well as reinforcing the safety case requirements and the operator's responsibilities.

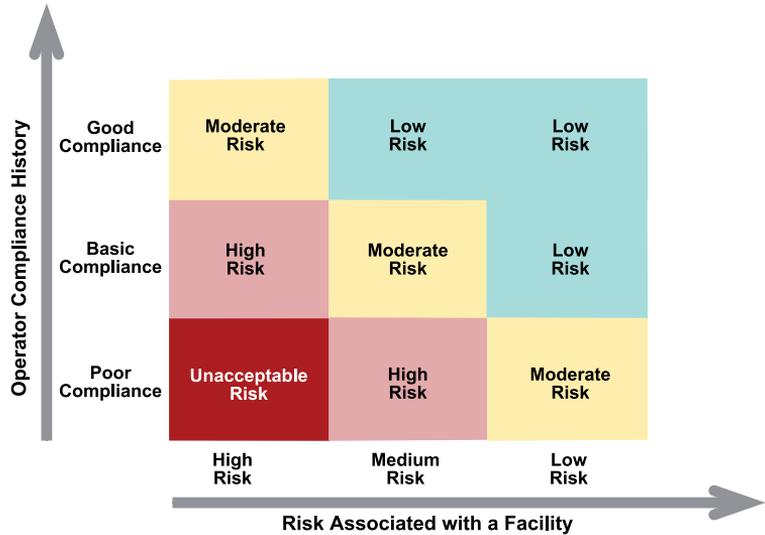
3.22 NOPSA's planned inspection approach<sup>89</sup> is to sample controls and SMS elements using MAEs and OHS hazards. The approach is to cover the whole facility over a period of five years looking at both prevention and mitigation controls, all main areas of the facility and both hardware and procedural controls. Other factors are taken into account including site specific issues, incidents, regulatory history and information from previous inspections and assessments. This is essentially a risk-based approach.

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88 Even those agencies which focus almost entirely on systems still note OHS hazards and require them to be corrected.

89 *NOPSA Planned Inspection Preparation Operating Procedure*, 1 July 2008, SOP 0290.

**Figure 7: Stylised risk matrix adapted from the Dutch regulatory model**



3.23 As noted, a mature risk matrix may assist NOPSA to map key risk indicators over time and provide a robust tool in defining the risk associated with the specific combination of operator and facility being audited. This tool can help ascertain which facilities require more frequent attention from NOPSA and which operators need a higher level of interaction during the safety case development process. NOPSA submitted that there were pitfalls involved in building a regulatory strategy around risk ranking and matrices. While we agree that judgement will be required in any regulatory system with limited resources, we note that the regulators we spoke to have formal methodologies to identify and measure risk developed over time. These refine both the regulator’s management of risk and its ability to target scarce resources where they will be most effective. We believe use of risk matrices is better practice.

3.24 The term inspection is used in the MOSOF regulations. Use of this term implies that a review of physical items will be undertaken and doesn’t fit well within a regime where a management system is used which has elements that address policy, leadership, activities and behaviours. In contrast, an audit can be defined as a systematic examination against defined criteria to determine whether activities and related results conform to planned arrangements and whether these arrangements are implemented effectively and are suitable

to achieve the organisation's policy and objectives.<sup>90</sup> This fits much better within the safety case duty of care co-regulatory regime.

3.25 NOPSA policy includes a range of tools to guide inspection and audit processes.<sup>91</sup> In this context:

- Themed Audits cover management system elements relevant to a nominated theme, focusing on facilities, regulated business premises and other premises. These might be triggered from a National Programme or a finding from a planned inspection, assessment or investigation;<sup>92</sup>
- Corporate Audits are a high level review of an operator's management systems resulting from possible systemic failure through the organisation. These audits focus on organisations; and
- Planned Inspections are the most common and focus on facilities. These focus on risk control measures related to Major Accident Events and Occupational Health and Safety controls. The number of inspections undertaken is risk-based and NOPSA has committed to at least one inspection per year for each manned facility where practicable.<sup>93</sup> 'Not normally attended' facilities are inspected on an opportunity basis.

3.26 During the 2007–08 financial year NOPSA undertook 95 planned inspections on 34 'attended' and 121 'not normally attended' facilities. In the same year, 38 per cent of the fixed manned facilities had more than one planned inspection.<sup>94</sup> This percentage has been increasing in recent years.

3.27 Inspections and audits are pivotal in gaining an understanding of the implementation of the safety case requirements. These are more effective than document reviews as the operator's approach and culture can be assessed. Through this, the regulator can see whether the safety case is simply a document produced by a consultant for the regulator rather than a living document.

3.28 NOPSA spends about 50 per cent more time on inspection activities than safety case assessment,<sup>95</sup> however this overstates the actual inspection time spent on the facility as there is a desktop review as part of each inspection.

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90 AS/NZS 4801:2001 Occupational health and management systems – specification with guidance for use.

91 *NOPSA Inspections and Audit Policy* – PL0025 1 July 08.

92 *NOPSA Guideline – Glossary of Regulatory Operations* GL0326 Version 2.1.

93 *Ibid.*

94 *NOPSA Annual Report 2007–08.*

95 *NOPSA Annual Report 2007–08.*

- 3.29 While the Inquiry strongly supports a risk-based approach to inspections, we note that a visit frequency of twice per year would enable each swing on a manned facility to be covered annually.<sup>96</sup> We also noted that NOPSA's inspections on the facility can be as short as 36 hours after travel time. We do not consider that this is sufficient time.
- 3.30 Other regulatory agencies achieve a higher number of visits per calendar year by focusing these visits differently and casting them in different lights. WorkSafe Victoria conducts one annual inspection, but this is not the only visit that the regulator pays to a site in a calendar year. There are typically three more visits, termed 'oversight visits' to each facility per year. These are generally single day visits conducted by two regulators (one inspector and one analyst) as opposed to full inspections which typically last three or four days and are conducted by four inspectors and an analyst. The frequency of these oversight visits, although averaging three per year, is dependent on the history of the site, risk of key issues and incident response measures.<sup>97</sup> NOPSA considers that its liaison meetings are similar to these onshore visits, and noted the logistical difficulties in reaching remote offshore facilities. Nevertheless, the Inquiry believes that were NOPSA to conduct extra on-site visits in addition to official inspections, it would significantly enhance safety assurance.
- 3.31 After drafting the inspection report, which takes about a week, there is normally a close-out meeting with management. This meeting discusses any recommendations, corrects any factual errors and agree close-out actions with the operator. The inspection close-out includes a NOPSA close-out form with the recommendations and the agreed operator actions and timing. The status of these actions was tracked regularly by NOPSA at liaison meetings and the action close-out register updated.
- 3.32 An important component of inspection is follow up and close-outs (including verification) of actions arising from previous inspections. NOPSA has usually fulfilled this component through spot checks or a sampling approach. NOSPAs noted the distinction between close-outs and verifications, noting that NOPSA's policy is to establish the close-out of all recommendations. We understand that a greater focus is given to the 'higher priority' recommendations, indicating a risk-based approach to this process.

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96 NOPSA should aim to cover the majority of the fly-in/fly-out 'swing' shifts annually.

97 Email from regulator at *WorkSafe Victoria* to the Expert Panel, 16 March 2009.

R 5

We recommend that NOPSA develop a robust risk assessment matrix for use in assessing and responding to the changing risk associated with each facility and the operator. Further, we recommend that NOPSA increase auditing frequency and duration to audit each manned facility on average twice per year (covering each staff swing), but more often if the risk matrix indicates this is necessary; and that audits should average several days actually on major facilities.

## Graduated penalty systems

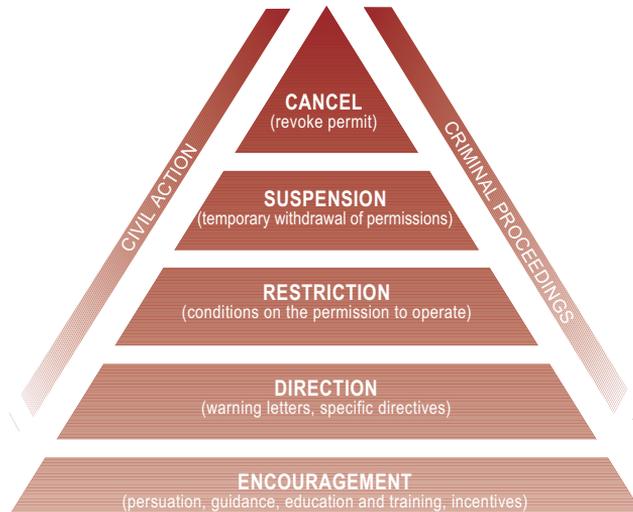
3.33

Graduated responses allow the regulator to either escalate action if an entity does not respond appropriately to the initial regulatory action or reward an entity for improved performance by moving down the hierarchy.<sup>98</sup> The ANAO cites approvingly the five-level enforcement hierarchy pyramid in the 1992 monograph by Ian Ayres and John Braithwaite and notes that:

*...flexibility in addressing non-compliance enables the response to:*

- *be proportionate to the risks posed by the non-compliance;*
- *recognise the capacity and motivation of the non-compliant entity to return to compliance;*
- *signal the seriousness with which the regulator views the non-compliance. ...*

**Figure 8: Five-level enforcement hierarchy pyramid**



98 Australian National Audit Office, *Administering Regulation: Better Practice Guide*, Canberra, March 2007, pp 64-5.

- 3.34 In addition to financial penalties, we discussed with all regulators the power of ‘naming and shaming’ – ie publicising safety breaches. By those organisations which use it, it is seen as a powerful tool for encouraging not only corporate compliance, but upper level management focus on safety issues and risks. The Norwegian press, in particular, monitors the PSA website and can generate significant negative publicity following a breach if operators do not take timely action. Among those agencies which use publication of breaches for enforcement purposes, it is considered to be a valuable tool to improve overall industry performance and, by the PSA, to be more effect than fining the company. Similarly, PIRSA used to put not only full fitness-for-purpose but also audit documents on its website, but removed them later due to legal concerns over revealing too much commercial information without adequate statutory protection.
- 3.35 The NSW Government’s Better Regulation Office provides one of the more comprehensive compliance measure menus beginning with a lower level of intervention and moving to a higher level of intervention and strict enforcement. The hierarchy comprises: advice; guidance material; education campaigns; warnings or cautions; monitoring measures – data collection, auditing and inspection; publications and names of offenders; enforceable undertakings; improvement notices; prohibition notices; penalty notices; civil pecuniary penalties; injunctions, negative licences; action against licences/accreditation/certification; and finally criminal prosecution<sup>99</sup>.
- 3.36 Sparrow also cites Braithwaite’s enforcement pyramid which was developed in the mid-1980s as part of an analysis of 39 coal mine disasters. In general, the softer approaches at the base of the enforcement pyramid are employed more frequently. Braithwaite found in 1985 that in only two of the 39 disasters would better regulatory compliance not have prevented or mitigated the accident. However, Sparrow notes that:

*Game-theoretic analyses that led to the enforcement pyramid (as the optimal solution) rest on the assumption that both players are paying attention and monitoring each other’s moves. In areas of regulation in which inspection resources are stretched thin, the same calculus may not apply. The theoretical work on responsive regulation now recognizes that choices have to be made at higher levels of aggregation and need to cover much more than selection of sanctions for observed infractions.*

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99 Better Regulation Office, *Risk-Based Compliance*, Sydney, NSW Government, September 2008, p11.

- 3.37 This highlights the importance of adequate regulatory resources. Sparrow also notes with respect to targeting systems that:
- ...regulators should ensure that the majority of inspections and enforcement actions are targeted on high-risk areas and that the noncompliance problems addressed are plausibly connected to significant harms. But they must also preserve a random component and other proactive intelligence gathering techniques that help them reassess their priorities and redirect their attention over the long term.<sup>100</sup>*
- 3.38 In relation to compliance and enforcement, NOPSA states that it takes action when it identifies the need for potential improvements in an operator's health and safety management systems or detects non-compliance with obligations imposed by the OPGGSA and its subsidiary regulations.<sup>101</sup> These actions include a range of graduated actions based on the perceived severity of the breach, with escalation for further non-compliance if required. As discussed in the previous chapter, a graduated approach is used by other regulators including the UK HSE, Norwegian PSA and US MMS and, while opinions regarding which type of enforcement penalty is preferable differ (possibly related to the cultural viewpoints of each country), use of enforcement penalties are viewed as a reasonable approach to achieving compliance. The NOPSA system, however, does not include the middle range of penalties available in States like NSW and other countries visited, and essentially has no easily enforceable penalty between an improvement notice and a court case (noting enforcement of a financial penalty in the case of an improvement notice being ignored would also require a court case). NOPSA strongly supports a middle range of enforcement penalties.
- 3.39 NOPSA's graduated compliance actions include education and awareness, a verbal warning then a written warning, which may be used when there is non-compliance with a lower severity requirement. NOPSA's graduated enforcement actions include an improvement notice, prohibition notice, recommendation for prosecution and withdrawal of acceptance of safety cases or pipeline safety management plans.<sup>102</sup>

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100 Ibid, p308.

101 NOPSA Compliance and Enforcement Policy – PL 0067 version 8.0.

102 NOPSA Standard Operating Procedure – Enforcement Management Model – SOP0147, version 08.

**Table 1: NOPSA levels of enforcement**

Level 1	Education and awareness	
Level 2	Verbal warning	
Level 3	Written warning	
Level 4	Improvement notice	Can be issued by a NOPSA inspector
Level 5	Prohibition notice	Can be issued by a NOPSA inspector and may result in the facility ceasing operations
Level 6	Prosecution by the Director of Public Prosecutions (or the State/Territory equivalent where a breach occurs in designated coastal waters)	Potential penalties depend on the offence, but the maximum penalty for a breach of duties by the operator is 1000 penalty units (currently \$110,000)
Level 7	Withdrawal of safety case	This would make it illegal to operate the facility

- 3.40 When NOPSA issues an improvement notice or lesser enforcement notice, there is no short term impact on the operation of the facility. There is a prescribed maximum penalty for not acting on an improvement notice that falls on the operator’s representative is up to 100 penalty units<sup>103</sup> or currently \$11,000.
- 3.41 A prohibition notice is used when there is an immediate threat to the health or safety of any person. This requires that the operator does not engage in an activity either at all or in a specified manner<sup>104</sup>. Such a notice may or may not result in the facility ceasing operation. There is a prescribed maximum penalty for not acting on an improvement notice that falls upon the operator’s representative which is up to 250 penalty units<sup>105</sup> or currently \$27,500.
- 3.42 For serious or repeated non-compliances, it may be recommended that prosecution action be undertaken by the Commonwealth Director of Public Prosecutions (DPP) or the State/Territory DPP if the breach occurs in coastal waters.<sup>106</sup> Prosecutions are conducted by the DPP under powers conferred by the OPGGSA. The penalty

103 Schedule 1 *Petroleum (Submerged Lands) (Occupational Health and Safety) Regulations 1993*.

104 Part 4, Div 3, Clause 77 *Schedule 3 to Offshore Petroleum and Greenhouse Gas Storage Act 2006*.

105 Schedule 1 *Petroleum (Submerged Lands) (Occupational Health and Safety) Regulations 1993*.

106 *NOPSA Standard Operating Procedure – Enforcement Management Model - SOP0147, version 08*.

prescribed in the OPGGSA can fall on various parties, including individuals. For the operator the maximum penalty is 1000 penalty units if there is a breach of its duties.<sup>107</sup> This is equivalent to \$110,000, or up to \$550,000 for a body corporate. For companies in the offshore petroleum sector these penalties are relatively small compared with their revenue and profit.

3.43 NOPSA publishes information about its compliance and enforcement actions in the CEO's Newsletters and via safety bulletins and alerts. However NOPSA only publishes the name of the operator after a successful prosecution.

3.44 There are challenges with prosecution in that a failure to act or to comply with the OPGGSA and regulations is invariably due to the actions of the operator as a whole. Prosecution can take many years and considerable effort and resources to reach a successful conclusion and relies on a robust regulatory framework. In four years of operation, NOPSA has had one successful prosecution under the OPGGSA.

3.45 The final step in the NOPSA enforcement process is to shut down the facility by withdrawing acceptance of the safety case or PSMP. In the case of a major gas producer this would most likely have serious social, commercial and political implications and place undue pressure on NOPSA.

3.46 Other regulators have powers to impose a more immediate and graduated enforcement which, along with the publication of associated information, can result in a more effective process to gain compliance (see also Annex 17). These models have taken a number of years to develop.

3.47 The Norwegian PSA has a graduated enforcement model (see Table 2). Firstly, the PSA will speak to the operator about an issue. They note that the majority of issues are resolved without ever resorting to a more formal process. If this is unsuccessful, the PSA then informs the operator that an order<sup>108</sup> will be issued within 14 days to remedy a health and safety defect. Again, this is a dialogue tool and the operator can respond to ensure that the order is never issued, noting that if the issue is urgent, the order itself can be issued immediately. The operator is then issued with the order up to fourteen days later and three to four days after the order has been issued the PSA publishes the order and all the associated information on its website. This includes naming the operator.

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107 Part 2 S.9.4 *Schedule 3 to Offshore Petroleum and Greenhouse Gas Storage Act 2006*.

108 In the Norwegian system, a notification is equivalent to the Australian improvement notice or a prohibition notice but with the powers of an injunction.

3.48

There is generally a high amount of public interest in the publication of these orders and it is seen as a powerful compliance lever. The PSA leverages public interest in the industry through the media and considers this combination of publication of the order and response by the media to be a more powerful enforcement tool than a financial penalty. While the PSA does have the ability to impose a coercive fine or day fine<sup>109</sup> and acknowledges its usefulness as a deterrent, it prefers not to utilise the day fine as it implies that the operator can pay its way out of a safety issue. The PSA predominantly uses dialogue and influence to get the operator to meet its safety obligations.

**Table 2: PSA levels of enforcement**

Level 1	Dialogue	The vast majority of issues are resolved at this level
Level 2	Notification of an order	Issued up to 14 days prior to an order (earlier if the issue is urgent) to enable the company to resolve the issue prior to formal notification
Level 3	Orders	Injunction to remedy a non compliance. Orders are made public on the website after 3–4 days
Level 4	Coercive Fine	A per diem fine for an unresolved non compliance
Level 5	Stop Activity	Only done if necessary to maintain safety
Level 6	Legal Prosecution	Very rare
Level 7	Expulsion as operator	Can advise the Minister to remove a company's pre-qualification to operate, thereby stopping the operation.

3.49

The US MMS has an enforcement model (see Table 3) in which it can impose a civil penalty based on a fine for each day of the violation. After the fine has been determined and the penalty paid, which sometimes does not occur until some years after the offence, a summary of the details are published on the MMS website, including the name of the operator, the violation and date, the amount of the penalty and the regulation violated. The purpose of publishing the summary is to provide public information on violations

<sup>109</sup> A day fine is a penalty which is paid by the company for every day of non compliance.

and to provide an additional incentive for safe and environmentally sound operations.<sup>110</sup> The US system also encourages involvement of upper management in building and maintaining a safety culture through meetings with senior management if safety issues cannot be resolved, and through personal senior management responsibility for safety.

**Table 3: MMS levels of enforcement**

Level 1	Warning	24 hours or 7 days to correct a violation. Can be imposed by inspectors on the spot
Level 2	Component shut in	Can be imposed by inspectors on the spot
Level 3	Facility shut in	Can be imposed by inspectors on the spot
Level 4	Civil Penalty	Up to US\$35,000 per day per violation. These penalties are posted on the MMS website
Level 5	Company disqualified	A company on probation is unable to operate any US facility. The company may be disqualified from operating either a specific facility or all its facilities on the US outer continental shelf
Level 6	Criminal Case	Prosecution by the Justice Department with significant penalties including jail time

3.50 A collaborative encouragement approach to compliance must be supported by a credible and usable process for managing an operator which does not seek to comply. The PSA and MMS approaches have useful tools to do this but use these tools sparingly, noting the considerably greater benefits to be gained through education and through dialogue, including with upper levels of management who may not be aware of the specific situation on a facility.

3.51 While the safety case/duty of care co-regulatory regime can face challenges in establishing non compliance, we believe that it is possible within the OPGGSA and its subsidiary regulations, including the safety case, to support a civil penalty approach. In addition we believe that it is possible from a legal perspective, provided

<sup>110</sup> US MMS website, <[www.mms.gov/civilpenalties/cpstatus.htm](http://www.mms.gov/civilpenalties/cpstatus.htm)> accessed on 18 March 2009.

adequate protections are in place, to put in place a process to enable NOPSA to publish information on its enforcement actions and on civil penalties including naming of the operator. At present, this is limited to general comments on enforcement activities in NOPSA's CEO newsletters. We also note a precedent exists in Australia at the Commonwealth level as AMSA publishes a list of ships with identified shortcomings from its Port State Control inspections.

R 6

**We recommend that the OPGGSA and its subsidiary regulations be amended to enable NOPSA to have a broader range of graduated compliance tools including the ability to impose a civil fine on an operator per day of non compliance with an improvement or prohibition notice. Legislation should also be considered that would enable NOPSA to make public, with appropriate safeguards, specific information concerning its enforcement actions including the name of the operator, the breach, and the enforcement action required including potential penalties.**

## Compliance and enforcement

3.52

NOPSA's Enforcement Management Model<sup>111</sup> is used to:

- provide a framework for making consistent compliance and enforcement decisions;
- help Team Leaders monitor the fairness and consistency of OHS inspectors' decisions; and
- assist newly appointed OHS inspectors in making compliance and enforcement decisions.

3.53

NOPSA's Compliance and Enforcement Policy refers to its Enforcement Management Model, stating that:

*An OHS inspector will generally not formally apply the Enforcement Management Model for health and safety issues identified as a result of a planned inspection or audit where it is likely that these issues would simply form a recommendation within a report. However, where the OHS inspector believes an identified health or safety issue may warrant the issue of a notice, the EMM will generally be formally applied, if practicable.<sup>112</sup>*

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111 NOPSA Standard Operating Procedure – Enforcement Management Model, SOP0147 Version 8.

112 NOPSA Compliance and Enforcement Policy – PL 0067 version 8.0.

- 3.54 Implementation of this Policy and Model can vary. For instance, NOPSA has issued eight improvement or prohibition notices to one operator in a short period of time. These notices were related to non-compliance issues that were relatively easy to establish and were not necessarily associated with an MAE. In contrast, we found evidence of other, seemingly more fundamental cases for which NOPSA did not issue any notice.
- 3.55 NOPSA faces challenges engaging in enforcement actions such as:
- partial implementation of a safety case, in which case it is more difficult to determine a breach than for if there is no implementation/compliance at all;
  - prompt action by the operator before NOPSA issues a notice, preventing NOPSA using the notification to engage with the company on rectification;
  - the significant amount of effort required to undertake a prosecution; and
  - the overall risk that enforcement could result in slower progress.
- 3.56 This final point is of key interest as it raises a question that is relevant to safety case regime regulators worldwide: how to encourage compliance for a diverse range of operators, cultures and practices. We have outlined better practice regulation with regards to development of a safety culture and we also encourage transparent regulation where the regulator is able to engage in ethical interaction to improve the operator's performance. We agree with NOPSA that bringing the operator to the table to engage in a proactive discussion on safety management has significant benefits. We also note that other reasons given for not using an enforcement approach are related to current legislation and regulation that makes it difficult for NOPSA to take effective mid-level enforcement action.
- 3.57 In many cases NOPSA does not believe it is possible to take action as:
- it cannot issue an improvement notice unless improvement is required for safety purposes;
  - it cannot issue a prohibition notice unless there is immediate danger; and
  - an enforcement history is required for prosecution of an operator. NOPSA's difficulty in issuing an improvement or prohibition notice would then make it difficult to succeed in a future prosecution due to this lack of history.
- 3.58 It is imperative that a regulator is able to use its enforcement tools, or the system can be seen to have no teeth. While we appreciate that enforcement may cause some resistance initially, it should set the ground rules and inform operators of the regulator's

expectations. Thus the NOPSA enforcement approach must go together with the assessment and assurance approach. In many cases the more mature operators self regulate and require less guidance, while those that don't need a different approach. Such strategies should not disadvantage the better performers.

F 13

We note that NOPSA should ensure that its inspection activities are appropriately focussed on the operator's effective implementation of its policies and systems and that these concerns should also be addressed in liaison meetings. NOPSA should implement a robust strategy for assuring itself that the operator is complying with its safety case based on issues raised from previous inspections and meetings with the operator. Corporate and themed audits should also be a part of this approach.



# 4: Resourcing and staffing a best practice regulator

- 4.1 According to the ANAO, in addition to the essential technical proficiency, important skills required of a regulatory officer include audit and inspection, team management, inter-personal and communication, risk and quality management, contract management, legal and criminal investigation, data management and public relations/media.<sup>113</sup>
- 4.2 Sparrow emphasises that regulators need to move beyond functional expertise towards ‘compliance management and problem solving’.<sup>114</sup> He argues for intelligence that combines insight with action and for operational analysis that includes:
- Scanning for emerging or evolving threats ... to make the invisible visible ... Defining risks, risk concentrations, or problems in the clearest, most natural ways ... Exploring and assessing risks ... prioritizing risks ... Disaggregating risks ... Action planning ... [and] Monitoring impacts and outcomes.’*
- His rule of thumb that ‘managers should expect to spend around 20 per cent of the cost of a project on analytic support, more during the early phase of the procedure’<sup>115</sup> has significant implications for regulatory capability.
- 4.3 Safety case and risk management approaches require the regulatory body to make judgements about whether the company is adequately managing large and complex hazards and risks. The competence of the regulator was a consistent theme in our conversations and we also observed that the confidence of the regulator was a key factor in successful regulation. The factors behind both competence and confidence provide indicators as to the success of the regulator in influencing the safety culture of companies within its jurisdiction.

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113 Australian National Audit Office, *Administering Regulation: Better Practice Guide*, Canberra, March 2007, p40.

114 Malcolm K, Sparrow, *The Regulatory Craft: Controlling Risks, Solving Problems, and Managing Compliance*, Washington DC: Brookings Institution Press, p122.

115 *Ibid*, pp265-71.

- 4.4 Firstly, and critically, the regulator must train and trust itself to interact closely and usefully with the operators. Part of this is essentially the mature and transparent system for assessing the risk presented by each facility outlined above. This enables the regulator to interact with each company through audits and education at an appropriate level. The importance of tailoring the approach is evident if you consider that an inappropriately high level of guidance to a mature and proactive operator could have the negative effect of dampening the safety culture, while insufficient advice and education for a less mature or resource-challenged operator leaves them struggling to understand even the basics of the safety case/duty of care regime. Another factor of the ability to interact closely and usefully with the operators is the regulator's ability to self-assess its own interactions with industry. The regulator needs to challenge its inspectors' preconceptions and 'good ideas' against a known and understood organisational policy, and to provide ongoing education and support to individuals within the organisation to enable them to step back and ensure that their own interactions with companies remain close but impartial.
- 4.5 The key aspect of the competency of the regulator, however, is a balance of people with technical abilities covering the various required disciplines and who have worked in industry (though noting that not all industry people make good regulators), people who are able to step away from the technical detail and look at the overarching systems, and people who are able to liaise effectively and champion the safety message with company personnel at all levels including the Managing Director and the Board. In addition, the regulator must have the specialist skills required to be able to assess human and organisational factors effectively.<sup>116</sup>
- 4.6 NOPSA's various legislated functions require it to make choices and establish balances between roles such as monitoring and compliance/enforcement activities, and promotion/advice activities. We consider that despite some good printed and web-based guidance material and use of industry forums for general safety promotion, NOPSA unduly limits opportunities offered by its promotion and advice functions. In part, this is resource-based but it is also an issue of internal policy, proactivity and balance.
- 4.7 As discussed earlier, industry parties have told us they need more guidance and information particularly, but not solely, during the safety case development process.<sup>117</sup> NOPSA seeks to retain distance

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116 The HSE Offshore division has a specialist team to do this that it is further developing and augmenting.

117 We have concerns that NOPSA's draft new guidance for safety case development offers less, not more, guidance for operators inexperienced in the safety case regime.

in order to avoid regulatory capture and to not compromise potential prosecutions (ethical separation). As an agency, NOPSA is therefore challenged by how to best operate within the duty of care/safety case regime. Getting the balance right is a key step in NOPSA's progression to world class regulation. In our view, better practice regulators have adopted a more hands-on and proactive approach in relation to working with the operators.

4.8 The time NOPSA's inspectorate spent on its main regulatory activities in 2007–08 was as follows:<sup>118</sup>

- inspection and audit – 42 per cent;
- safety case assessment – 30 per cent; and
- incident and complaint investigation – 13 per cent.

4.9 While we note that the above categories may contain some promotional and advisory work, according to NOPSA's publicly reported data only about 6 per cent of NOPSA's time was focussed specifically on promotional and advisory activities. Within the inspection and assessment activities NOPSA focuses more on MAEs than occupational health and safety hazards reflecting the relative risks from each. Inspections, audits and investigations are activities where the operator's implementation of the management system is reviewed and we believe that this should have more focus than the desktop based assessment.

4.10 NOPSA's promotional and advisory activities include national programs, guidelines and safety alerts, its website, the CEO newsletter, industry workshops and forums and participation/presentations at various conferences. NOPSA is in a unique position to overview the issues facing the industry and to offer valuable advice on this to the operators and other stakeholders in order to assist in improving health and safety. The Inquiry has received numerous complimentary comments about NOPSA's workshops, and the 2007 stakeholder survey contained similar praise. However, this was contrasted with concerns and deep frustrations experienced by some operators during the safety case development process where they are unable to access one-on-one advice and become disheartened and disengaged from the process, particularly if the safety case then required extensive revisions prior to acceptance. Such operators consider that earlier advice from NOPSA would create a better outcome. So, while NOPSA is providing some good general advice to assist novice operators through its guidance notes and other information on the website, we consider that this is an area where NOPSA could do more and better.

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118 *NOPSA Annual Report 2007–08.*

- F 14 We note that NOPSA should increase its advisory and promotional functions by engaging with operators more, and in a more targeted fashion, in the early stages of the safety case and PSMP process.
- 4.11 Best practice operators and regulators alike consider that a safety culture and leadership within the company are key drivers for optimal safety outcomes. Because its legislation does not specifically encompass leadership and culture, NOPSA considers itself unable to consider these issues when assessing a safety case or auditing despite the fact that without leadership buy-in and a safety culture, the safety case is just a document. Part of NOPSA's role should be to assure itself that an operator has the appropriate leadership and culture to drive the implementation of the health and safety management system and to set a strong example as to the required behaviours throughout the organisation. Leadership and behaviours are usually addressed in the safety management system elements in the safety case and PSMP. Addressing this aspect requires action across a number of fronts.
- 4.12 This is an area in which NOPSA admits that it could do better. It is pivotal in achieving good safety performance in both the short and long term. It takes time to build up a healthy leadership culture but it can deteriorate quickly with changing personnel, focus and operating environment.
- 4.13 NOPSA's inspections and audits do not include a structured review of the leadership elements of the operator's safety case. Onshore meetings are part of NOPSA's inspection policy, but are usually dedicated to discussions on upcoming inspection activities. Operator leadership is vital in achieving a robust health and safety culture and effective implementation of the safety case.
- 4.14 Leadership is one of the elements where it can be more challenging to measure performance, although it is possible. For example, the personal safety commitment of senior management can be assessed quantitatively through numbers of health and safety site visits and activities they undertake during these visits.<sup>119</sup> Onshore inspection activities can include senior executives and can be used to help gauge how they undertake the leadership element of the SMS. Some NOPSA inspections could be timed so that inspectors go to the facility at the same time as a senior manager and witness their interactions on site. Discussions on site with personnel on an individual and group basis can include their perceptions of senior management commitment to health and safety and MAE prevention.

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<sup>119</sup> This is a leading indicator and is being trialed by APPEA. Leading and lagging indicators are discussed in Annex 14.

- 4.15 At present, safety leadership is not one of the national programs within NOPSA. These currently focus on two areas – facility integrity and lifting and crane operations. It is the Inquiry’s view that safety leadership is important enough to warrant the additional effort of running a third national programme. NOPSA took a lead in forming the new APPEA Safety Leadership Forum<sup>120</sup> and this approach is supported. However, such work needs to be expanded further into NOPSA’s day-to-day activities.
- R 7 We recommend that the MOSOF regulations be amended to explicitly enable assessment of safety culture, leadership, and consideration of operator past history, motivation and current capacity in approvals of safety cases. NOPSA should be able to audit against these criteria and challenge operators on these issues.**
- 4.16 A regulator’s organisational capability within a safety case regime requires different knowledge, skills and personal attributes than a regulator in a prescriptive regime. These include operational and engineering knowledge relevant to offshore technology, health and safety regulatory competencies, the effect of human factors on safety, and the ability to understand the organisational and leadership cultures and how these add to, or detract from, the safety culture.
- 4.17 NOPSA’s recruits technical and regulatory personnel and aims to have at least two people with each of its identified required technical specialties. Specialist consultants are used via an expert panel to fill gaps where necessary, normally during safety case assessment and significant investigations. NOPSA is building and enhancing regulatory capability using an Inspector Competency Programme. NOPSA selects recruits within four main criteria:
- Skills and experience in a major hazard industry, preferably offshore petroleum;
  - Managerial experience;
  - Good interpersonal and influencing skills; and
  - Regulatory experience, noting that training can also be provided within NOPSA.
- 4.18 Within a safety case regime regulators must be competent to understand the standards and procedures proposed by the operator and must have sufficient technical capability to assure themselves that these are appropriate for managing the hazards. The assessment and ongoing assurance processes require the regulator to be aware of changes in standards and therefore able to question

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120 NOPSAs Annual Report 2007–08.

the operators during the operational phases. This is far different from a prescriptive regime where a regulator becomes very familiar with one set of standards and is able to regulate through something of a box ticking process.

- 4.19 RET's predecessor, the Department of Industry, Tourism and Resources (DITR), recognised the importance of technical and operational experience prior to the creation of NOPSA. In a speech to APPEA in March 2003, DITR noted:
- The skill set of a competent offshore petroleum regulatory organisation embraces a variety of knowledge, skills and personal attributes. These include operational and engineering knowledge relevant to offshore technology ...*<sup>121</sup>
- 4.20 DITR also noted that:
- ...staff with operational experience of the onshore chemicals industry, power generation, mining and other backgrounds may also provide suitable staff for NOPSA.*
- 4.21 Our research indicates that NOPSA has a relatively low level of operational drilling and marine experience and personnel with offshore production operations experience.<sup>122</sup> More inspectors with the latter background may assist in better understanding the operator's perspective and may be in a position to more quickly 'cut through' to the issues and the root causes. In addition they may command more respect with the operators. During NOPSA's 2007 stakeholder survey, stakeholders suggested that difficulties encountered in communication with NOPSA are due to NOPSA staff lacking an appropriate understanding and knowledge of the operator's technical functions.<sup>123</sup>
- 4.22 Corporate affairs are a necessary aspect to any organisation's activities. NOPSA has a number of interfaces and relationships to manage with other Commonwealth and State and Territory agencies, as well as with industry bodies and personnel and external representative organisations. NOPSA also has to perform its functions in relation to promotion and advising on offshore health and safety matters. NOPSA has a stakeholder liaison process in which to manage these relationships, but we note that its management of some key relationships, such as with DOCEP, was clearly inadequate. In addition, we consider that NOPSA does

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121 *Creating a New Offshore Petroleum Safety Regulator*, presentation to IADC, APPEA Conference 25 March 2003 – Peter Wilkinson, Department of Industry, Tourism and Resources.

122 *CEO's Newsletters*, NOPSA website and information received from NOPSA. NOPSA cited privacy considerations in not outlining to the Inquiry numerical data on staff backgrounds and competencies.

123 Of interest, more industry stakeholders (38%) than government/associations (6%) stated that they found it difficult to communicate effectively with NOPSA.

not interface consistently with the Commonwealth Department of Resources, Energy and Tourism regarding broader and strategic legislative requirements and/or possible amendments that could improve the Authority's performance. We found that NOPSA's self-image is much more positive than the reputation it has outside the organisation. Despite MOUs and NOPSA's own assurance that it effectively liaises with a wide range of organisations, we found that this liaison is often reactive, based on a requests or approaches by the other organisation, and NOPSA often fails to proactively engage. Again, this may be linked to lack of staff resources.<sup>124</sup>

- F 15 We note that there is significant merit in a NOPSA position being created in Canberra, closely linked with RET, to handle liaison with Commonwealth stakeholders, assist the Board, and drive the policy agenda, including facilitating legislative change.
- 4.23 The 2007 NOPSA stakeholder survey highlighted that there were areas for improvement with some of the recommendations relating to:
- industry information sharing, educational and consultative processes;
  - the appropriateness, transparency and accessibility of NOPSA systems and processes for stakeholders in their interactions with NOPSA; and
  - stakeholder communication channels.
- 4.24 Since this survey NOPSA has employed a Perth-based external affairs officer who reports to one of the regulatory team leaders. In addition, NOPSA now has a more formal organised stakeholder liaison process. However, we note that the external affairs officer's key responsibilities are to do with promotional activities and external communications.<sup>125</sup> Responsibilities do not include corporate affairs strategy development or involvement in arranging or representing NOPSA in discussions with industry, union or government bodies at a senior level and these could be picked up through the suggested Canberra-based officer.
- 4.25 Another significant skills gap faced by NOPSA is lack of the specialist expertise required to understand organisational and human factors. This area of expertise is recognised as vital by OGP and better practice regulators overseas and is used to proactively assess organisational capacity and the effect of human factors on safety and incidents.

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124 Professor Andrew Hopkins notes 'NOPSA is seriously under resourced... [so] it has touched too lightly on MAE risks and compliance.'

125 *External Affairs Officer, NOPSA Position Description August 2007.*

- 4.26 In NOPSA, regulators are defined as OHS inspectors under the OPGGSA<sup>126</sup> and have powers invested in them as such. The title inspector can seem more consistent with the investigation and enforcement functions of a regulator under a more prescriptive regime.<sup>127</sup>
- 4.27 The functions of NOPSA and its OHS inspectors within the MOSOF regulations and under the OPGGSA are also broader than OHS issues and include MAE hazards arising from the integrity of facilities.
- 4.28 The terminology OHS inspector and inspections may lead to confusion among both operators and inspectors and may reinforce behaviours and a focus less central to a duty of care/safety case regime. Norwegian PSA regulators who undertake audits are titled health and safety auditors instead and further consideration could usefully be given to the best language for the Australian context.
- 4.29 It is important that NOPSA has sufficient resources to undertake its assurance activities and to adequately accommodate the number of facilities and to maintain a critical mass of regulators. Prior to its commencement NOPSA was envisaged as having a minimum of 24 regulators (inspectors and team leaders) based on the current and likely workload at the time.<sup>128</sup> In 2005, the first year of NOPSA's operation, there was 44 levied facilities, which included 32 longer term manned production facilities and 8 MODUs.<sup>129</sup> By 2008 this number had grown to 101 levied facilities, which included 37 longer term manned production facilities, 14 MODUs and 13 construction, pipe lay or marine vessels. In addition there are several medium to large scale offshore projects either completed or moving towards production.
- 4.30 In comparison, the Norwegian PSA has some 160 people covering its onshore and offshore oil and gas industry, covering 73 fixed installations, 23 MODUs, 8 integrated land plants, around 22,000 workers and about 13,400km of pipelines. While the PSA covers environment and facility integrity as well as safety, the Norwegian industry is far more consolidated, geographically, reducing auditor travel requirements. Similarly, the Offshore Division of the UK HSE has around 160 staff covering 25,000 offshore workers on some 250 installations. However, in addition to the 160, the HSE Offshore Division shares corporate support and other services such as the legal area and the health and safety laboratories with the

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126 Division 6 *Offshore Petroleum and Greenhouse Gas Storage Act 2006*.

127 *Petroleum (Submerged Lands) (Occupational Health and Safety) Regulations 1993*.

128 *Creating a New Offshore Petroleum Safety Regulator*, Presentation to IADC, APPEA Conference 25 March 2003 – Peter Wilkinson, Department of Industry, Tourism and Resources.

129 *NOPSA Annual Report 2007–08*.

3000+ person HSE. It does not, however, cover pipelines, which are regulated by the Onshore Division, or environmental issues. After Piper Alpha, in the 1990s the Offshore Division expanded to over 300 but has since faced efficiency measures that have reduced staffing.

4.31 The current NOPSA staffing is 28 inspectors and team leaders, excluding two vacant inspector positions.<sup>130</sup> On a pro rata basis, if a staff of 24 inspectors was considered adequate to cover 44 levied facilities in 2005, 40 regulators would be a more realistic staffing level to cover the current 101 levied facilities. We have also recommended additional responsibilities, increased auditing and increased focus on advisory and promotional roles within this report as well the need for broader skills such as human and organisational factors experts and more depth in offshore production, pipelines and corrosion expertise and in liaison with other organisations.

**R 8 We recommend that NOPSA critically review its regulatory manning levels based on its current workload and the recommendations for additional areas of focus and increased auditing presented in this Report. To meet these requirements, we estimate that NOPSA requires up to 50 inspectors in total plus associated support staff to bring overall staffing from about 55 to 75. RET should help facilitate the necessary ongoing levy funding in consultation with industry.**

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130 NOPSA Organisation Chart 29 January 2009, NOPSA website.



# 5: A better practice functional split

## The conflict between safety and environment

- 5.1 The split between policy, resource management and promotion, safety regulation, environmental issues and investigating major incidents is handled in different ways in different jurisdictions both in Australia and overseas. The inherent conflict of interest between some of these roles can create situations in which the regulatory role is subordinate to, for instance, the promotional role or in which environmental concerns outweigh effective regulation of safety issues.
- 5.2 In 2004 the PSA split from the Norwegian Petroleum Directorate (NPD), creating a clear delineation between ‘safety’ and industry development/resource management. The PSA works cooperatively with the NPD and other agencies but has the authority to override other considerations and halt development or production if safety is like to be compromised. Closer to home, in WA prior to November 2008, the Director of the Petroleum and Environment Division in DOIR had responsibility for policy advice, resource management, safety regulation, titles, approvals, royalties and investigations and had environmental roles and delegations. While some of these roles are complementary, others presented substantial conflicts which have only been partially reduced as a result of having OHS staff in a different division.
- 5.3 A recent Victorian report<sup>131</sup> concluded that:  
*...[the Victorian DPI’s] role in occupational health and safety is seen as fundamentally compromised and conflicted because of its location within an industry-based government department with a range of diverse and often conflicting roles and responsibilities.*
- 5.4 The report recommended that occupational health and safety responsibilities be separated from DPI and given to another Victorian agency (WorkSafe). The same concerns and considerations that apply in Victoria and overseas in countries like Norway are more

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131 Pope, N; Report into the Regulation of Occupational Health and Safety in Victoria’s Earth Resources Industries, May 2006.

widely applicable.<sup>132</sup> During our Inquiry we noted two specific issues which need addressing, namely the conflict between safety and environmental regulation, and the need for an independent safety investigation capacity.

5.5 We found, through industry sources, that safety can be overtaken by environmental requirements. We heard considerable criticism that the various approval authorities did not, and still do not, treat environmental requirements holistically with safety and that safety could be a casualty if an environmental matter was a last hurdle delaying a major project. In these circumstances the developer can be driven by commercial pressure to accept design or operating criteria that erode best practice from a safety perspective. Recent examples of this were said by several sources external to the Inquiry to potentially include the location of a flare within the proposed Gorgon plant and location of a proposed major LNG plant at Onslow instead of at a less tidal/cyclone affected area.

5.6 The desire to minimise environmental impacts can facilitate an increased and unidentified risk which could initiate and/or exacerbate the impact of any integrity failure. The potential for conflict between safety outcomes and environmental outcomes needs to be recognised and openly considered as part of project approvals. Moreover it is important that a holistic view is taken of major facility hubs as new developments are added to ensure risks are not being added that are unidentified and not managed.

5.7 We see considerable benefit in a formal study investigating the impact of environmental requirements on the overall safety and integrity of a facility.

**R 9 We recommend that MCMPR liaise with Ministers with environmental and planning responsibilities, and if necessary COAG, to ensure that environmental requirements for oil and gas projects are not imposed subsequent to safety assessments and do not increase the risk of major accident events.**

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132 We were told that the 'Ritter report' to the WA Government in relation to mines safety had a similar theme.

## Safety and regulatory investigations

### *NOPSA inspections*

- 5.8 A NOPSA inspection covers an investigation or inquiry into a breach of the provisions of the OPGGSA.<sup>133</sup> The NOPSA investigation guidelines provide that an investigation may be preceded by a preliminary enquiry to enable a decision to be made on whether to investigate. It should be noted, however, that there is no specific provision for a ‘preliminary enquiry’ within the legislation. When an investigation is conducted, the enforcement outcomes may be administrative (Improvement Notice or Prohibition Notice) or a criminal prosecution.
- 5.9 NOPSA investigators may, at any time on their own initiative or if directed by the authority, conduct an inspection to ensure legislative compliance: to determine any contravention of OHS law; or into an accident or dangerous occurrence or fatality. Inspectors have very extensive search and evidence gathering powers, exercised with the operator’s permission or under a warrant issued by a magistrate. They also have extensive powers to require assistance and, in particular, to require answers to inspectors’ questions. A person is not excused from answering a question or from producing a document or article on the grounds that the answer, document or article may tend to incriminate the person or make the person liable to a penalty. But any such information is not admissible in civil or criminal proceedings.
- 5.10 The ‘NOPSA Investigation Handbook’, advises that inspectors should first ask the interviewee to provide information on a voluntary basis. Information provided in this way (voluntarily) is not protected by self incrimination provisions of the OPGGSA. Only when an interviewee refuses to answer questions are the compulsion powers of the OPGGSA used. The protection against self incrimination also triggers ‘derivative use immunity’ which renders inadmissible any information, document or thing obtained as a direct or indirect consequence of answering the question or producing a document or article. Some powers provided under the OPGGSA are more appropriately provided to a safety investigation organisation like the ATSB, rather than a regulator.
- 5.11 NOPSA’s powers must be used to the highest investigative and ethical standards and OHS inspectors must heed the *Public Service Act 1999* and including the ‘Code of Conduct for Public Servants’. The Code requires that public servants ‘disclose, and take reasonable steps to avoid, any conflict of interest (real or apparent) in connection with APS employment’.

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133 *Offshore Petroleum and Greenhouse Gas Storage Act 2006*, Schedule 3, Part 4 – Inspections.

### ***The ‘Stop Rule’***

- 5.12 In all investigations, regardless of purpose, there is a place where avenues of investigation must be terminated. Various accident theorists (Rasmussen, Reason, Hopkins, et al) have addressed the concept of the ‘Stop Rule’. Where the termination of an avenue of inquiry occurs will depend upon the purpose of the investigation. For example, NOPSA investigations:

*... (will) continue until the ... use of more resources is not justified.*<sup>134</sup>

Ideally, the purpose of an ‘in-house’ company investigation is to examine the company systems and procedures to understand internal root causes of an incident and to introduce remedial action.

- 5.13 The purpose of a criminal or regulatory compliance investigation, such as police or OHS authorities conduct, is to establish that there has been a breach of law. Safety investigations, however, drill beyond company considerations and legal issues to examine a whole-of-industry system.
- 5.14 The questions become, where does an investigator ‘stop’ a particular line of inquiry? And where does an investigation ‘stop’? One answer offered is that the investigator stops when continuing will make no difference to the investigation findings. In the case of a company investigation, this should continue until the underlying causes of a incident are understood and a safe regime of work is restored and identifiable risks are mitigated (to ALARP). In a criminal or regulatory compliance investigation the ‘stop’ point is reached when a breach of the law has been proved for the purposes of a brief of evidence to the DPP. With respect to this issue, Hopkins notes:

*For governments, on the other hand, it makes sense to go one step further and ask whether a failure of the regulatory system was the root cause, for this is a matter which governments can do something about.*<sup>135</sup>

- 5.15 This is not to suggest that possible breaches of OHS legislation should not be subject to a criminal or compliance investigation.
- 5.16 It is important to remember that normally under the duty of care co-regulatory regime a breach of the safety case is a breach of legislation. Where a failure in the safety case and its associated safety management system is so egregious that lives are recklessly put at risk there must be a consequence that imposes a penalty on any perpetrator to deter similar actions by others.

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134 NOPSA Investigation Handbook, 2.7.

135 Hopkins, A. (2000) *Lessons from Longford, The Esso Gas Plant Explosion*, Sydney: CCH Australia Ltd, p.17.

- 5.17 Further, OHS investigations do not necessarily address the underlying issues. Other than the loss of reputation, the possible fine would not seem to be a significant deterrent.
- 5.18 In the event of a fatality, a brief is also prepared for a Coroner. Although the Coroner establishes cause of death and may make recommendations to prevent a similar event in the future, the proceedings are often delayed, sometimes for years. The proceedings are also often emotive and adversarial in nature.<sup>136</sup>
- 5.19 Inquires into major incidents which include a reference to the legislative framework often take the form of a public, judicial inquiry. The findings of such inquiries are typically authoritative. However, judicial inquiries are expensive and although inquisitorial in theory, are often adversarial in their proceedings. Witnesses are often subject to forensic cross examination whether or not they have some responsibility for the incident. This adversarial nature often leads to counsel seeking to discredit witnesses on behalf of their clients rather than assisting the inquiry to understand what made sense to the people involved at the time<sup>137</sup> and what changes to the system should be made to improve safety for the future.

### ***An investigation framework for the 21st Century***

- 5.20 A significant number of governments have introduced an independent inquiry of an administrative nature whose aim is to establish safety outcomes by investigating accidents and incidents without attributing blame or assigning liability.

*... independent accident investigation may yield important benefits. The reason for an accident may lie in flawed policy-making, or in failings in either the setting or policing of safety standards. Accident investigators must not feel constrained in considering such possibilities.*<sup>138</sup>

*The public (and especially the survivors and the relatives and friends of those who lost their lives) has a legitimate interest in learning the truth of what happened, without anything being swept under the carpet.*<sup>139</sup>

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136 Walker, M. & Bills, K. (2008) *Analysis, Causality and Proof in Safety Investigations*, Canberra: ATSB.

137 Turner, B. (1987) *Man-Made Disasters*.

138 Home Office (UK), (1997) *Report of the Disasters and Inquests Working Group*, Part 2, para 2.22.

139 Clarke, LJ, *Thames Safety Inquiry*, Final Report, 1999, para 5.3.

- 5.21 Safety organizations such as the United States' NTSB, Canada's TSB, the Dutch Safety Board, New Zealand's TAIC, and Australia's ATSB<sup>140</sup> are staffed by trained safety investigators who are specialists in the various transport modes' failure analysis, organisational structures and human factors. The reports issued by these bodies are independent of operators and regulators, authoritative, public, and solely aimed at preventing future accidents and incidents.
- 5.22 The formation of independent multi-modal or specialist investigation bodies does not rule out other forms of inquiry. Nor does it remove the need for investigating breaches of the law with a view to prosecuting reckless or egregious acts or omissions on the part of individuals or companies.
- 5.23 Entrusting such investigations to an independent, expert, specialist safety investigation body is a safeguard against withholding from exposure unpleasant or uncomfortable factors.
- 5.24 In Canada, the US and the Netherlands pipelines are regarded as a form of transport. Pipeline accidents, may be subject to an independent safety investigation into all aspects of an accident including technical, legislative and societal issues (see Annex 4). The ATSB conducts transport safety investigations on the same basis but currently ATSB investigations are limited to aviation, marine and rail accident and incident investigation (see Annex 10). Such investigations, except in extreme cases of public interest, avoid the need for public inquiries and thus save both time and cost while nevertheless ensuring the facts of an accident are properly investigated and the necessary lessons learned for the future. As a no-blame investigation, they are able to move away from the liability issue and focus on ensuring that the risk of such incidents occurring again is significantly reduced. In the Netherlands, the Dutch Safety Board<sup>141</sup> already investigates major incidents in the oil and gas industry, including any role or factors involving the regulator (SODM).
- 5.25 However, professional regulators must still have expertise in compliance and enforcement investigation and be able to prepare adequate documentation to justify enforcement action and potentially a comprehensive brief of evidence to be considered for court action by the Director of Public Prosecutions (DPP). When accidents and incidents are reported to a regulator, the regulator must assess whether to investigate the occurrence for regulatory compliance purposes. Some regulators also seek to investigate

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140 A brief outline of the aims of an ATSB investigation are contained in Annex 10 of this report.

141 The Dutch Safety Board is an autonomous administrative body authorised to investigate serious accidents and incidents particular in aviation, shipping, rail transport, road transport, non-battlefield defence, hospitals and health, pipelines, and major fires and explosions.

to ascertain and assess some of the safety factors involved in an incident but this is unavoidably complicated by the fact that any such investigation may lead to enforcement action if culpable action is uncovered. While regulators should have powers to compel documents, Commonwealth legal policy (which reinforces natural justice), is that individuals should not be compelled to give oral evidence that might incriminate them and could be used in court proceedings against them.

5.26 In addition, regulators are invariably poorly placed to consider any contribution that their own role (by act or omission) may have played in more serious occurrences. This is because they can have both a perceived and a real conflict of interest. In addition, regulators tend to not go after root cause beyond the point of finding the evidence for a prosecution and their investigation role does not lend itself to assessing root causes that may involve operator organisational factors and culture or regulatory factors.

5.27 One way to address this is for governments to set up a separate inquiry to investigate more serious occurrences on a case-by-case basis. However, this usually only occurs when a major accident event occurs and there is public pressure for an inquiry, so does not pick up the rich safety learnings from independent no-blame investigation of 'near misses'. In addition, a public inquiry commissioned by government can typically only take two forms – either a Judicial/ Royal Commission which has all necessary powers but tends to take years and be extremely expensive (eg the NSW Waterfall rail accident commission cost around \$40m), or an inquiry with no powers that relies on the cooperation of those involved and cannot protect any evidence gathered. Based initially on the model in the aviation industry, and covering upstream petroleum in the Netherlands and oil and gas pipelines in North America and the petroleum industry more broadly in the US, best practice worldwide is to establish a separate independent no-blame safety investigation body that can investigate accidents and incidents at its own initiation within the limits of an annual budget and potentially also at the request of a Minister or Ministers.

5.28 In other industries and countries, there is a separate body that conducts investigations on significant incidents for future safety purposes and not for prosecution or fines (see also Annexes 4 and 10). For these investigations, operators and others involved in incidents typically provide good cooperation. Supporting legislation generally empowers these 'no blame' investigations to demand evidence while ensuring that this evidence cannot be used for prosecution purposes. In contrast, where a regulatory body carries out a compliance investigation, operators may wish or be advised to withhold material from other investigations and inquiries on the basis that it maybe be used in future liability proceedings.

- F 16 We note that NOPSA has recently added the position of investigator (currently vacant). We support creation of this position and observe that this person needs to be trained and experienced in compliance and enforcement investigations and preparation of evidence briefs to the DPP.
- R 10 **We recommend that the Commonwealth and States/Northern Territory legislate to establish a properly resourced and empowered independent national safety investigation capacity to investigate serious oil and gas industry (including pipeline) incidents including near miss events that could have led to a major accident event. We further recommend that the regulatory investigatory powers under the OPGGSA be reviewed in the context of powers for the proposed independent national safety investigator, noting that the regulator must retain those investigatory powers necessary in order to fulfil its legislative functions.**
- 5.29 Consideration should also be given to the independent investigator managing a new confidential safety reporting scheme to capture safety concerns that may not otherwise be provided to an operator or regulator. Such schemes are operated for the aviation and marine industries by the Australian Transport Safety Bureau.

# Conclusions

Our review of documentation and theory and meetings overseas and in Australia have given us a broad picture of competent, confident and effective regulation. While we note the developing trend even in prescriptive environments towards more flexible, risk-based approaches to safety management, we consider that the NOPSA safety case/duty of care co-regulatory regime, properly augmented, is the most effective available for the Australian offshore context.

Overall, the key lessons learned for consideration in a better practice safety case/duty of care co-regulatory regime were:

- the critical importance of the competence of the regulator as a safety case/duty of care regime requires a regulator with the technical ability to assess the risks associated with a facility including integrity (eg corrosion risks), combined with the strategic and human factor abilities to focus on systems and management strategies;
- the necessary confidence of regulators to interact confidently with industry to promote the safety message, coach poorer performers, provide advice and take firm compliance action when necessary to assist them to meet and hopefully exceed their regulatory obligations;
- that not all operators are equally strong in safety in a safety case/duty of care duty of care regime and all regulators face the same issues of identifying those companies and working with them to regulate them effectively without inhibiting good performers;
- the necessity for the regulator to have access to a broad, graduated enforcement menu and the confidence to use it when required; and
- the better practice of a separation of policy, resource management and promotion, environmental issues, safety and integrity regulation, and no-blame safety investigation into separate agencies.

NOPSA has undoubtedly developed many systems and capabilities since its 2005 formation that are very creditable. Inevitably, our focus is on what can be done to make it more effective within a duty of care/safety case co-regulatory regime. Some of what we believe needs to be done will involve better use of existing resources but much will require additional inspector and support staffing estimated to bring NOPSA's staffing to about 50 inspectors and

25 non-inspector staff. The inspector cadre should include qualified offshore industry operational personnel, and specialists in human and organisational factors and in well operations, corrosion science and pipelines.

Priorities include undertaking offshore audits in much greater depth than currently occurs on more complex manned facilities with most of the additional focus on major accident events including through the rupture of pipelines carrying large hydrocarbon inventories. NOPSAs must recognise the different capacities, cultures and motivations among operators and tailor and target advisory activities and compliance activities accordingly. There must be a preparedness to use graduated enforcement tools including those that may be added through legislative change. Cooperation and collaboration with other Commonwealth and State/NT authorities with similar regulatory roles and with stakeholder groups including industry and unions, needs to be made a higher priority. MOUs alone are not sufficient and healthy relationships are critical.

# Annex 1:

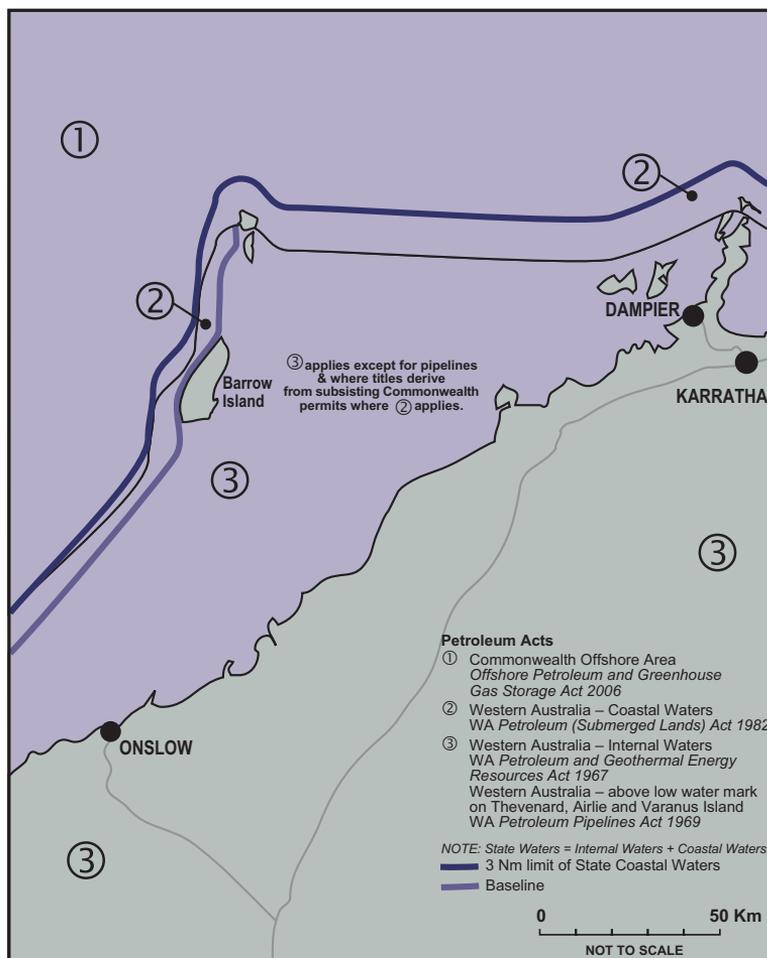
## Legislative framework for offshore and island petroleum activities

Following the 1979 Offshore Constitutional Settlement, the waters adjacent to Western Australia fall into three categories:

- (a) *Commonwealth waters* – these are the waters covered by the *Commonwealth Offshore Petroleum and Greenhouse Gas Storage Act 2006*, i.e. waters of the continental shelf outside the 3 nautical mile territorial sea.
- (b) *Designated coastal waters* of each State and the Northern Territory – these are the waters covered by the mainland State and Northern Territory *Petroleum (Submerged Lands) Acts*, i.e. the first 3 nautical miles of the territorial sea adjacent to each State and the Northern Territory, plus (in the case of Western Australia) some title areas landward of the territorial sea baseline but external to the mainland State. The latter areas originate from pre 1982 exploration permits issued under the Commonwealth PSLA, which formerly extended into those waters. The *WA Petroleum (Submerged Lands) Act 1982* also covers all offshore pipelines in either the designated coastal waters, or the internal waters. This coverage extends from the mean low water mark (either on an island or the mainland) to the outer limit of the territorial sea.
- (c) *Internal Waters* – waters landward of the territorial sea baseline (or inner limit of the territorial sea) but excluding the area referred to in (b) above.

Oil and gas resources and operations in Commonwealth waters are regulated by the *Commonwealth Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGSA). The Joint Authority, currently consisting of the Commonwealth Minister for Resources and Energy and the WA Minister for Mines and Petroleum, is responsible for making decisions regarding the areas to be opened

**Figure 9: Relevant legislation boundaries**



for applications for permits; the grant and renewal of exploration permits and production licences; approval of instruments creating interests in permits and licences; and the determination of permit or licence conditions governing the level of work or expenditure. In the event of a disagreement, the Commonwealth has the right of veto. Both Ministers have delegated the majority of their responsibilities as the Joint Authority under the OPGGSA to their relevant Departments. With the exception of safety issues, which are regulated by NOPSA, day to day administration of facilities in Commonwealth waters is undertaken by the WA Department of Mines and Petroleum (DMP). Safety of oil and gas operations in Commonwealth waters is regulated by the National Offshore Petroleum Safety Authority (NOPSA), created under what is now the OPGGSA, and the

*Petroleum (Submerged Lands) (Management of Safety on Offshore Facilities) Regulations 1996* (MOSOF Regulations). NOPSA commenced operations on 1 January 2005. NOPSA's responsibility is focussed on risk to human safety when personnel and hydrocarbons are present. If proposed changes to the MOSOF regulations (and possibly to the overarching Act), are drafted in 2009, NOPSA will also regulate the integrity of facilities (eg platforms, monopods and turret moorings) and pipelines.

Oil and gas resources and operations in WA designated coastal waters are regulated under the *WA Petroleum (Submerged Lands) Act 1982* (PSLA 82), which largely mirrors the Commonwealth OPGGSA in order to create a consistent regulatory environment. Day to day administration of non safety related matters is undertaken by DMP with powers delegated by the WA Minister for Mines and Petroleum. Safety in the WA designated coastal waters is the responsibility of NOPSA. In these waters, the Safety Authority's general functions and powers are derived from the *WA Petroleum (Submerged Lands) Act 1982* and its specific regulatory functions and powers are derived from provisions of that Act, and regulations made under it, that 'mirror' Schedule 3 and the Commonwealth occupational health and safety regulations. The WA NOPSA PSLA 82 amendments were passed in 2005 and commenced together with the required four safety regulations in March 2007. From March 2007 NOPSA has regulated petroleum safety in its own right in the WA designated coastal waters area.

Onshore oil and gas resources and operations are regulated primarily under the *Petroleum and Geothermal Energy Resources Act 1967* (PGERA 67) which covers all onshore areas of the State, and, in certain circumstances, areas of internal waters. The PGERA 67 contains no provisions for pipelines as this is provided for under the *WA Petroleum Pipelines Act 1969*. As noted above, the *Petroleum Pipelines Act 1969* only covers onshore areas, including the island production hubs (Barrow Island has its own legislation).

Until recently, in the internal waters under the PGERA 67 and on the three island production hubs of Airlie, Thevenard and Varanus islands, NOPSA provided technical advice and auditing under a Service Agreement with WA. The Service Agreement set out a framework for the range of services and advice that could be provided. In practice, NOPSA would audit and assess safety and provide a report with recommendations to DMP's predecessor, the Department of Industry and Resources (DOIR), upon which DOIR then acted.



# Annex 2:

## Commonwealth/WA misunderstandings regarding internal waters

Differences between Commonwealth and Western Australian departments in their understanding of the history and background to regulation islands in Western Australian waters could impact on consideration of this Inquiry's key recommendations. While decisions should desirably be based on the current circumstances and recommendations outlined in our report, a shared understanding of the relevant history may assist. This Annex cites key public documents available to the panel but is written in the light of confidential documents from both jurisdictions. Of course, there may be other documents of which the panel is unaware.

As outlined in Annex 12 below, a March 2000 independent review of Australia's offshore petroleum safety arrangements reached the primary conclusion that:

*the Australian legal and administrative framework, and the day to day application of this framework, for the regulation of health, safety and environment in the offshore petroleum industry is complicated and insufficient to ensure appropriate, effective and cost efficient regulation of the offshore petroleum industry ... Much would require improvement for the regime to deliver world-class safety practice.*

The 2000 review team said that there were too many Acts, directions and regulations, their boundaries were unclear and there were overlaps, and their interpretation and application was inconsistent. In response, with Commonwealth/State/NT Ministerial agreement, the Commonwealth coordinated consideration of recommendations and policy options with senior State/NT officials and in 2001 published *Future Arrangements for the Regulation of Offshore Petroleum Safety* which proposed a new national offshore safety regulatory body.

As part of the process towards forming a new national offshore regulator, Commonwealth and State/NT Ministers of the Ministerial Council for Mineral and Petroleum Resources (MCMPR) on 4 March 2002 agreed nine principles for offshore industry regulation including that: 'A consistent national approach to offshore safety regulation in both Commonwealth and State/NT waters is essential for the most cost-effective delivery of safety outcomes in the offshore petroleum industry.'

The MCMPR meeting in Perth on 13 September 2002 was chaired by the Western Australian Minister and considered the reports of a steering committee and three working groups tasked to develop the arrangements the new national offshore safety authority and recommendations by senior officials. The meeting Communiqué stated that: 'The national offshore safety authority will be a single agency covering both Commonwealth and State coastal waters and will be accountable to the Commonwealth, State and NT ministers. ... A single authority will reduce the regulatory burden on industry operating across multiple jurisdictions.' Attachment A to the Communiqué stated: 'That the authority is set up so that it may, if jurisdictions wish to provide it with appropriate regulatory powers, undertake safety regulatory activities in other areas of State/NT jurisdiction.' Further it required: 'That effective and efficient coordination is established between the safety authority and other regulatory agencies.'

While it is clear that the new authority was to cover Commonwealth waters and the three nautical mile band of State/NT coastal waters, it was not agreed that it would cover 'internal' State waters and islands close to shore in WA. The Commonwealth/State/NT officials Steering Committee and its working Groups had supported the formation of a single statutory authority operating in both Commonwealth and coastal waters to the mean low water mark with powers conferred under Commonwealth and State/NT legislation. But this did not include waters within the limit of the State as at 1901 or islands within the limits of a state.

The next year, in 2003, a *National Offshore Petroleum Safety Authority Transition Plan* chaired by the Commonwealth included discussion of future service level agreements (SLAs) with the States/NT and stated:

*There is agreement that the States and Northern Territory may contract for services for other areas (such as islands and offshore and onshore areas covered by State and Northern Territory petroleum acts). The proposed structure needs to be developed, with aspects to be addressed in such agreements to include delegation of powers, levels of authority and appropriate fee structures.*

The 2004 Commonwealth legislation that established NOPSA<sup>142</sup> emphasised occupational health and safety (OHS) and restricted the Authority's functions to offshore petroleum operations in Commonwealth waters and those conferred under State/NT Petroleum (Submerged Lands) Acts (or PSLA) in relation to designated coastal waters, plus cooperation with relevant States/NT. NOPSA's powers, including powers to enter into contracts, were linked to its offshore OHS functions. This suggests that NOPSA would not be able to contract to provide such regulatory services in State internal waters or on State islands. However, an additional section of the Commonwealth legislation (originally s150XI of the PSLA 1967 and then s360 of the OPA 2006 and now s650 of the OPGGSA 2006) allowed for a State or NT law (but not a contract) to empower NOPSA to exercise power in State internal waters or on islands in relation to offshore petroleum activity by a Constitutional corporation, if there is an agreement on fees payable, but stated that NOPSA and its staff are not obliged to do so. The original Explanatory Memorandum for the sub-section stated that it:

*requires that there be an agreement between the Commonwealth and the State or Territory concerned as to the fees payable by the State or Territory for the exercise of powers by the Safety Authority or its staff/inspectors under onshore legislation. It is intended that there will be service level agreements, between the Commonwealth and the State or territory concerned, providing for the Authority's services to be made available.*

On 20 October 2004 there was a First and Second reading of the *WA Petroleum Legislation Amendment and Repeal Bill 2004* to insert a new schedule into the PSLA to cover NOPSA's proposed role in coastal waters, to repeal the *Petroleum Safety Act 1999* (which had not yet come into effect), and to provide for SLAs with NOPSA in internal waters and islands by invitation from WA on a case by case basis. The second reading speech reference to regulation onshore including islands that:

*At present, the regulation of safety onshore relies on either ministerial notice – a direction; condition of licence; condition of approval; or by agreement with the operator. This is not only cumbersome but also potentially unreliable should steps in*

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142 The Communiqué from the MCMPR meeting in Alice Springs from 29–30 July 2004 stated that NOPSA would become operational on 1 January 2005 and 'will deliver a uniform, high quality level of regulation of safety on offshore petroleum facilities in Commonwealth waters and State and Northern Territory coastal waters. NOPSA can also regulate onshore activities should the States/NT so choose.' While WA internal waters were not mentioned, the latter sentence appears to cover onshore islands such as Varanus, Airlie and Thevenard consistent with the WA position in 2002.

*the notification and other processes be missed, rendering any non-observance of the safety rules free from prosecution. ... the public need to have confidence that such rules are enforceable.*

This legislation lapsed due to a State election.

After the election, the *WA Petroleum Legislation Amendment and Repeal Bill 2005* was introduced, with minor amendments, on 7 April 2005. The 2005 second reading speech was substantially the same as on 20 October 2004 with the exception of the omission of the above quotation. Both versions included the following:

*The commonwealth legislation also provides for the safety authority to undertake regulatory activities requested by a state in internal waters or onshore. If Western Australia made such a request, NOPSA would draw its powers from the state legislation. Those circumstances will be where the nature of the activity – for example, a pipeline extending from offshore to onshore – makes it appropriate for safety matters to be regulated by a single authority. It will, however, be on invitation by a state on a case-by-case basis and will be the subject of a service level agreement. In order for this latter provision to be enacted, it is beneficial to replicate the safety provisions of the commonwealth and the WA submerged lands acts in the Petroleum Act 1967 and the Petroleum Pipelines Act 1969 thereby avoiding NOPSA, petroleum companies and the work force from having to deal with a different style of safety rules.*

However, while the Act received Royal Assent on 1 September 2005, the parts covering the *Petroleum Pipelines Act 1969* and the *Petroleum Act 1967* were still not proclaimed at the time of the 3 June 2008 incident.

In the event, the Commonwealth agreed to sign two service contracts with WA for NOPSA to provide services to the WA department with respect to (1) offshore petroleum operations in designated coastal waters; and (2) in internal waters and the three island production hubs of Airlie, Thevanard and Varanus. The former contract was meant to be short term pending the passage of the agreed amendments to the WA PSLA 1982, but these ultimately did not take place until March 2007 because of a range of factors, including various legislative resource constraints in WA<sup>143</sup>. Once

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143 On 31 May 2007 the senior officers of NOPSA and DOIR executed a Memorandum of Understanding effective to 31 December 2012 which confirmed in schedule 1 that 'For non-PSLA waters all processes are a State responsibility'. It then outlined the allocation of respective petroleum regulatory duties involving the WA Designated Authority in designated coastal waters and the Joint Authority in Commonwealth waters and NOPSA with respect to tenement administration, drilling, development planning and construction and production, diving and decommissioning.

enacted, the PSLA also became the vehicle for NOPSA to provide advice on various subsea pipelines regulated by WA. The latter contract was also expected by the Commonwealth to be short term but, consistent with its longstanding position, WA seems only to have regarded it as short term in the sense of a longer term SLA contract being possible after it had amended the *Petroleum Act 1967* and the *Petroleum Pipelines Act 1969*.

The most recent NOPSA Services Contract was executed by senior officers of NOPSA and the WA Department of Industry and Resources (DOIR) on 26 June 2008 and has a term to 30 June 2010, with fees agreed on 8 July 2008 on behalf of the Commonwealth by the department Secretary. The contract recital provisions seem out of date in referring to NOPSA's initial legislation and stating that WA is to mirror Commonwealth legislation and confer powers upon NOPSA in relation to offshore petroleum operations in designated WA coastal waters (which had occurred in 2007). This reference to coastal waters appears now to mean internal waters and islands. The third recital states that: 'NOPSA has the power to enter into contracts and this Services Contract is to provide interim arrangements for the provision of services by NOPSA to the State until the above legislation and associated regulations are passed and take effect, and a new service level/delivery agreement is entered into between the State and NOPSA.' The contract scope is then stated to cover the provision of contractor services for the regulation of safety and health in relation to the now '*Petroleum and Geothermal Resources Act 1967* (coastal waters only) and the *Petroleum Pipelines Act 1969* (for pipeline licences on Varanus, Thevanard and Airlie Islands and other pipeline licences as may be nominated from time to time)'. The reference to 'coastal waters' seems to mean what had previously been termed 'internal waters'. Schedule B to the contract in relation to fees again refers to the previous Commonwealth legislation that set up NOPSA (section 150XI of the *Petroleum (Submerged Lands) Act 1967*) and to the fees being in relation to services in WA waters to which the PSLA 1982 does not apply and that are covered by parts of *Petroleum Act 1967* and the *Petroleum Pipelines Act 1969*, ie designated internal waters and islands.

The Panel believes that correspondence between the current Commonwealth and WA Ministers should be considered in the light of the foregoing. In summary, while WA was very slow to enact legislation to enable NOPSA to regulate in coastal waters and for all subsea pipelines, WA appears never to have decided or undertaken to do more than enact legislation/regulation that would facilitate longer term service contracts with NOPSA with respect to Varanus, Airlie and Thevenard Islands. However, WA has thus

far not done this. The Commonwealth consistently wanted WA to provide for NOPSAs having a longer term role in internal waters and islands consistent with other offshore petroleum regulation but did not advise WA clearly that NOPSAs's legislation did not allow NOPSAs to enter into contracts for the three islands in the absence of WA enabling laws. This contributed to the jurisdictional, legislative, and regulatory complexity and confusion. The panel's preferred recommendation is that WA and the Commonwealth reach agreement and legislate as soon as possible to give NOPSAs coverage on the three islands and associated pipelines. If WA agrees, the Panel believes that as an interim measure, it could be reconsidered (including in light of the 2005 WA legislation) whether relevant individual NOPSAs inspectors and their supervisors could be appointed as inspectors under s62 of the *Petroleum Pipelines Act 1969* with fees to be agreed by the Commonwealth (s650(1) and (3) of OPGGSA).

# Annex 3:

## Interfaces between DOIR & DOCEP, & DOIR & NOPSA

### **Interface with DOCEP**

Prior to the creation of the National Offshore Petroleum Safety Authority (NOPSA) on 1 January 2005, responsibility for petroleum safety in both WA offshore and onshore sectors was the responsibility of the Safety and Environment Branch within the Petroleum Division of the Department of Industry and Resources (DOIR). During that same period, responsibility for occupational safety and health and environmental regulations across the mining sector was the responsibility of the Safety Health and Environment Division (SHED) of DOIR.

On 1 March 2005, the technical officers (petroleum inspectors) transferred to SHED, while the environmental officers transferred out of SHED and the division was renamed the Safety and Health Division (SHD).

Shortly thereafter, on 1 July 2005, SHD was transferred from DOIR to the Department of Consumer and Employment Protection (DOCEP) and renamed the Resources Safety Division (RSD). This resulted in further technical staff leaving the Petroleum Division (DOIR) to take up their new position at SHD at a time when around another eight technical staff members leaving for higher paying jobs within NOPSA. The RSD is responsible for administration of the:

- *Dangerous Goods Safety Act 2004*; and
- the *Mines Safety and Inspection Act 1998*.

The Minister for Resources, under his department i.e. DOIR, retained responsibility for the regulation of occupational safety and health under the *Petroleum and Geothermal Energy Resources Act 1967* (formerly the *Petroleum Act 1967*) and the *Petroleum Pipelines Act 1969* even though he had lost most of the technical petroleum safety expertise from DOIR. DOCEP was requested to carry out certain occupational safety and health regulatory functions for DOIR

(since it had no staff to effectively undertake this function), and provided advice in relation to safety to DOIR, as specified and agreed in a Memorandum of Understanding (MOU) which was eventually signed on the 17 August 2007.

This MOU took some time to evolve as a number of issues arose in relation to which department had regulatory responsibilities and issues of which authority would cover the matter of pipeline and petroleum facility integrity. DOCEP had come to some agreement that it would provide advice on integrity matters to DOIR as requested of it.

Therefore, the scope of this MOU covered the provision of services by DOCEP in relation to the regulation of safety and health (including facility integrity) and the provision of technical advice and guidance to DOIR in relation to the following legislation:

- The *Petroleum Act 1967* (WA);
- The *Petroleum Pipelines Act 1969* (WA);
- The *Petroleum (Submerged Lands) Act 1982* (WA).

The scope of this Agreement specifically excluded those facilities and marine operations covered by these Acts for which regulatory services were provided by NOPSA under separate contractual agreement(s) with DOIR. In general, DOCEP provided these services to DOIR for onshore (mainland) areas including Barrow Island but not Varanus, Thevenard and Airlie islands.

The scope of the MOU also excluded marine seismic vessels and operations. It is also important to note that the responsibility for the administration of petroleum legislation and enforcement remained with DOIR.

On 1 January 2009, the Department of Mines and Petroleum (DMP) came into being and RSD transferred into the new department from DOCEP. The RSD now provide services to DMP as part of the organisational structure. The Petroleum and Royalties Division was renamed Petroleum and Environment Division.

## **Interface with NOPSA**

NOPSA is the statutory authority which has the responsibility for administering and regulating occupational health and safety (OHS) matters on offshore petroleum facilities. NOPSA commenced operations on 1 January 2005 and has its headquarters in Perth.

Whilst NOPSA has assumed responsibility completely in Commonwealth waters, there has been a transitional period whereby NOPSA acted as contractor for DOIR with respect to the latter's responsibilities in WA State waters. On 16 December 2004, an MOU between NOPSA and the State was signed to take effect from the

1 January 2005 and continue in force until 31 January 2007. The MOU was subsequently extended to December 2012 (if required).

This MOU provided for the mutual intentions of both parties to ensure effective administration of the regulations under the *Petroleum (Submerged Lands) Act 1982* (WA) (PSLA). The MOU stated that all processes in non-PSLA waters were a State responsibility. The schedule to the MOU provided detail on the interface between NOPSA and the State (through its Designated Authority in coastal waters and Joint Authority in Commonwealth Waters) to allow proper exchange of information and the agreed position on areas of responsibility.

## **Service Contract No. 1 – PSLA**

On 30 December 2004, the first service contract between the State and NOPSA was signed to provide interim arrangements for the provision of services by NOPSA to the State until the PSLA legislation and associated enabling regulations were passed and took effect. The contract took effect from 1 January 2005 and remained in force until 30 June 2005 or sooner if the amendments to the PSLA to confer functions upon NOPSA in relation to offshore petroleum operations in the designated coastal waters of the State came into effect prior to this date.

The contract allowed for a monthly fee for services and a schedule which provided details regarding the provision of technical advice and services to DOIR for the contract areas in respect to assessments (including evaluation of safety case submissions), audits and inspections (against the safety cases, PMP, Diving SMS or Project plans), investigations (for safety incidents), advice, resolution of issues, enforcement/prosecutions (recommendations to DOIR) and consultation.

The responsibility for OHS under the Act remained with DOIR during this period and NOPSA did not purport to exercise any power or to perform any function under any law of the State. This contract was purely a service to DOIR to assist it to perform its functions under the PSLA until NOPSA received the conferred powers.

Part 4 of the *WA Petroleum Legislation Amendment and Repeal Act 2005* (PLAR Act 2005) covered the OHS provisions of the PSLA i.e. safety regulations covering diving safety, pipeline management and OHS on offshore facilities.

With the commencement of part 4 of the PLAR Act 2005 on 27 March 2007, NOPSA was enabled to operate in its own right in WA coastal waters under the PSLA rather than under the service contract. This service contract consequently lapsed at this time.

## **Service Contract No. 2 – *Petroleum Act 1967 (WA) and Petroleum Pipelines Act 1969 (WA)***

On 13 January 2005, a services contract between the State and NOPSA was signed to cover the provision of contractor services for OHS in relation to:

- the *Petroleum (and Geothermal Energy Resources) Act 1967 (WA)* (coastal waters only); and
- the *Petroleum Pipelines Act 1969 (WA)* (for pipeline licences on Varanus, Thevenard and Ailie Islands and other pipelines that can be nominated from time to time).

This contract provided for NOPSA and its staff to conduct services as contractor to DOIR in relation to the above legislation in WA in waters of the seas that are landward of the baseline of Australia's territorial sea adjacent to the State that are not waters to which the PSLA apply or within the limits of the State. NOPSA itself did not have regulatory powers in these areas.

NOPSA provided technical advice and contractor services to DOIR for the above areas with respect to assessments (safety case submissions, review of technical reports etc), audits and inspections, investigations, advice, resolution of issues, enforcement, prosecutions and appeals (issuing of improvement and prohibition notices etc), and consultation with operators.

DOIR maintained the role of appointing inspectors for the purposes as specified in this service contract and remained the regulator for OHS and integrity. NOPSA staff did not take up the option to be appointed inspectors during the course of this contract (and its renewals) as legal advice precluded them from doing so.

Subsequent renewals were eventually extended from 3 monthly to yearly with the last renewal being for a 2 year period until NOPSA ceased providing such services in February 2009, with the exception of some support services with respect to the Varanus Island reinstatement works.

# Annex 4:

## NTSB and TSB investigation reports on gas pipeline explosions involving external corrosion and CSB petroleum refinery reports

The US National Transportation Safety Board (NTSB) and the Transportation Safety Board of Canada (TSB) are independent multi-modal safety investigation bodies like the Australian Transport Safety Bureau (ATSB). But unlike the ATSB, they each have federal powers to investigate, on their own initiative, serious pipeline accidents and incidents anywhere within the US and Canada respectively. There are several final investigation reports by both bodies that are relevant to this inquiry. In addition, because the NTSB and TSB investigate only for future safety purposes (any regulatory or police investigation that may lead to fines or prosecution is separate), operators and others involved in accidents typically provide good cooperation. In contrast, in those jurisdictions where the regulatory body carries out the investigation, operators may wish (or be advised) to withhold material from other investigations and inquiries that may use it against them in future liability proceedings. In the US, the Chemical Safety and Hazard Investigation Board (CSB) uses a similar methodology separate from the regulator to investigate chemical industry accidents and incidents including oil refineries. This independent 'no-blame' systemic safety investigation model helps to uncover occurrence causality in complex high technology industries where organisational and regulatory factors may be as important or more important root causes or contributory factors.

## NTSB investigations

On 24 August 1996, there was a pipeline rupture, liquid butane release and fire at Lively in Texas. The NTSB investigation (report PB98-916503) determined 'the probable cause of the accident was the failure of Koch to adequately protect its pipeline from corrosion'. A major safety issue was the 'adequacy of Koch's corrosion inspection and mitigation actions'. The 8-inch-diameter steel LPG pipeline originally constructed in 1981 had several hydrostatic pressure test failures before a May 1995 'smart pig' metal-wall-loss inspection was performed using a low-resolution magnetic-flux-leakage (MFL) internal inspection tool. After the accident, a high-resolution MFL inspection found severe corrosion in 15 lengths of pipe not identified 16 months previously, as rapid corrosion had occurred in the interim. The line had an external coating, before it was buried, to prevent corrosion. Corrosion was also mitigated by an impressed current cathodic protection system and the pipeline was subject to annual testing for external corrosion to comply with US regulation 49 CFR 195.416(a). Before the accident there had been a number of readings less than the industry norm of -0.85V. After the accident, readings 500 feet north and south of the rupture ranged from -0.49V to -0.52V. Significant corrosion was found at the centre of the pipe rupture, and while most anti-corrosion coating was destroyed in the fire, nearby pipe had experienced disbonding that significantly reduced cathodic protection via local shielding and had corrosion damage from 30 per cent to 64 per cent of wall thickness. A post-accident consultant found several types of bacteria with 'Aerobic Acid Producing bacteria ... the main contributor to the corrosion'. However, the testing was performed late about 48 hours after the pipe was removed from the ground, and the pipe was also cleaned by Koch and tap water was used for sample preparation instead of the phosphate-buffered saline solution recommended in NACE International Standard TM 0194-94. The NTSB discounted the result, stating that NACE International should develop a standard for microbial sampling and testing of external surfaces on an underground pipeline.

The NTSB found that despite a 1986 NTSB recommendation, regulation in Title 49 CFR 195.416 did not provide specific criteria for 'adequate cathodic protection' for liquid pipelines. There were specific criteria in appendix D of the gas pipeline safety regulations, 49 CFR 192. The NTSB was also concerned that 'because no overall requirement exists for operators to evaluate pipeline coating condition, problems similar to those that occurred on Koch's pipeline could occur on other pipelines' and recommended further revision by the regulator to 49 CFR Part 195.

On 19 August 2000 a 30-inch-diameter natural gas transmission pipeline operated by El Paso ruptured near Carlsbad, New Mexico with 12 people killed in addition to physical damage. The NTSB's probable cause 'was a significant reduction in pipe wall thickness due to severe internal corrosion' because the operator's 'corrosion control program failed to prevent, detect, or control internal corrosion'. There were also major safety issues with 'the adequacy of Federal safety regulations for natural gas pipelines, and the adequacy of Federal oversight of the pipeline operator'. While this was an instance of internal and not external corrosion, there were issues with both salt and bacteria in leading to corrosion and non-use of pigging or corrosion coupons or adequate monitoring devices. The NTSB noted that the regulator had published a notice of proposed rulemaking (NPRM) in January 2003 'to require operators of gas transmission pipelines to establish integrity management programs to identify and evaluate the condition of and threats to their pipelines in high-consequence areas and to take steps to protect against pipeline failures'. Also cited were American Society for Mechanical Engineers (ASME) publications on gas pipelines including managing system integrity and determining the threat of corrosion.

## **TSB investigations**

On 29 July 1995 an initial rupture and fire occurred on the 42-inch TransCanada natural gas pipeline near Rapid City, Manitoba as a result of external stress corrosion cracking (SCC). The heat from this fire and delay in shutting down the line, led less than an hour later to a second rupture and fire on the adjacent 36-inch natural gas pipeline. The TSB referred to issues with polyethylene tape and asphaltic coatings susceptibility to SCC under specific environmental conditions and past TSB reports dealing with SCC in the soil types at the accident site despite cathodic protection. At the rupture site, polyethylene tape was used which is known to disbond and/or degenerate creating an area on the surface of the pipe which is shielded from the CP system. CP potentials at the rupture site exceeded minimum industry norms. The TSB noted that bacteria in the soil and groundwater act to accelerate the process of SCC. The operator's mitigation program included defining likely sites for SCC, hydrostatic testing and selective excavation, and identifying and removing 'significant' pipeline defects but had not prevented this rupture which occurred after a corrosion flaw extended 81 per cent into the pipe wall before the site had been excavated. The spacing of four pipelines in the 66.1 m right of way was generally 9.1 m but at the rupture site, two pipes were 7 m apart which was less than the company's horizontal standard (itself fairly common in the industry).

The TSB was critical of the lack of federal regulations for horizontal spacing, especially as there were vertical spacing standards.

On 27 February 1996 a rupture occurred on an Interprovincial 864 mm outside diameter pipeline built to carry crude oil. The failure was caused by 'excessive narrow, axial, external corrosion located adjacent and running parallel to the longitudinal seam weld of the pipe, which was assisted by low-pH stress corrosion cracking and was not identified through the company's ongoing pipeline integrity program called the Susceptibility Investigation Action Plan'. Annual pipe-to-soil surveys of the CP system were undertaken 'to ensure the existing minimum industrial norm of 850 millivolts (mV) 'off' cathodic potential and 100 mV shift potential were met'. Poor bonding of the tape wrap correlated with the corrosion at the centre of the failure. The TSB was 'concerned about the absence of programs to mitigate the risks presented by the consequences of disbondment of self-adhesive coatings on other pipeline systems ... making the pipeline system susceptible to general corrosion'.

On 2 December 1997 a rupture and fire occurred at an area of general external corrosion on the TransCanada 914 mm outside diameter natural gas pipeline near Cabri, Saskatchewan. There were six parallel pipelines in the vicinity. About 70 per cent of the wall thickness had been corroded after the pipe coating of asphalt enamel, felt wrap, kraft wrap and an outerwrap had either been damaged or become disbonded. The TSB stated that even a brief interruption in cathodic protection would have allowed corrosion at uncoated locations. Further 'since the soil conditions at the rupture site alternated between wet and dry, depending on the season, sections of the pipe that were poorly coated would have experienced variations in corrosion rates and the amount of current required for adequate protection'.

On 7 August 2000 there was a rupture in Westcoast Energy's 762 mm natural gas pipeline in British Columbia. Surveys in 1995, 1997 and 1998 indicated lower than industry standard CP current reaching the ruptured section of pipe. Shallow surface pitting corrosion coincident with an area of higher pipe hardness on the surface of the pipe helped initiate a crack which later led to the rupture at an operating pressure of about 5599 kPa (6453 kPa was allowable).

On 14 April 2002 there was a rupture and fire in TransCanada's 914 mm diameter natural gas pipeline near Brookdale, Manitoba at a zone of stress corrosion cracking (SCC) initiated on the outside of the pipe that had progressed transgranularly through the grain structure rather than between the grain boundaries. The presence of minor corrosion pits was indicative that the CP was locally ineffective for some time allowing the SCC. Overall, the exterior

hot-applied asphalt coating appeared to adhere well to the pipe but there were thin areas and disbonded areas. It found that ‘the combination of a disbonded exterior coating, fluctuations in the environmental conditions surrounding the pipe, the presence of anaerobic bacteria, a susceptible high-strength steel pipe, and the existence of atomic hydrogen, probably from the cathodic protection reaction, together with a sustained tensile stress due to the internal operating pressure of the pipeline, permitted a zone of near-neutral stress corrosion cracking to initiate and grow to failure’. The TSB also noted that ‘extensive research has found that the development of SCC requires shielding of the CP system by the exterior coating (coating disbondment), the absence of an effective CP system, or a CP system where there are variable CP levels over time. Although the line was protected with an asphalt exterior coating, the exterior coating can degrade over time to the point that water and moisture can migrate through the coating, enabling the CP potential through the asphalt coating. ... Insufficient CP levels may have occurred from time to time as a result of factors related to the pipeline, with decreasing CP system efficiencies or with varying resistivities of local soil conditions. ... the occurrence area was found to be in a transitional environment zone’. The TSB found that as the operator did not assess the risk as justifying the cost of the use of an In-Line Inspection crack detection device (but it had used a magnetic flux leakage in-line inspection tool which is not designed to identify zones of cracking), and that this may require revision, particularly as ILI devices had been commercially available since 1999.

## **CSB investigations**

On 23 March 2005 an explosion and fire in BP’s Texas City refinery killed 15, injured 180 and led to US\$1.5 billion losses. The US Chemical Safety and Hazard Investigation Board (CSB) investigated and, in addition to safety recommendations during the investigation, released a 341 page final report on 20 March 2007. Further valuable perspectives are provided in the 16 January 2007 Baker Panel Report commissioned by BP and in the 2008 book *Failure to Learn* by Professor Andrew Hopkins. While the ‘proximate cause’ of the accident involved the start-up of an isomerisation (ISOM) unit and massively over-filling a ‘raffinate splitter’ hydrocarbon distillation tower, causal factors went well beyond human error, procedural breaches, and inadequate equipment and systems. After the 23 March 2005 explosion and fire there were two further serious incidents at the refinery in 2005 and, most recently, on 14 January 2008 the top of a large steel filter housing blew off in the refinery’s cracker unit leading to the third fatality since 23 March 2005.

The CSB report into the March 2005 accident, like major ATSB reports and the NASA space shuttle investigation reports, examined both technical and organisational causes and highlighted key issues involving safety culture, regulatory oversight, process safety and human factors. Serious issues with safety culture, cost-cutting and deficiencies at all levels were traced back to BP in London. On the regulatory side, the CSB was critical of the effectiveness of the US Occupational Safety and Health Administration (OSHA) which conducted several pre-explosion inspections, primarily in response to fatalities, but failed to identify the likelihood of a catastrophic incident. It had an OHS focus on personnel safety and gave little attention to major process accident safety and risk despite many prior incidents and warning signs. The initial process hazard analysis (under May 1992 Federal Code 29 CFR 1910.119) and subsequent revalidations for the ISOM unit failed to identify the possible scenario of tower overfill leading to a liquid release. Therefore, 'instruments, such as the level transmitter were not identified as critically important to prevent column overfill and the potential for a catastrophic liquid release from the vent, and as a consequence were not placed on a priority schedule for maintenance and inspection'. There were also issues with process data, management of change, and mechanical integrity not picked up by OSHA. The NTSB had found in 2002 that OSHA was seriously deficient.

After the explosion 'Despite the large number of violations on the ISOM unit, and these two additional serious incidents in 2005, OSHA did not conduct a comprehensive inspection of any of the other 29 process units at the Texas City refinery'. The CSB found again that:

*OSHA's capability to inspect highly hazardous facilities and to enforce process safety regulations is insufficient; very few comprehensive process safety inspections were conducted prior to the ISOM incident and only a limited number of OSHA inspectors have the specialized training and experience needed to perform these complex examinations.*

Such reports as the foregoing are publicly available and can usefully be studied by offshore operators and regulators to prompt consideration of any safety and integrity vulnerabilities.

## Annex 5:

# Report of the Integrity Working Group of September 2007, and Report on the consolidation of Offshore Petroleum Regulations of September 2007

### **Integrity Working Group**

Following a January 2006 decision of officials under the MCMPR umbrella, an Integrity Working Group (IWG) was established with membership drawn from the Commonwealth, State/NT Departments, NOPSA, and industry represented by APPEA, APIA and the IADC. In relation to a broader integrity role the IWG's initial 'unequivocal finding was that NOPSA was best placed to assume this role' beyond its current OHS only mandate, and accordingly, three subgroups considered integrity issues in relation to pipelines, wells and subsea facilities. The September 2007 IWG report 'recommends that NOPSA's role be extended to cover the regulation of the non-OHS related aspects of the integrity of facilities where people are not, or not normally, to be found'.

The report notes that 'the integrity of all facilities and equipment is fundamental to and essential in eliminating risks to people and the

environment. The Working Group acknowledged that integrity failures can have security of supply and possible public safety implications.’ The IWG noted that while under section 356 of the *Offshore Petroleum Act 2006* NOPSA could regulate integrity of facilities, amendments to sections 352 and 356 would improve clarity and provide for an expansion of those functions where people are not present. Changes to the MOSOF regulations and mirroring across jurisdictions was also recommended. The report states further that:

*During the preparation of this report the WA Designated Authority commented on its use of external consultants in assessing technical information. It was suggested that NOPSA, as a central organisation, might be better placed to provide this service<sup>144</sup>.*

The IWG concluded that if agreed by Ministers:

*NOPSA’s role would be to approve, or recommend approval of, the technical specifications for the construction of the pipeline or other seabed structure or the drilling and equipping of the well, as the case may be to the Designated Authority for licence approval. Changes to current arrangements under which NOPSA can request third party validation of proposals are not being considered. NOPSA would also have responsibility for the ongoing supervision of structural integrity. That is, operators would be required to provide reports to NOPSA, rather than to the Designated Authorities, of their compliance with their monitoring and maintenance obligations. Such a role would require a change to NOPSA’s legislated functions.*

The Inquiry Panel is supportive of these recommendations.

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144 Attachment A to the IWG report in relation to the Gorgon project states further: ‘WA advised they may no longer have the skills (particularly the critical mass of skills) to undertake pipeline integrity assessment and regulate pipeline ongoing integrity and it was suggested that consideration be given to changing NOPSA’s OHS only mandate to include these types of issues.’

## Report on the consolidation of offshore petroleum regulations

In October 2006 the then Department of Industry, Tourism and Resources initiated a project to review the operation of regulations enabled or to be enabled by the OPA 2006 to examine how regulations can be incorporated into others where overlaps occur and to implement changes to improve the efficiency and effectiveness of the regulatory framework. It assumed that the three basic reasons to regulate are for safety, environment and resource management<sup>145</sup>. The review focussed on evolutionary change because it found the current regulatory framework was seen by industry as largely workable, although 'inconsistently applied, unclear in places, has duplicative requirements, and has aspects of over-regulation'. The review made 54 recommendations, most of which were supported by stakeholders and are being actioned. Points of particular relevance to the current Inquiry are summarised as follows.

*It is proposed that ... With the safety case incorporating safety aspects of pipelines, the pipeline management plan and the pipeline safety management plan would no longer be required as the safety information relevant to the pipeline would become part of the safety case. ... should the pipeline regulations be revoked, the individual roles of NOPSA and the DA would need to be clearly drawn particularly in relation to applying for a pipeline licence. Obviously in relation to environment, the DA would keep its role.*

The review also noted that:

*Scope of validation is required under safety and pipeline regulations. Once the regulator and the company agree on the scope of validation the company employs an independent validator to undertake the validation. The regulations leave NOPSA or the individual DA to reach agreement with the ... operator or pipeline licensee, as the case may be, on the scope of validation. There is no direction given on how agreement might be reached and only very broad guidance on what the validation should include.*

*There is considerable duplication in regulation between Commonwealth and State processes chiefly with pipelines which cross from Commonwealth to a State jurisdiction. A pipeline operator may have to obtain three licences and seek*

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145 The other stated guiding principles are that guidelines should normally not be turned into regulation, where an issue is genuinely important, it should be in legislation or regulation, and only require information once and regulate once.

*six consents to construct and operate a pipeline if the pipeline goes from Commonwealth offshore water to State offshore to State onshore and internal waters and onto land.*

The review therefore recommended that:

*consideration be given to developing a State/Territory/ Commonwealth system to require only one approval process for licensing pipelines which cross from Commonwealth waters into State waters and onshore.*

*Objective-based regulation provides for evaluation of the compliance of companies against objectives set out in management plans (safety case, environment plan etc). This allows regulatory efforts to be geared towards inspection and audit rather than reviewing reports.... When considering a report over auditing/inspection it needs to be asked whether this will deliver the same or better regulatory outcome than can be provided through inspection/audits. ... NOPSA put forward a comprehensive argument why self-regulation<sup>146</sup> was not applicable in a major hazards industry.*

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146 While there are many definitions, this report states that 'Self-regulation usually refers to standards expected of industry operators. Industry codes ... are underpinned by Commonwealth and State Government legislation.'

# Annex 6:

## Guidance from ICAO on SMS, and the architecture of Australian aviation

### ICAO

The International Civil Aviation Organization (ICAO) is the United Nations body responsible for the safety of aviation and has more than 190 states as members. It regulates through annexes to the Convention on International Civil Aviation (Chicago Convention) which contain standards and recommended practices (SARPS). Aviation is on the leading edge of many areas of safety. ICAO published the first edition of its *Safety Management Manual* in 2006 and a draft second edition is also available for free download on the ICAO website. The following key extracts are from the 2006 manual, Document 9859 AN/460.

Like other safety bodies, ICAO notes that: 'Safety is the state in which the risk of harm to persons or of property damage is reduced to, and maintained at or below, an acceptable level through a continuing process of hazard identification and risk management.' ICAO differentiates between safety programmes and safety management systems (SMS): 'A safety programme is an integrated set of regulations and activities aimed at improving safety' while 'A safety management system is an organized approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures.'

*ICAO 'require establishment of a safety programme to achieve an acceptable level of safety in aviation operations ... by the State(s) concerned ... [and] may include provisions for such diverse activities as incident reporting, safety investigations, safety audits and safety promotion. To implement such safety activities in an integrated manner requires a coherent SMS*

*[Therefore] ... States shall require that individual operators, maintenance organizations, ATS providers and certified aerodrome operators implement SMS accepted by the State. As a minimum, such SMS shall: identify safety hazards; ensure that remedial actions necessary to mitigate the risks/hazards are implemented; and provide for continuous and regular assessment of the safety level achieved. An organization's SMS accepted by the State shall also clearly define lines of safety accountability, including ... senior management.*

ICAO stresses that 'acceptable level of safety' is the overarching concept and regulatory compliance has to be complemented by a performance-based approach. Further, an 'acceptable level of safety' can vary across industry sectors and should be set with regard to implied risk, cost-benefit of improvements, operational context and complexity, and public safety expectations. ICAO says an 'acceptable level of safety' is expressed through safety performance targets and safety performance indicators, and implemented through safety requirements.

ICAO states that many bodies share responsibility for safety and effective safety management and sees 'considerable merit' in a regulatory system with 'a well-balanced allocation of responsibility' between the regulator and the operator or service provider that is justifiable given the economic resources of the State and a risk-based regulatory resource allocation<sup>147</sup>.

ICAO believes that specialist independent accident and incident investigation authorities are important to avoid potential conflicts of interest.

A positive safety culture is crucial, including: senior management safety emphasis; a realistic view of short and long term hazards; fostering feedback and dealing with safety deficiencies; a non-punitive 'just culture' (but punishment if culpability); communicating safety at all levels; good training and learning; a safety ethic so little risk-taking behaviour; human factors understood and defences in place; and pro-active data gathering, analysis and response.

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147 The oil and gas industry safety management structure is based on very similar principles established in the safety case regime operative in many parts of the world, including Australia. How responsibility is shared and what balance is best set between prescriptive and performance-based elements is the perennial challenge of a co-regulatory system.

## **Australian aviation safety architecture**

Reflecting the very strong international and safety focus of the aviation industry and best practice governance suggested in Annexes to the Chicago Convention and ICAO guidance material, there are increasingly well defined public sector separations involving safety within Australian aviation. Typically policy, allocation and industry promotion is separated from operational safety regulation and compliance activity, but best practice also separates safety investigation from other roles. In best practice regimes, after an accident or serious incident, the regulator's investigative role has a limited regulatory compliance focus while a separate body undertakes a systemic 'no-blame' investigation of all causal factors involved (which may involve safety culture and/or errors and omissions by the regulator) with the sole aim of enhancing future safety.

In Australia, industry policy, coordination and legislative change is managed for the Commonwealth portfolio Minister by the Department of Infrastructure, Transport, Regional Development and Local Government. The Department also provides the staff for the International Air Services Commission which allocates airspace rights. The Department undertakes a number of other activities such as international negotiations, and the regulation of airport noise and security.

The Civil Aviation Safety Authority (CASA) is an independent statutory authority established in 1995 under the *Civil Aviation Act 1988* to regulate aviation safety in Australia and the safety of Australian aircraft overseas. While the safety regulation of civil aviation remains its primary role, CASA also provides safety education and training programs and in recent years has acquired responsibilities for airspace regulation and some environmental issues. In fulfilling its responsibilities CASA sets aviation standards, certifies aircraft, maintenance organisations and operators, licenses pilots and engineers, carries out safety surveillance, enforces safety standards and promotes industry awareness and understanding of aviation safety standards and safety issues. CASA's 600 staff oversee the activities of over 42,000 licensed industry personnel (including pilots, Licensed Aircraft Maintenance Engineers and Air Traffic Controllers), over 13,000 registered aircraft, more than 850 general aviation operators, more than 40 airline operators, over 700 maintenance organisations, more than 170 certified aerodromes, more than 130 registered aerodromes, and 26 air traffic control (ATC) facilities including major ATC centres in Brisbane and Melbourne.

CASA seeks to work constructively with the industry it regulates while taking firm regulatory action against industry where necessary to

ensure safety. After several changes of direction, CASA has decided to adopt the European Aviation Safety Authority (EASA) model of regulation with high level legislation plus guidance material which, if followed, provides an acceptable means for compliance. Industry can propose alternative means for compliance that are better suited to their particular operations and are at least as effective.

Airservices Australia is a government-owned body that operates commercially under a board and CEO and provides air traffic control and aerodrome fire fighting and rescue services and is regulated by CASA in much the same way as CASA regulates major operators such as Qantas, Virgin Blue and Sydney Airport.

The Australian Transport Safety Bureau (ATSB) is a multi-modal no-blame safety investigation body that investigates accidents and incidents across the aviation industry and involving international and interstate ships and interstate rail. The ATSB performs its functions in accordance with the *Transport Safety Investigation Act 2003* (the TSI Act). It has a similar role to investigate under the *Space Activities Act*. Section 7 of the TSI Act defines the object of the Act as to improve transport safety through, among other things, independent investigations of transport accidents and incidents and the making of safety action statements and recommendations that draw on the results of those investigations. It is not the purpose of ATSB investigations to lay blame or provide a means for determining liability. The ATSB's main office and laboratories are in Canberra and it has field offices in Adelaide, Brisbane and Perth. As well as investigating individual aviation accidents and incidents, the ATSB also looks at systems and trends where these might provide information on future safety issues.

While the ATSB's investigation powers are vested in its Executive Director under the TSI Act to provide for operational independence, currently the ATSB is located within the Department and its staffing and budget are through the Department. The Government has legislated to make the ATSB a statutory authority with its own budget and staffing to enhance its independence. From 1 July 2009, it is to be led by a Chief Commissioner who will be the full time CEO, and at least two part-time Commissioners.

If the Australian aviation architecture was applied to the oil and gas industry, it would lead to ensuring that safety regulation was separate from departments that have a policy, allocation and industry promotion and development role. It would also mean that a no-blame systemic investigator would be established that could independently investigate accidents and serious incidents to a level that established root causes and other factors including any role of the regulator that either led to the accident or failed to prevent it.

# Annex 7:

## Possible impacts of the national review into model OHS laws

### **Purpose of this annex**

In this annex, we consider:

- a) key findings and recommendations of the recent national review into model OHS laws ('the national OHS review'); and
- b) how decisions about the recommendations in the review's reports may affect safety regulation in relation to the petroleum, gas and maritime industries.

We also suggest possible action by the responsible Ministers.

### **Background**

In 2008, the Workplace Relations Ministers Council (WRMC) established the national OHS review. It was conducted by a three member expert panel. The purpose of the review was to make recommendations for the optimal content of a model OHS Act, which could be implemented as nationally consistent laws by the Commonwealth, States and the Territories. Under an intergovernmental agreement signed by the Prime Minister, the Premiers and the Chief Ministers,<sup>148</sup> this objective is to be given effect by the end of 2011.

As required by the review's terms of reference, the panel has presented two reports to the WRMC.<sup>149</sup> The reports are lengthy and contain 232 recommendations.

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148 COAG, *Inter-Governmental Agreement for Regulatory and Operational Reform in Occupational Health and Safety*, 3 July 2008.

149 The reports, which were presented on 30 October 2008 and 30 January 2009, are available at <[www.nationalohsreview.gov.au](http://www.nationalohsreview.gov.au)>.

## Relevant findings and recommendations in the reports of the national OHS review

With the assistance of the Chair of the expert panel members of the national OHS review, we have considered key findings and recommendations that appear relevant to our inquiry. We have given particular attention to those relating to:

- a) the scope of the proposed model OHS law;<sup>150</sup>
- b) the duties of care and the consequences of non-compliance;<sup>151</sup>
- c) other OHS obligations;<sup>152</sup>
- d) workplace participation, representation and consultation;<sup>153</sup>
- e) OHS issue resolution;<sup>154</sup>
- f) the role, powers and functions of the regulator;<sup>155</sup>
- g) permits and licensing<sup>156</sup>.

### Scope

In relation to the scope of the model OHS law, the national OHS review drew attention to the plethora of laws in Australia regulating OHS in a wide range of contexts. Considerable overlap was found between the primary OHS laws and other laws regulating health and safety in specific industries or in relation to specific hazards. The review found that, although a single OHS legislative system would conform to the Robens model, separate legislation may be justified for some types of industries or hazards.

Therefore, the review recommended a wider scope of the principal OHS Act in each jurisdiction, with separate regulation of OHS in specific industries or in relation to specific hazards only where it is periodically and objectively justified. As far as possible, the separate legislation should be consistent with the nationally harmonised OHS laws.

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150 National Review into Model OHS Laws: Second Report to WRMC – January 2009, Chapter 20.

151 National Review into Model OHS Laws: First Report to WRMC – October 2008, Parts 2 and 3.

152 National Review into Model OHS Laws: Second Report to WRMC – January 2009, Part 8.

153 Ibid, Part 7.

154 Ibid, Part 7.

155 Ibid, Part 9.

156 Ibid, Part 8, Chapter 34.

Where the continuation of separate legislation was not so justified, the review proposed that it be replaced by the model Act within an agreed timeframe. The panel recognised that the WRMC may not be responsible for some of the other OHS-related laws and therefore recommended that the WRMC ask COAG to consider taking the recommended approach forward in those areas. This would involve COAG asking the relevant Ministerial councils to examine the relevant laws in their areas of responsibility and to consider whether separate regulation was warranted. If so, the Ministers would also be asked to consider whether the relevant safety laws should be made consistent with the model OHS Act.

The review noted that there are various other initiatives proceeding under the aegis of COAG that related to some of these areas of regulations (including the establishment of a single national system of maritime safety regulation<sup>157</sup>). This would facilitate the consideration of whether OHS regulation should be rationalised.

## **Duties of care**

After examining the existing diverse provisions relating to the duties of care and noting the varying jurisprudence in the jurisdictions, the review recommended a clearer, common approach.

### ***A primary duty of care***

There would be a primary duty of care, subject to reasonable practicability, placed on persons conducting a business or undertaking (rather than on employers or deemed employers). This would provide a more effective and dynamic way of dealing with the many new and emerging work relationships that are replacing traditional employment relationships.

The primary duty of care would require the duty holder to ensure so far as is reasonably practicable that workers engaged in work as part of the business or undertaking and any other persons are not exposed to a risk to their health or safety from the conduct of the business or undertaking.

The duty would expressly apply where the primary duty holder provides accommodation to a worker, where it was necessary to enable the worker to undertake work.

Various specified persons would also have that primary duty expressly placed on them. As well as the usual classes of designers, manufacturers, suppliers, erectors, installers, etc, a specific duty of

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157 Australian Transport Council, Joint Communiqué, 7 November 2008, p.2.

care would be placed on a person with management or control of a 'workplace' (widely defined).

In addition, the primary duty would apply to OHS service providers. These would be defined as including persons engaged by another duty holder to provide advice on OHS, systems, policies, procedures, etc, relating to the management of OHS, OHS training, and OHS testing, analysis, etc. Persons who exercise a power or perform a function under an Act would be excluded, as would members of emergency service organisations and legal practitioners when providing advice to which legal professional privilege applies.

### ***A proactive duty of care for officers***

Officers (as defined in the Corporations Act) would have a proactive duty of care. This is in contrast with the current position under which officers are typically taken to be liable where there is a breach by a corporation, subject to certain defences being available to the officers concerned. This duty would be subject to due diligence.

### ***The duty of care for workers and others***

Workers and others at a workplace would also have a duty of care, subject to reasonable care. The term 'worker' would be defined widely to accommodate the continuous process of change in working relationships.

### ***Offences***

In the event of a breach of a duty of care, there would be three types of offences. The focus of the offences would primarily be on the level of culpability, not the outcome of the breach.

- a) Category 1 offences would apply where the breach involved gross negligence or recklessness and serious harm to a person or the risk of such harm.
- b) Category 2 offences would deal with cases where there was serious harm or the risk of it without recklessness or negligence.
- c) Category 3 offences would apply to other breaches.

Category 1 offences would be indictable offences (proceedings would normally be before a judge and jury).

There would be no right of private prosecution for breaches.

## **Sanctions**

The review recommended substantial increases in fines (up to a maximum of three million dollars for a corporation convicted of a category 1 offence), imprisonment (up to five years for an individual convicted of a category 1 offence) and a very wide range of sentencing options for courts, including fines, injunctions, remedial orders, training orders, and corporate probation. The maximum fines specified in the model legislation for corporations would be five times the maximum fines for individuals.

Regulators would also be empowered, subject to certain safeguards, to accept enforceable undertakings as an alternative to prosecution, other than for category 1 offences.

## **Other OHS obligations**

The national OHS review recommended a range of particular obligations be provided for, including:

- a) monitoring the health and safety of workers and conditions at a workplace;
- b) requiring a person conducting a business or undertaking to employ or engage a suitably qualified person to advise on health and safety matters (in the case of larger businesses or undertakings, there would be a specific obligation to appoint a workplace health and safety officer);
- c) incident notification to a regulator would be required, but would be limited to the most serious incidents; and
- d) workers would be required to report any illness, injury, accident, risk or hazard of which they are aware arising from the conduct of the work to the person conducting the business or undertaking or the person with management or control of the workplace.

## **Workplace participation, representation and consultation**

Numerous recommendations were made in this area. Broadly, the national OHS review recommended that an obligation be placed on persons conducting businesses or undertakings to consult workers and for duty holders to consult one another where their duties overlapped. There were also recommendations for the election of Health and Safety Representatives (HSRs) representing work groups, for the powers and functions of HSRs (including the issuing of Provisional Improvement Notices) and for their being granted paid

leave to undertake competency-based training in relation to their roles as HSRs. There were also recommendations relating to the establishment and functions of Health and Safety Committees.

In related recommendations, the review proposed that the model legislation provide for the authorisation of union officials to exercise rights of entry at workplaces for purposes of consultation (with twenty-four hours notice) or investigating suspected breaches (without prior notice, but subject to a requirement to notify an appropriate person as soon as practicable after entry). Various safeguards were recommended. The recommendations were framed to align the right of entry provisions under the model Act with those under federal industrial relations laws, including those proposed in the Fair Work Bill 2008.

Strong protection against victimisation, discrimination and coercion was proposed, with a combination of civil and criminal remedies.

## **OHS issue resolution**

A process of resolution of disputes or concerns relating to OHS matters was recommended, with a focus on informal consultation at the workplace, escalating to an inspector or a court or tribunal with powers of conciliation or arbitration. The court or tribunal would not be able to deal with a matter that was the subject of a provisional improvement notice.

## **Role, powers and accountability of the regulator and inspectors**

As to the role, powers and functions of the regulator, the review emphasised the importance of graduated enforcement, the importance of information, education and advice from the regulator, the ability of the regulator to secure compliance by various means (consistently with the well-known enforcement pyramid) and the need for well trained inspectors to have the skills and understanding to secure compliance.

In this respect, the national OHS review noted the resource constraints facing most regulators and proposed that provision be made for the cross-appointment of inspectors in the various jurisdictions. In addition, the review recommended that the various Acts make it clear that evidence that was gathered in one jurisdiction could be validly used in another. Again, the review referred to the importance of the accountability of regulators and inspectors.

## Permits and licensing

The review was required to consider permits and licensing arrangements for those engaged in high risk work and the use of certain plant and hazardous substances. The review recommended that engaging in such high risk activities without the relevant authorisation should be an offence. The detail of the authorisation process would be stipulated in regulations. Mechanisms would be established for mutual recognition of such authorisations.

## OHS regulation in the petroleum, gas and maritime industries

As we discuss elsewhere, the regulation of these industries involves a complex mosaic of Commonwealth and State (or Territory) legislation. These laws include:

- a) the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth);
- b) the *Occupational Health and Safety (Maritime Industry) Act 1993* (Cth);
- c) the *Navigation Act 1912* (Cth);
- d) the *Occupational Safety and Health Act 1984* (WA), except for workplaces that are, or work carried out on, petroleum wells or petroleum pipelines to which the *Petroleum and Geothermal Energy Resources Act 1967* (WA), the *Petroleum Submerged Lands Act 1982* (WA) or the *Petroleum Pipelines Act 1969* (WA) apply;
- e) the *Petroleum and Geothermal Energy Resources Act 1967* (WA);
- f) the *Petroleum Submerged Lands Act 1982* (WA);
- g) the *Petroleum Pipelines Act 1969* (WA);
- h) the *Western Australian Marine Act 1982* (WA);
- i) the *Dangerous Goods Safety Act 2004* (WA).

Under s.89 of the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth), State and Northern Territory OHS laws do not apply to:

- a) a facility located in the offshore area of a State, the NT or the Territory of the Ashmore and Cartier Islands;
- b) activities at such a facility; or
- c) a person at such a facility, a person near such a facility affected by the facility or activities at the facility.

A facility is, for these purposes, defined in cl.4 of Schedule 3, Occupational Health and Safety, of the Commonwealth Act and, in specified circumstances, may be constituted by a vessel, structure or a pipeline. Otherwise, State or NT OHS laws will apply within their jurisdictional competence.

## **Implications for these laws of the national review**

Of the Commonwealth and State laws mentioned above, those most likely to be directly and immediately affected by the national review's findings and recommendations are:

- a) the *Occupational Health and Safety (Maritime Industry) Act 1993* (Cth);
- b) the *Occupational Safety and Health Act 1984* (WA).

Each is administered by a Minister, who, in accordance with the Inter-Governmental Agreement, is responsible for implementing agreed matters arising from the national review.

If the national OHS review's recommendations were acted upon, there would be substantial changes in a number of areas (particularly in relation to duties of care and the consequences of non-compliance).

In the longer term, Ministers in other portfolios may be requested by COAG to examine laws that they administer which affect OHS to justify the continued separate operation of those laws. This may affect the petroleum and gas regulation that is the subject of our inquiry.

Even if no action were to be taken following the national OHS review, we consider that close attention should still be given to certain underlying concerns identified by the national OHS review. These relate to the inefficiency and potential confusion caused by too many sources of regulation. Even apart from the question of how well the laws identified above have been administered, there is considerable potential for difficulties to arise from their interaction, given the differing provisions and regulatory practices associated with them. Rationalising the laws, improving their interaction and having more effective coordination of their administration should be a priority.

## **Suggested action**

The existing principal OHS Acts in the various jurisdictions appear likely to be amended in line with the proposed model OHS Act to achieve national consistency. Those amendments will be based on the decisions of the WRMC about the content of the laws, after the WRMC has considered the two reports of the national review. As the WRMC has accepted the recommendation that various other laws that relate to OHS will at least be made consistent with the national model OHS law, we suggest the following course of action.

If COAG agrees that separate, industry or hazard specific laws relating to OHS should only be maintained where objectively justified, careful consideration will be required to see whether such justification exists. If the separate legislation is justified, then, in line with the review's recommendation, further careful examination would be required to justify any variation from the nationally consistent principal OHS laws.

To prepare for such a process, we recommend that there be full and early engagement with all interested parties, including industry bodies, operators, unions and regulators for the purposes of that examination to identify and evaluate the options.

### ***Suggested approach if recommendations about justifying separate OHS laws are not accepted***

If those recommendations are not accepted by COAG, we propose that the Commonwealth and WA should nonetheless reconsider the content and operation of all laws in the petroleum and gas industry that affect OHS.

The aim should be to achieve as much consistency with the content and operation of the harmonised principal OHS laws as is appropriate. We consider that the benefits of doing so would be considerable, for reasons including:

- a) reducing the regulatory burden on duty holders who are subject to more than one OHS regime;
- b) using OHS regulatory resources more efficiently; and
- c) facilitating the entry of workers to the industry by ensuring that there are, as far as possible, OHS rights and responsibilities that are consistent with those under general OHS laws, thereby reducing the amount of training required.



# Annex 8:

## The effectiveness of OHS regulation by NOPSA and DOCEP

### **Purpose of this annex**

We discuss the effectiveness of regulation of OHS by NOPSA and DOCEP. We note the impact of changes in administrative arrangements in WA relating to onshore oil and gas safety. The resource safety responsibility transferred to DOCEP on 1 July 2005 was transferred to the new Department of Mines and Petroleum on 1 January 2009.

### **Background**

We have outlined the history of NOPSA elsewhere. We have noted that NOPSA regulates the health and safety provisions of the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* in Commonwealth waters and the *Western Australian Petroleum (Submerged Lands) Act of 1982* in designated coastal waters.

DOIR had responsibility for OHS and integrity for the onshore (mainland) portions of the gas export pipelines. From July 2005 to the end of 2008, DOCEP provided, under an MOU, regulatory services to DOIR for these portions of the pipelines. The regulatory role is now undertaken by the Department of Mines and Petroleum (DMP), which also administers the *Dangerous Goods Safety Act 2004* and *Dangerous Goods (Major Hazard Facilities) Regulations 2007*.

## How to assess the effectiveness of OHS regulators

OHS regulatory performance is notoriously difficult to measure. There is a lack of objective data that allow complete and definitive conclusions to be reached about the performance and influence of a regulator. This is partly because there are many factors that affect OHS outcomes, apart from the regulator's activities.

Some commonly used methods include:

- a) measuring trends in overall OHS performance<sup>158</sup>;
- b) ad hoc assessments of the impact of particular programs or interventions<sup>159</sup>;
- c) surveys of those who are subject to the legislative regime administered by the regulator<sup>160</sup>;
- d) intermediate performance indicators (e.g., the extent to which duty holders have adopted particular measures promoted by the regulator to address hazards and risks; the extent to which recognised best practice regulatory methods are used; the numbers of proactive workplace visits by inspectors compared with reactive interventions<sup>161</sup>);
- e) consideration of the views of stakeholders on the regulator's policies and practices in relation to securing compliance<sup>162</sup>.

Performance must be assessed against a range of criteria. There appears to be no single reliable, objective method of assessing performance. Various factors may lead to a false impression about performance. For example, in an industry where major incidents are low frequency but have highly serious consequences, apparently

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158 The Comparative Performance Monitoring program compares Australian and NZ OHS and workers compensation schemes at a broad level (see the 10th Comparative Performance Monitoring report, Commonwealth of Australia, August 2008). DOCEP's 2007–08 Annual Report refers to the overall reduction in injury and disease rates as a measure of agency performance.

159 For example, the Heads of Workplace Safety Authorities coordinate and evaluate programs of interventions in areas of particular hazard and risk, e.g., in relation to the prevention of falls, safer manual handling. See <[www.hwsa.org.au/activities/activities-campaign\\_final\\_reports.aspx](http://www.hwsa.org.au/activities/activities-campaign_final_reports.aspx)>.

160 These may be conducted on an ad hoc basis or to meet a statutory requirement (e.g., the 2007 NOPSA stakeholder survey).

161 10th Comparative Performance Monitoring report, op cit.

162 Stakeholder views on OHS performance tend to be obtained through representative bodies (e.g., the WA Occupational Health and safety Commission). They are usually sought on a wider basis in the course of inquiries and reviews, but do not provide much information that allows trends to be identified. Surveys are less frequently undertaken on a systematic basis (e.g., the DOCEP surveys about the effectiveness of its ThinkSafe campaigns).

good OHS results may simply mask incompetence or indifference. The true picture may not be clear until after a serious event has occurred.

## **The involvement of other regulators**

We consider elsewhere the problems of overlapping regulation in the context of the events that are the subject of our inquiry. Such problems are compounded where there are inadequate arrangements between the responsible regulators for coordinating their efforts and achieving their common and complementary goals. In relation to safety in the oil and gas industries, the challenge is magnified not only by the operation and interaction of Commonwealth and State jurisdictions, but also the legislative and administrative arrangements that have operated in WA.

The WA Department of Mines and Petroleum (DMP) drew our attention to the impact of the commencement of NOPSA's operations in 2005. According to DMP, at that time half of the technical staff in the relevant resources safety area of DOIR took up positions with NOPSA and most of the rest were transferred to DOCEP. DOIR then had approximately one FTE position to discharge its ongoing regulatory responsibilities and, as we discuss elsewhere, relied on arrangements with DOCEP and NOPSA to carry out operational tasks. It is self-evident that this was not a satisfactory situation, but, as we note, it continued for some years.

## **Interaction of law and practice**

The regulatory task is crucially dependent on the legislation that gives regulators their roles, powers and functions. If there are shortcomings in the legislation, it will be difficult for even the most skilled regulator to overcome them by administrative means. In this regard, we note that NOPSA was given regulatory responsibilities under relatively modern OHS legislation [Schedule 3 of the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cwth)]. On the other hand, as DMP has pointed out, the *Petroleum Legislation Amendment and Repeal Act 2005* (WA), which provides a comparable OHS regime, has for the most part not been proclaimed in the absence of the requisite accompanying regulations. This not only creates disparity in the regulation, but leaves the State regulator in the position of relying on a variety of Acts and regulations to address OHS issues, as well as having the field work performed by arrangement with other agencies.

## Stakeholder views

In broad terms, stakeholders have, in their submissions to our inquiry, pointed to the need for improvements in OHS performance by the regulators. Overall, the submissions do not closely examine this question.

Stakeholder	Concern or comment	Type of issue to be addressed
International Association of Drilling Contractors	Inconsistency between safety case approach (NOPSA) and prescriptive OHS regimes (AMSA)	Overlapping regulation
HolisTech Pty Ltd	A regulatory framework should have sufficient flexibility to tighten and loosen regulation as the risk profile changes. For example, as a risk profile for a system or sub-system becomes worse, more draconian regulatory strategies and mechanisms should be used. Conversely, if the risk profile decreases, the regulatory strategies should become more relaxed.	Regulatory policy and practice
APPEA	Inconsistency between safety case approach (NOPSA and some onshore regulation) and prescriptive OHS regimes (some jurisdictions without safety case).	Consistency in regulation
Woodside	In recent times inconsistent interpretation, sometimes by inexperienced officers and companies new to the regime, has led to inefficient and potentially ineffective outcomes ... there would be value in a refocus on education, with a view to developing a common understanding between regulators and industry on what effective implementation means.	Better interaction, consistency, education.
Australian Pipeline Industry Association	A strong working relationship with regulators and information is shared openly and appropriately.	Regulation for onshore gas transmission industry is effective

Stakeholder	Concern or comment	Type of issue to be addressed
Petroleum Technical Advice Australia Pty Ltd	Exposure to regulatory capture in the Australian system. Australia does not have the advisory committee structure for stakeholder input as was legislated in the US as a result of an early history of regulatory capture. Officials need to be highly competent in order to deal with technical documents.	Need for measures (including transparency and accountability) to reduce risks of regulatory capture.
MUA	The safety case is unsatisfactory, including by marginalising the workforce. It should be replaced by 'the conventional OHS regulatory model'. Nationally declared OHS standards should apply to facilities. There should be a single offshore regulator. HSRs should be better trained and supported.	NOPSA is seen to operate under a flawed model of OHS regulation. This is interlinked with a view that the relationship with AMSA is not optimal.

## Reviews and surveys

In the relatively short time since it commenced operating, NOPSA has been subject to a relatively high degree of scrutiny.

In 2007, NOPSA arranged a survey<sup>163</sup> of stakeholders, namely, Ministers, the offshore petroleum industry and industry associations, HSRs and unions. Some findings are relevant to a consideration of its OHS regulatory performance. In short, it rated relatively highly in terms of overall management of offshore petroleum safety regulation, effective management of OHS and its approach to enforcement. It rated well on consultation and in assisting compliance. A majority saw NOPSA as having improved the quality and timeliness of safety information.

On the other hand, nearly a third of respondents felt that NOPSA was inconsistent in applying the safety case regime. There was some industry dissatisfaction about the accessibility of NOPSA systems and processes.

The 2008 *Report of the Independent Review Team* examining NOPSA's operational activities, found that NOPSA had made good progress in building a safety regulatory regime and authority of world

<sup>163</sup> NOPSA Stakeholder Survey May 2007 conducted by McGrath Nicol and Piazza Consulting.

class calibre.<sup>164</sup> there were some findings, however, that indicated room for improvement in:

- a) the understanding by all parties of the safety case;
- b) providing guidance about the structure and content of the safety case;
- c) consistency;
- d) the approval process for a new facility's safety case (lack of physical inspection);
- e) KPIs.

While the findings point to some fundamental areas for ensuring better performance, the report did not address day to day performance as an OHS regulator.

## **Information provided by the regulators**

NOPSA outlines its OHS activities in its annual reports. For example, in the 2007–08 annual report, information is provided about the number, nature and type of OHS field operations and an analysis is provided of time spent on core regulatory functions as opposed to other activities. Some trends in OHS risks and problems discovered in those regulatory activities are described. On the other hand, information is not readily available about trends in NOPSA's regulatory performance from one year to the next, or comparisons with other regulators (whether in the industry or elsewhere).

The information provided publicly by DOCEP and DOIR appears less useful for assessing their OHS regulatory performance.

## **Summary**

On the material before us, we have concluded that NOPSA should, through its processes of engagement with the industry and unions and other interested stakeholders, settle on a clear program of improvements to its performance as an OHS regulator. This would go beyond its current program for improvement and involve defined objectives and measures of performance that could show trends. This should not present difficulties, given NOPSA's positive approach to accountability and performance improvement.

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164 Ognedal, M et al, *Report of the Independent Review Team, Review of the National Offshore Petroleum Safety Authority Operational Activities 2008*.

For DMP, there appear to be many issues that require attention, including resources and the legislation under which it operates. Those are matters for government, but merit priority attention. In the meantime, DMP has the opportunity as a new Department to develop performance objectives and criteria. There may be value in NOPSAs and DMP working together in this respect.



# Annex 9:

## Learning from major accidents: Cullen, McInerney and Hopkins

There are a large number of major accident reports in offshore, refining and transport industries from which we can learn and that are indicative of the way a judicial inquiry might review a major multiple-fatality offshore accident in Australia. In the UK, Lord Cullen's reports into the Piper Alpha platform disaster and Ladbroke Grove rail accident are seminal. In Australia, the reports by Justice McInerney into the fatal Glenbrook and Waterfall rail accidents in NSW are important.<sup>165</sup> Professor Andrew Hopkins has analysed and summarised the lessons from the 25 September 1998 Esso Longford, Victoria gas explosion and Royal Commission, and from the 23 March 2005 Texas City refinery explosion reports.

### **Cullen Inquiries**

Lord Cullen's 1990 two-volume report into the 6 July 1988 Piper Alpha explosions and fire that killed 167 of 229 on the offshore platform included 106 recommendations and formed the basis of the safety case regime, administered by the UK HSE, under which the offshore oil and gas industry must demonstrate that an effective safety management system is in place. Key was the unambiguous assigning to the company management of the responsibility for assessing risk and properly managing it. It also drove improvement in the quality of safety management, a rigorous permit-to-work system and good communication including across shifts, safety training including for emergencies and simulations, improved auditing, and

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<sup>165</sup> The US reports on the Challenger and Columbia space shuttle explosions and the Canadian report on the 1989 Dryden aviation accident by Justice Moshansky are similar landmarks.

the installation of automatically operating pipeline isolation valves as well as redesigning platform layouts to remove the most hazardous modules from proximity to accommodation.

About a decade later, Lord Cullen inquired into the 130 mph head-on passenger train collision on 5 October 1999 at Ladbrooke Grove which killed 31 and injured 400 after one of the trains passed an obscured red signal. Lord Cullen found that 'There was a lamentable failure on the part of Railtrack to respond to recommendations of inquiries into two serious incidents' in November 1995 and February 1998. He was critical of the deficient regulator which suffered from 'a lack of resources, a lack of vigour in pursuing issues, and the placing of too much trust in duty holders'. In terms of the regulator's excuse of being 'overwhelmed with work' he said they should 'have pressed for more resources'.

## **McInerney Inquiries**

The NSW Commissions of Inquiry into the multiple-fatality rail accidents at Glenbrook on 2 December 1999 and at Waterfall on 31 January 2003 reportedly cost about \$20m and \$40m respectively. Among other things, in Glenbrook, Justice McInerney was critical of operator safety culture and competency, the regulatory system, and the quality of accident/incident reporting and investigation managed by the regulator. His 95 recommendations included the need for a separate independent safety investigation body and learning from national and international best practice. In the Waterfall Inquiry report, Justice McInerney was concerned that many of his previous recommendations had not been implemented and made a further 127 recommendations. These included improvements in emergency response, risk management, training, safety culture and governance, safety regulation, and the independent investigation of all future NSW major accidents and incidents by the ATSB.

## **Lessons from Hopkins**

Consultant to our Inquiry, ANU Professor Andrew Hopkins has written a number of excellent books focussing on the organisational causes of disasters including the 2005 *Safety, Culture and Risk*. In his 2000 *Lessons from Longford: The Esso Gas Plant Explosion*, he analyses the 25 September 1998 accident that killed two men, injured eight others and cut Melbourne's gas supply for two weeks. He goes beyond the Royal Commission's findings that the operator was to blame and that the accident was preventable, to critically examine the submissions of the OHS regulator, Workcover, which argued

‘that the regulatory system was in no way a cause of the accident’. He notes that State Government support for the regulator appeared calculated to avoid criticism or blame. However, a safety case regime was proposed for the future. Hopkins’s other lessons for the oil and gas industry include: over-reliance on lost-time injury data in major hazard industries is itself a major hazard; systematic hazard identification is vital for accident prevention; corporate headquarters should maintain safety departments with enhanced oversight of the management of major hazards; frontline operators must be provided with appropriate supervision and backup from technical experts; routine reporting systems must highlight safety-critical information; maintenance cutbacks foreshadow trouble; and organisational mindfulness is required and companies should apply the lessons from other disasters.

Hopkins’s 2008 book, *Failure to Learn: the BP Texas City Refinery disaster*, provides a nuanced multi-factorial explanation of the causal factors underlying this 23 March 2005 disaster. Highlighting a poor safety culture led from the top and factors noted previously, Hopkins refers to the ‘normalised deviance’ found by the two US space shuttle explosion inquiries and BP’s blindness to major risk, in part created by an over-reliance on personal safety and OHS compliance, which could detract from process safety measures that could prevent catastrophic accidents. He found that corporate decentralisation and cost cutting exacerbated the problems and that a focus on financial indicators at the expense of safety was pervasive. For Hopkins, inquiries that focus on blame are largely incompatible with properly explaining an accident or serious incident.

In terms of regulation, the US regulator’s primary focus was also on personal safety and OSHA did not have the resources to enforce its process safety regulations effectively. In contrast, the UK regulator (the HSE) carried out detailed annual multi-disciplinary inspections of the nine refineries under its jurisdiction ranging from 80 to 150 days in duration. Hopkins states that ‘there is good scientific evidence that intensive regulatory scrutiny is an effective accident reduction strategy’ and notes that BP’s California refinery had a relatively better safety performance in part due to the intensity of State regulatory scrutiny. Hopkins argues that:

*it is sometimes better to carry our risk assessments remote from the circumstances of particular decisions and to create rules that decision-makers must then comply with. In some cases these might be internal company rules, in some cases they might be contained in industry codes, and in some cases it might be appropriate to formulate them as regulatory requirements. In particular, where industry best practice is clear and relatively uncontroversial ... [S]afety inspectorates could*

*examine the position and powers of company safety specialists ... pay incentive schemes ... channels of communication ... [and] insist that CEOs apply the same management of change requirements to their own decision-making, particularly with regard to company reorganisations and cost cuts, as is required at lower levels of a company ... Depositions can hold people accountable – in the sense of requiring them to give an account of their actions and inactions ... without fault’.*

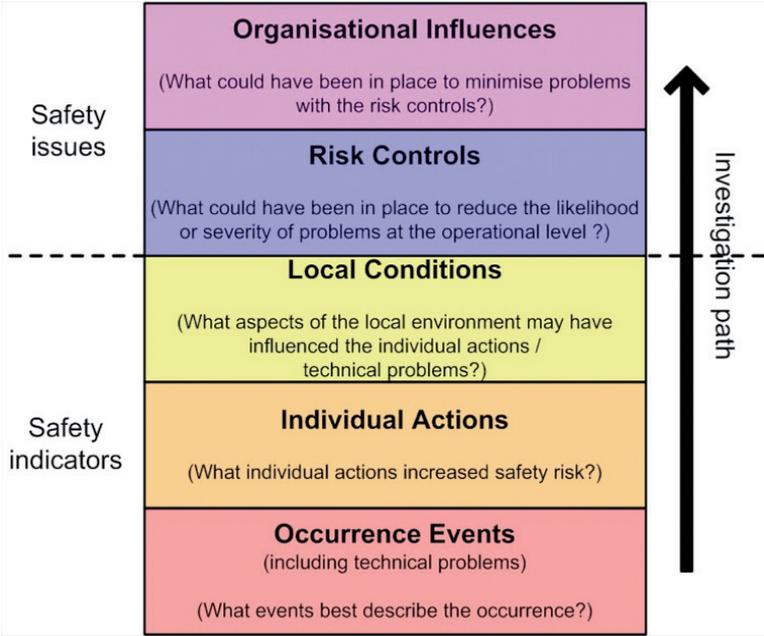
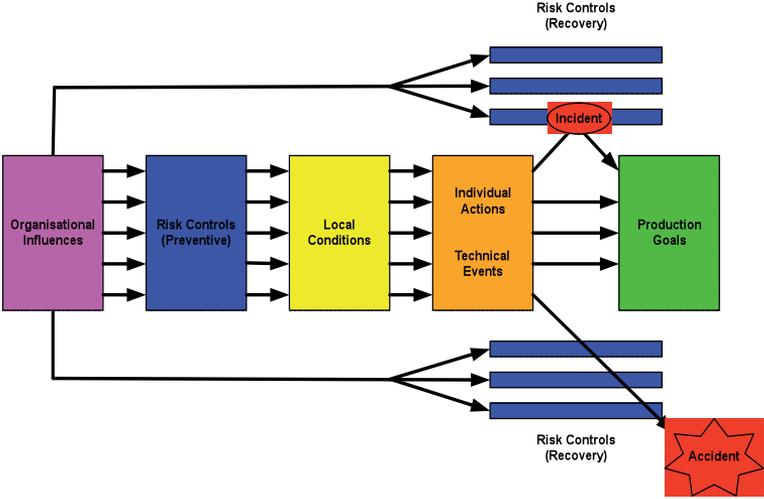
The Inquiry was impressed to be told that Santos’s CEO had purchased 50 copies of Hopkins’s *Failure to Learn* and circulated them widely around the company.

# Annex 10:

## ATSB reports of relevance to Offshore Safety Regulation

The Australian Transport Safety Bureau (ATSB) was established on 1 July 1999 and is the independent transport safety investigation body for aviation, marine and rail accidents under Commonwealth jurisdiction. Larger ATSB investigations are systemic, examining the whole safety system that led to a serious accident or incident. All reports are published direct to the public without fear or favour and are purely focussed on future safety rather than blame. The ATSB website <[www.atsb.gov.au](http://www.atsb.gov.au)> has more than 1 million new users and 40 million 'hits' annually and includes about 1500 aviation, 250 marine and 50 rail final investigation reports, mandatory and confidential incident reporting, research reports and other safety material. Importantly, the ATSB is separate from any police or regulatory investigation that may seek to apportion blame or liability and, in the interests of safety, under the *Transport Safety Investigation Act 2003* the ATSB can compel evidence even if in other circumstances it could be incriminatory. The quid pro quo is that this cannot be then used in civil or criminal courts. Where relevant, major ATSB reports go beyond just documenting the relevance of immediate technical or human causal factors, and look at organisational, regulatory and other factors that may have contributed to the occurrence or to another contributing safety factor. The ATSB also reports on any other safety factors that may need to be addressed to reduce risk. A summary of the ATSB methodology is available on-line in the 2008 report *Analysis, Causality and Proof in Safety Investigations* by Dr Michael Walker and Mr Kym Bills and is built up from a Professor James Reason type model as illustrated below.

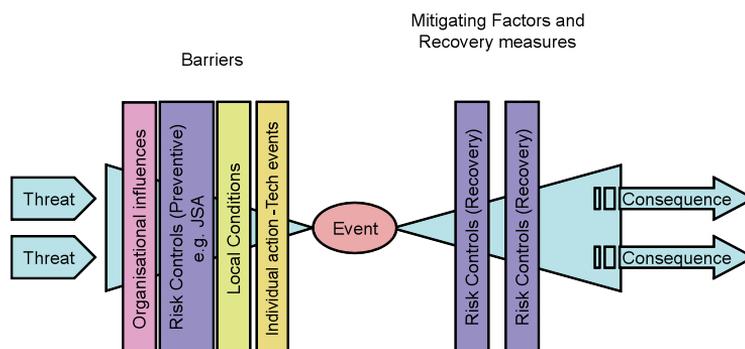
**Figure 10: ATSB investigation analysis models**



## Bow-tie model

The oil and gas industry typically use a 'bow-tie' analysis for a safety case comprising four steps: identification of the top events with their hazards; assessment of all the potential threats and escalating factors, identification of control measures to prevent the hazard occurring or being released (the left side of the bow-tie) and identification of mitigation or recovery measures should the hazard occur (the right side of the bow-tie). The bow tie model can be mapped to the ATSB model as follows:

**Figure 11: Bow-tie model compared with ATSB model**



## Major ATSB reports

A 1999 ATSB report into a trial of 'class G' airspace with less air traffic control type guidance in a busy corridor that led to a number of incidents was, among other things, critical of the regulator (the Civil Aviation Safety Authority) acting with both the Minister and CASA Chairman's encouragement in advance of legislation being amended, and the inadequate safety analysis and a lack of industry education ahead of the trial. The investigation looked at higher level organisational factors including issues involving the CASA Board.

The ATSB final report into a runway over-run by a Qantas 747 on 23 September 1999 during heavy rain in Bangkok found that in addition to a number of errors and poor decisions in the cockpit, there were organisational issues with company training, procedures and culture including some linked to cost savings, and issues involving CASA in terms of regulations for wet runways, emergency procedures and training, and surveillance of Qantas operations.

In March 2001 the ATSB released its final report into Avgas fuel contamination from Mobil's Altona refinery that grounded thousands of aircraft in eastern Australia from January 2000. The ATSB

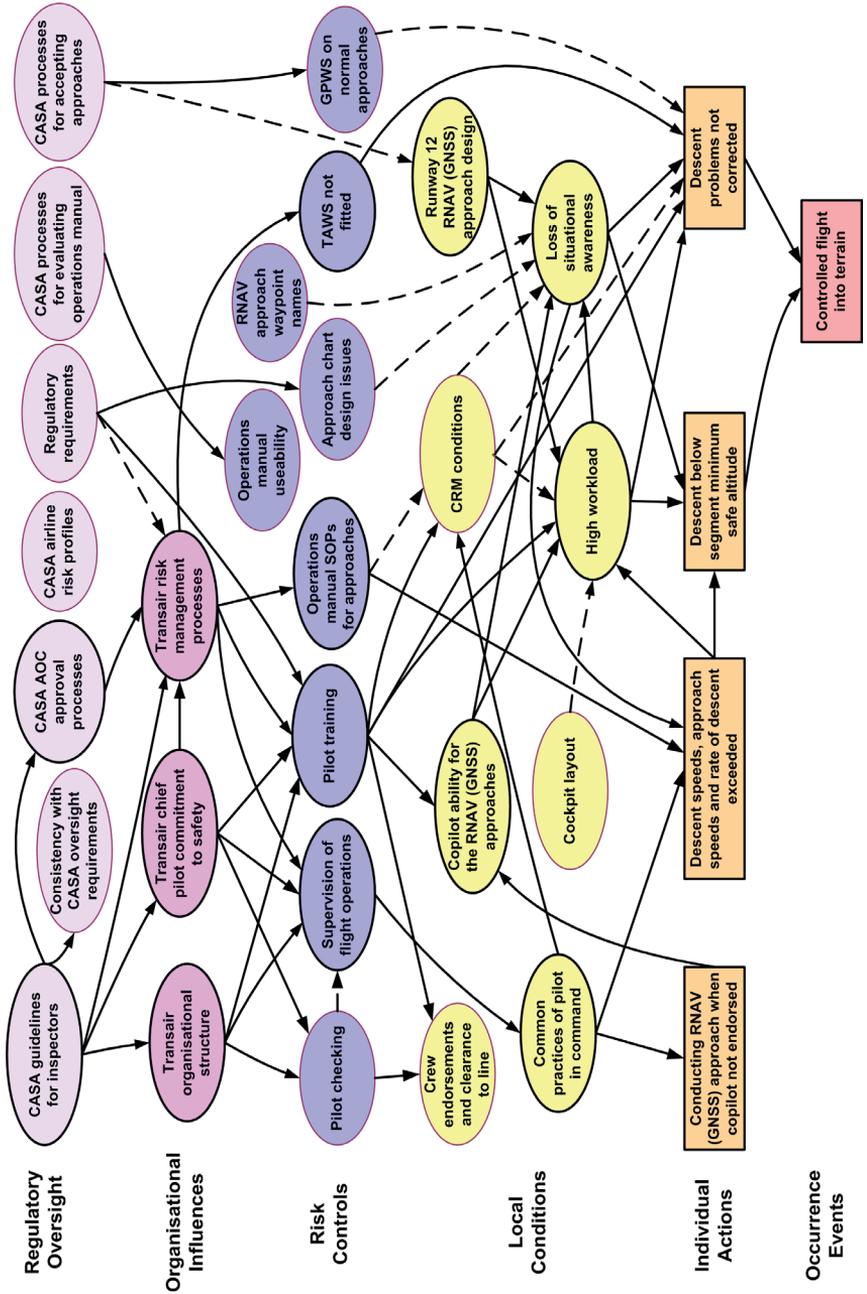
found serious problems with the refiner's risk management and management of processes for the manufacture of Avgas which were relevant more broadly to managers of complex, safety critical systems, including the need for heightened mindfulness. There were issues with the development and use of international standards for Avgas, and also issues with a lack of regulatory oversight and a 'diffusion of responsibility' among regulators.

The ATSB final report in November 2002 into maintenance deficiencies that led to a lack of inspection of cracking in safety-significant areas of Ansett 767 aircraft found serious organisational issues within Ansett that allowed the problem to emerge. There were also issues with the Australian regulator, the US aircraft type regulator of Boeing aircraft – the US FAA, and with the UN international regulatory body, ICAO. There was inadequate sharing of safety information among regulators and hence an absence of closed-loop learning.

A final ATSB report into a 15-fatality scheduled passenger aviation accident was released in April 2007 following several reports and recommendations in the interim. The 'controlled flight into terrain' accident occurred in bad weather when the pilots lost situational awareness in the approach to Lockhart River aerodrome in Queensland. The ATSB had sufficient evidence to find 17 contributing safety factors with a probability of over 66 per cent (black outline ellipses in the diagram on the next page), 10 of which involved the pilots. However, there were five contributing safety factors involving the operator and two contributing safety factors involving CASA regulation.

In this case, the contributing safety factors included the poor commitment to safety shown by the company's Managing Director who was also overloaded as both Chief Pilot and check pilot and had another significant role in PNG with an associated company. The operator's safety management system comprised manuals which did not correspond to reality, internal safety incident reporting rarely led to follow-up action and training was often inadequate. While the regulator argued that the focus of the ATSB investigation should have remained with the pilots, the ATSB found that if CASA had done more to assess changes to the operator's Air Operator's Certificate as the airline expanded quickly and risk increased and changed, and had given better guidance to its inspectors, the accident may not have occurred.

**Figure 12: ATSB investigation model applied to the Lockhart River accident**



## ATSB marine reports

In addition to an investigation into the grounding of the Vanuatu registered offshore tug/supply ship *Massive Tide* after departing Bass Strait, there are three recent ATSB marine investigation reports of relevance to the Inquiry's additional consideration of the regulatory interfaces and effectiveness between NOPSA and AMSA in light of the December 2008 incidents involving the vessels *Karratha Spirit* and *Castoro Otto* during cyclone Billy.

The ATSB investigation into the fires on board the Panamanian-registered accommodation platform *Safe Concordia* on 12 and 18 September 2005 during its positioning voyage from Singapore to Bass Strait found electrical faults associated with the number one and four thruster motors and a design that did not allow for effective and safe fire fighting in the thruster rooms. Among other things, a certificate of class was issued by the American Bureau of Shipping (ABS) despite an endurance test not being successfully completed, and the safety case submitted to NOPSA did not take into account the problems with the propulsion electrical system before the platform was deployed to the Yolla gas field in Bass Strait.

The ATSB investigation into the Bahamas-registered *Dampier Spirit* during cyclone Hubert on 6 April 2006 found that a mooring line (hawser) attaching the vessel to the CALM buoy at the Stag oil platform off Dampier parted and forced the ship to put to sea as the cyclone approached. The ship carrying 12,100 tonnes of crude oil cargo had difficulty making headway while trying to avoid the cyclone and was tracking towards Tryal Rocks until the wind eased. The ATSB highlighted the Master's delayed decision to consider disconnecting and avoiding the cyclone which did not accord with company guidelines. Further issues involved the floating storage and offloading (FSO) ship's degraded performance, and not replacing the hawser when its service conditions indicated this was needed. In addition to safety actions taken by Teekay Shipping's internal investigation, the ATSB made recommendations to owners and operators of FSO and FPSO ships in relation to cyclones, and regarding hawser inspection and replacement.

The ATSB investigation into the grounding of the Panamanian-registered bulk carrier *Pasha Bulker* on Nobbys Beach, Newcastle on 8 June 2007 also considered the decisions of 56 other vessels that were queuing to load coal at Newcastle as gale force winds approached. The ATSB found that most left the queue well before the storm hit. *Pasha Bulker's* master did not appropriately ballast the ship or weigh anchor until it dragged in severe weather. He had assumed that Newcastle Port would have been more assertive in providing storm advice. The master became overloaded and made inappropriate and poor decisions leading up to the grounding.

The methodology used in ATSB investigations results in the uncovering of underlying causes of serious transport accidents and incidents. The rigorous systemic process employed goes beyond the immediate contributing factors of such occurrences to examine deeper root causes and, in so doing, maximises the probability of preventing similar events. Better practice within the oil and gas industry has used similar techniques in the past with some success. A key advantage of the ATSB model is the independence of the investigating body from both the operator and regulator. This independence ensures the methodology is used without fear or favour and that the result will provide the best opportunity to minimise underlying risk and improve future safety. Another advantage is the ATSB's legislation and critical mass of professional investigations.



# Annex 11:

## Productivity Commission Upstream Petroleum Regulation Review

The Panel informed themselves of the work of the Productivity Commission (PC) by reading the December 2008 draft and the April 2009 Research Report on the Review of the Regulatory Burden on the Upstream Petroleum (Oil and Gas) Sector and meeting with Commissioner Mr Philip Weickhardt and secretariat member Mr Peter Garrick. The Panel found a great deal of common ground between the two inquiries particularly in terms of the negative impacts from layers and complexity of multiple regulatory jurisdictions, bodies and interfaces which need to be further simplified, particularly in Western Australia. But there were also some areas where there was a divergence and where the Panel believed there was a case to go further than suggested by the PC. The following highlights the main relevant areas of difference and emphasis.

We believe very strongly that any new national regulator such as the PC's proposed National Offshore Petroleum Regulator (NOPR) should not include NOPSA in either its current or an expanded form. We agree that NOPSA should be expanded to cover integrity of offshore pipelines and subsea equipment and the safety aspects of wells, as well as integrity more broadly where it goes beyond personal safety. But in our view, the case for maintaining separation of safety regulation from other forms of regulation and from policy and industry promotion and development is very strong and is not just a theoretical matter but one that has arisen repeatedly from experience with major accidents around the world. In addition to Lord Cullen's Inquiry into the 167 fatalities on Piper Alpha in 1988 where the dual Department of Environment (DOE) departmental role of industry resource management and safety regulation was identified as a problem, in the US the 1996 ValuJet DC9 accident

involving 110 fatalities was quickly seen as involving a problem because the Federal Aviation Administration in the Department of Transportation had a 'dual mandate' whereby an industry promotion role could undercut safety regulation. More recently, Justice McInerney has recommended, in the context of major judicial inquiries into two multiple-fatality rail accidents in NSW, that safety regulation should be separate from other forms of regulation and of other government roles such as policy (see Annex 9). Justice McInerney also strongly supported the need for an independent and properly resourced no-blame systemic investigator to investigate serious accidents and incidents in the future. We strongly support this for the oil and gas industry but the PC report is silent on any need for such investigation.

The PC report considers an option in which the mandate of an expanded NOPSA includes regulation of onshore sections of integrated upstream facilities. However, it states that, on balance, it does not consider the option to be practical. While recognising the challenge involved, we believe that minimising unnecessary interfaces and taking a whole-of-process perspective is likely to reduce safety risk and improve regulatory effectiveness as well as efficiency. We agree with the PC that State/NT jurisdictions should have the option to delegate responsibility for the regulation of cross-jurisdictional onshore upstream pipelines to NOPSA. In addition, if some jurisdictions wished to have NOPSA regulate other upstream activities, including those located entirely onshore, this should also be facilitated through relevant legislative amendment.

The PC recommended, on balance, that NOPSA not have future responsibility for environmental compliance regulation and despite some good arguments either way on the issue, we support such a conclusion.

The PC report refers to the need to improve guidance on safety case regulation but at the same time to avoid 'regulatory creep' and we provide further analysis of some key aspects of this and reference to international best practice.

The PC report also recommends further work to reduce uncertainty involving NOPSA and AMSA with respect to the *Offshore Petroleum Act 2006* and the *Navigation Act 1912*. We have undertaken a good deal of work on this as part of the addendum to our terms of reference and have developed some concrete findings and recommendations as a result.

# Annex 12:

## March 2008 review of NOPSA and precursor reports since 1996

The February–March 2008 review of NOPSA and associated submissions provided helpful background to this Inquiry and we have many areas of agreement with its recommendations.

### **1996 report by Dr Tony Barrell**

The context of the Barrell report on *The Regulation of Health and Safety in the Australian Offshore Petroleum Industry* was the ‘objective-based’ safety case regime that since 1992 had progressively replaced the traditional prescriptive regulatory system, with full effect expected from 1996. Barrell outlines the well-known four-fold disadvantages of prescriptive regulation in complex high hazard industries: that it is impossible to prescribe every process and activity; legislation becomes out of date; it inhibits innovation and cost effective solutions; and there is a transfer from employer to regulator of both risk and the responsibility for devising greater safety. He notes that prior to the 1988 Piper Alpha disaster, UK legislation was prescriptive and in some instances badly out of date, and there was criticism of the UK Department of Energy for allowing its twin functions of safety regulation and safety promotion and exploitation to become too intertwined. Lord Cullen’s Inquiry into Piper Alpha emphasised the need for safety regulation to be handled separately outside the department responsible for resource management.

For Barrell, the four principles of a safety case regime are:

- (i) that employers who create risks to their employees by practising their business activities are wholly responsible for controlling and reducing those risks;
- (ii) that the regulator is responsible for administering the safety legislation and where necessary enforcing it;

- (iii) that the legislation should be objective-based, in that it sets out the safety goals to be achieved, but does not prescribe the solutions;
- (iv) that the approach to safety improvement should be risk-based, in other words all risks should be identified and the action taken to reduce them risks should then be proportionate to the size of those risks.'

In such a co-regulatory environment 'the regulator is expected to display independence, probity and competence. Moreover, it should work in an organised and systematic manner that is as transparent as possible to those who are regulated and to the public. It should operate at minimum cost consistent with achieving effectiveness, and it should endeavour to achieve high service standards in its dealing with its various clients and stakeholders.' These are principles still broadly applicable in 2009.

A number of serious concerns noted by Barrell also remain relevant. He felt 'particularly strongly that regulatory staff must keep on file proper written records of their visits offshore, and of their meetings with operators (particularly the actions agreed and the timetables associated therewith), and that they follow-up all meetings on the implementation of safety improvements promptly with letters confirming the substance of such agreements' because he found too much undocumented and 'insufficient evidence of actions by the Regulator'. Barrell stated that 'the penalties in the safety regulations available following successful prosecution are, in my view, quite inadequate for the possible gravity of the offences concerned' and 'there is confusion arising from the interface between the *Petroleum (Submerged Lands) Act* and the *Navigation Act* and that this ought to be clarified'. He also argued for companies to imaginatively improve communication about safety matters.

Barrell outlines common essential elements of safety case administrative systems, including: an annual operating plan specifically for safety with key objectives and performance measures; an annual internal review of performance against last year's plan, explaining reasons for any difference from plan; a definition of the responsibilities and accountabilities of safety personnel; a competency framework and a training plan to fill gaps; written internal procedures and standards covering the scrutiny of safety cases, inspection, service standards, communications with operators and others, auditing, etc; policy and guidance on inspection and enforcement and on ensuring probity; an accident/incident database and document control system; and internal arrangements for auditing systems and performance.

*Barrell argues that in a safety case regime, the 'inspector has to be able to use the considerable analytical and*

*reasoning powers necessary to uncover any weaknesses in the fundamental and comprehensive thinking that has gone into such safety cases, or in the design of the safety management systems. ... The qualities needed in an inspector are not primarily those to do with technical ability ... what counts is the intellectual ability to analyse and reason, the capacity to work in a systematic and thorough manner, the resolve to take an objective, detached and questioning approach and the determination to back one's judgement in the face of pressure ... to ask searching questions about the design and adequacy of the design and operation of management systems and have the judgement and experience to determine what is a satisfactory answer, when the matter needs to be pursued further and when enforcement action must be taken.*

He maintains that funding should enable inspectors to maintain professional networks and attend relevant conferences, seminars and the like.

The move from prescriptive legislation to the safety case regime has changed the role of the regulator as described above. Barrell stated that the resources required to carry out this role need to be tailored to the task if the regulation is to be effective in all respects. The panel believes that there is still more to do in this respect in 2009.

## **2000–2001 reports**

Following an Independent Review Team (IRT) report of March 2000, and the earlier Longford Royal Commission criticism of the effectiveness of the implementation of safety management systems in onshore facilities, the Commonwealth coordinated consideration of recommendations and policy options with senior State/NT officials and published *Future Arrangements for the Regulation of Offshore Petroleum Safety* which reviewed the extant safety case regime administered by the States/NT. The report noted that data gathered in 1999 were inconclusive in terms of demonstrating whether or not the level of offshore safety had in fact improved since the introduction of the safety case regime. The primary IRT conclusion was that:

*The Review Team is of the opinion that the Australian legal and administrative framework, and the day to day application of this framework, for the regulation of health, safety and environment in the offshore petroleum industry is complicated and insufficient to ensure appropriate, effective and cost efficient regulation of the offshore petroleum industry ... Much would require improvement for the regime to deliver world-class safety practice.*

The IRT found in March 2000 that:

- there were too many Acts, Directions and Regulations, their boundaries were unclear and there were overlaps and interpretation and application was inconsistent;
- guidelines are often applied as if they were compulsory regulations;
- provisions for graded sanctioning of non-compliance are absent;
- the use of consultants to assess safety cases can potentially cause a conflict of interest and consultants have closer ties to companies than with regulators; and
- lead performance indicators need to be developed.

Further, the IRT assessed that State/NT safety regulators lacked regulatory skills, capacity and consistency and did not have a clear view of their role, and that the level and competencies of Commonwealth staffing was also deficient.

However, the IRT noted that the States/NT continued to argue for the retention of a disaggregated regulatory system. Ultimately, the IRT recommended that a national petroleum regulatory authority similar to AMSA should be developed. With industry support, the 2001 report recommended the establishment of what became NOPSA.

The 2001 report outlines the key safety case rationale and elements that remain relevant:

*Objective based (or goal setting) regimes, including the safety case regime, are based on the principle that the legislation sets the broad safety goals to be attained and the operator of the facility develops the most appropriate methods of achieving those goals. A basic tenet is the premise that the ongoing management of safety is the responsibility of the operator and not the regulator. Within this objective-based regime there is a requirement that the operator of an offshore petroleum facility must make a formal 'case' to the regulator which outlines the types of safety studies and analyses undertaken, the results obtained and the management arrangements in place to assure the continued safety of personnel on a particular facility. The 'Safety Case' must establish a strong enough argument, supported by evidence that will satisfy the regulator, that the operator knows what technical and human activity related safety problems exist, how they must be managed and how the safety of personnel will be assured in the event of an emergency. The safety case must also identify the methods used to monitor and review all activities to continually improve safety performance.*

The report states further that:

*A typical offshore safety case comprises three elements – a Facility Description, a Safety Management System (SMS), and a Formal Safety Assessment (FSA) ... The results of the FSA and general safety studies are used to devise methods of eliminating or controlling hazards to reduce risks. It is a demonstration that risks to personnel have been reduced to as low as reasonably practicable (ALARP). ... The SMS must be comprehensive, integrated and contain feedback loops that continually measure performance and drive change ... The primary focus of the safety case regime is on reducing the incidence of major accident events (MAEs). ... In general, a breach of an accepted safety case is a breach of the regulations. ... it is generally now accepted that LTIs [a low level of lost time injuries] do not provide a good correlation with the likelihood of MAEs in the future.*

The 2001 report also cites a late-2000 discussion paper from the UK HSE outlining essential characteristics under which they operate their safety case regimes when giving consent or permission for an operator/duty holder to undertake an activity in the railway, nuclear, offshore and onshore major hazard industries. The HSE notes that through the democratic political process the regulator and the regulated are subject to society's views about the tolerability of risk and 'permissioning regimes are applied to high hazard industries, about which society has particular concerns'. The goal-setting framework make duty-holders think for themselves about hazards, risks and controls and in this context 'permissioning regimes define elements of the management arrangements required'.

The 2001 report states that regulators in a safety case system must be resourced 'to carry out searching audits of elements of the safety management system which require ongoing activity, such as incident reporting systems and management of change requirements'. It also restates that there is a 'tension between regulation and industry facilitation, on the basis that there is a conflict of interest arising if one organisation is responsible for both aspects'. This remains an issue in 2009 as is the potential conflict if a regulator investigates its own performance in the event of a significant or major accident or incident.

The 2001 report reinforces the importance of workforce understanding and involvement in a safety case if risk is to be properly managed and continuous improvement is to occur. It suggests that major accidents occur because hazards have not been identified or controls that were supposed to be in place were not operating as intended. (Underestimation of risk may be considered an allied or further causal factor.) Regulatory effectiveness also

requires systems that are as simple as possible to operate and administer and where unnecessary duplication is minimised. The IRT stated that attention needs to be given to the interaction between Commonwealth and State legislation and to clarify the unclear and undefined role of the Designated Authorities with the best solution the development of a single national petroleum safety authority but the issue of whether health, safety and the environment should be integrated under one set of regulations and one reporting framework was an issue of administrative efficiency with only a second order effect on safety. The IRT stated that performance standards<sup>166</sup> are an important tool in verifying that the design assumptions (and the risk figures that flow from them) remain valid over time, but that the Australian regime was not doing this well. Further, the IRT believed that while there was no concrete evidence of serious reductions in safety as a result of cost pressures, the potential was there.

Industry also noted that the same lack of regulatory clarity which impacts efficiency and cost effectiveness in the offshore context can result in attention being distracted from the main intent of preventing major accident events. As a result, the 2001 report found a 'clear requirement exists to improve the interfaces between State and Commonwealth legislation applicable to the offshore industry'. The Commonwealth proposed that 'an independent statutory authority be developed that will regulate both Commonwealth and State petroleum safety activities'.

The 2001 report also noted the absence of sufficiently robust national safety performance data or data analysis capability for the Commonwealth to determine the level of offshore risk and the desirability of a standardised suite of leading and lagging indicators that could be benchmarked across companies, countries and regulators. Examples of possible measures in the suite were:

- measures of near misses that could have resulted in a major accident event;
- measures of perceptions (attitudes) towards the commitment of the organisation to safety;
- measures of activities which are being undertaken to identify and minimise risk (audits and close out actions); and
- existing lagging indicators (fatalities, LTIFR or total medical treatments for injuries).

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166 The IRT stated that performance standards are criteria established by the operator that indicate, particularly in respect of safety critical systems, what has to be done, and at what frequency, to preserve the risk figures assumed in the design.

## 2003 review

The June 2003 *Report of the Independent Review Team* on the implementation of the 2000 IRT recommendation to establish a National Offshore Petroleum Safety Authority comprised the same team of Messrs Magne Ognedal and Odd Bjerre Finnestad from Norway's safety regulator and Mr Ed Spence of Integral Safety Ltd. The 2003 report cites the principles for offshore industry regulation agreed on 4 March 2002 by the Ministerial Council for Mineral and Petroleum Resources (MCMPR):

- 1. An enhanced and continuing improvement of safety outcomes in the Australian offshore petroleum industry is a priority for Governments, industry and the workforce.*
- 2. A consistent national approach to offshore safety regulation in both Commonwealth and State/NT waters is essential for the most cost-effective delivery of safety outcomes in the offshore petroleum industry.*
- 3. The safety case approach is the most appropriate form of regulation for the offshore petroleum industry to deliver world-class safety.*
- 4. The legislative framework must be clear and enforceable to ensure safety regulation motivates operators to discharge their responsibilities for safety.*
- 5. The regulator must demonstrate an independent approach in implementing its legislative responsibilities and in its dealings with industry. The structure and governance of the regulatory agency must promote independence, transparency and openness.*
- 6. The regulator must employ competent and experienced personnel to guarantee effective regulation of the offshore petroleum industry's activities and operations.*
- 7. The administration of the safety regulator must deliver effective safety outcomes at efficient cost to industry.*
- 8. Under the safety case regime, the industry and its workforce must be empowered to identify and report potential hazards and to implement appropriate control measures.*
- 9. Approval processes in safety, titles, environment and resource management must be streamlined and dovetailed to ensure no undue delay to project development in the offshore petroleum industry.*

By the end of their review, the 2003 IRT still had three significant concerns with respect to the people resources, indeterminate scope, and unknown size and structure of NOPSA. The 2003 IRT noted APPEA's 'opinion that transportation pipelines from installations

to shore should be NOPSA's responsibilities as long as they are in water, ie they reach land (terminals)'. Further, among other things, the National Oil and Gas Safety Advisory Committee emphasised that 'the interface between the PSLA and the Navigation Act is a grey area' and that 'Barrow Island needs to be properly sorted out. We cannot be under 3 regulators of the same issues ... NOPSA should regulate all waters and islands (and) be responsible for all pipelines in water'. The 2003 IRT also reported that 'All DAs agreed that transportation pipelines in water to the shoreline or pig receiver, should be the responsibility of NOPSA'.

## **2008 review**

The March 2008 IRT included Magne Ognedal (again assisted by Mr Odd Bjerre Finnestad) Director General of Norway's PSA, Australian major hazards consultant, Dr Derek Griffiths, and Mr Bruce Lake Managing Director of Vermilion Oil and Gas Australia Pty Ltd and a former senior executive of Apache Energy Ltd in Perth.

The Review Team's main conclusion was that: 'NOPSA has made good progress in building a safety regulatory regime and authority of world class calibre, and, as expected there are still some aspects of the regime that can be improved on to achieve best practice regulation.'

Further the IRT concludes that 'NOPSA has addressed all aspects outlined by the Barrel Report for the common essential elements of Safety Case administrative systems. The two main recommendations of the 2000 Review, that the current Australian Commonwealth Safety Case regime framework of legal documents is revised and implementation of the Safety Case regime's regulatory system be restructured, have been implemented. The principles laid down in the Ministerial Council for Mineral and Petroleum Resources (MCMPR) are to a large extent fulfilled, but compliance with principles 4, 6 and 9 can be improved upon to enhance the delivery of safety outcomes in accordance with principle 7'.

Most aspects of the 2008 IRT report are of relevance to the current Inquiry and the panel is broadly supportive of most recommendations made by the 2008 Review of NOPSA with a number of additions, the most important of which are summarised as follows.

There are a number of areas where the panel believes that the current legislation and regulations need to be clarified and simplified, including to ensure that integrity is an integral part of NOPSA's future role. NOPSA's guidelines on how to structure and implement a safety case require broad industry and union input and consultation with worked examples. While operators must have the primary

responsibility and ownership, NOPSA should involve itself more in the development and revision of safety cases, particularly when these are developed for smaller operators by external consultants and ensure there is real workforce input and operational realities are reflective of the safety case. However, the danger of unintended 'regulatory creep' through guidance material needs to be avoided. We agree that the initial acceptance of a new facility safety case should be in conjunction with inspection of a facility upon commencement of operations and that NOPSA should consider an audit regime that targets greenfields operations at commencement of operations.

NOPSA coverage should be increased to include the complete hydrocarbon production system from wells through to custody transfer point or reasonable physical/technical system boundary. In some cases this will require the conferral of powers from States/NT to NOPSA. This is strongly encouraged as NOPSA coverage should minimise safety interface problems. Further, if jurisdictions wish to confer power on NOPSA to regulate upstream facilities and associated pipelines onshore, this should be facilitated as it will further minimise interfaces and foster critical mass and expertise within NOPSA.

NOPSA should continue to develop and trial KPIs in association with International Regulators Forum colleagues, APPEA and unions. Indicators should include a mix of both lagging and leading measures, with the latter drawn from the types of examples noted in Annex 18 to this report.

The current inquiry has a different perspective on the NOPSA Board from that taken in the 2008 Review report. We agree that the role of the NOPSA advisory Board needs to be clarified so that it and Commonwealth and other MCMPR Ministers and relevant officials have a common understanding of the Board's legislated functions. If, as currently legislated, the Board is to be able to initiate the giving of advice and making recommendations to the NOPSA CEO about operational policies and strategies to be followed in relation to NOPSA's performance of its functions, or to Ministers about policies or strategic matters in relation to NOPSA's performance, this needs to be made clear and an annual budget provided for the Board accordingly. Resourcing for four to six meetings annually and some research between meetings is considered reasonable. With the proposed broadening of NOPSA's functions, the Board should also be able to provide advice in relation to integrity per se. To encourage a closer working relationship between the CEO and Board, any advice to Ministers not supported by the CEO should only occur after real consultation with the CEO with a view to minimising unnecessary differences.



# Annex 13:

## 2008 draft review of the effectiveness of NOPSA's use of levy revenue

This (draft) 2008 Department of Resources, Energy and Tourism (RET) review follows an initial review in 2006 and examines, inter alia, the effectiveness of NOPSA's use of the *Offshore Petroleum (Safety Levies) Act 2003* and the *Offshore Petroleum (Safety Levies) Regulations 2004* to cost recover fully its functions in relation to its regulation of facilities and to the two primary safety case components covering the safety management system and safety investigations. RET's findings are largely positive, with NOPSA's \$5.6 million net retained surplus (about \$4 million of which was derived from levies) largely explained by delays in recruitment, an exceptional level of offshore activity, and \$1.5 million provision for future capital expenditure to replace and upgrade assets. There were reportedly no submissions to the RET review that made any significant comments on the safety case levy proportions, but marine contractors were found to have contributed a greater share to NOPSA's budget than the regulatory activity involved would have suggested.

We support the RET review's conclusion that NOPSA should involve industry and unions more in developing its work program and in targeting offshore petroleum issues and that such enhanced consultation does not imply a right of approval or veto. We also support the need to link NOPSA's levy revenue to its annual work plan plus a contingency amount and clarifying the industry operations liable to make levy payments.

Our recommendation about the need to increase the breadth and depth of NOPSA's work will entail an increase in levy revenue following appropriate recruitment.



# Annex 14:

## Leading and lagging indicators for the offshore petroleum sector

While there is an established consensus on a number of lagging indicators used in the offshore petroleum industry, the specification of leading indicators is much more problematic. A positive safety culture will encompass both personal (OHS) and process (MAE) safety and separate leading and lagging indicators are normally required for each. In both cases, it is important to choose indicators that are as simple and understandable as possible, use data already generated if possible, and to seek standard measures that allow meaningful comparison across the industry and across time. Monitoring of such indicators can drive positive safety change. Because OHS indicators are better developed, the focus below is on process safety and indicators that may be indicative of developing hazards that could lead to a major accident event. Good indicators will allow operators, industry bodies and regulators to better target safety 'hot spots', including through education, training and safety promotion.

### **Examples of measures that can be developed into leading indicators**

- Safety considerations in organisational structure and hierarchy (eg to reduce middle management filtering of unwanted 'bad news' on safety)
- Staffing of key safety/technical positions (ie per cent filled, competency levels)
- MAE/emergency training (per cent personnel trained, level of training, recency)

- management training in system safety and process safety (per cent, level and recency)
- management attention to incident data and learning from MAEs across the corporation and from others in like industries
- incentive structures for management that include safety as well as commercial objectives
- workforce input to continuous review of the safety case (monthly number of suggestions and percentage of workforce making suggestions annually)
- average time to resolve process safety suggestions
- level of confidential reporting of safety issues by workforce (monthly number of reports and trends in reporting)
- incidents and 'near misses' reported monthly (although an improving safety culture will promote more reporting so numbers alone do not imply problems)
- percentage of relevant process standards and their revisions reviewed annually
- use of audits and internal investigation to establish root causes of safety matters
- open recommendations involving safety from audits, consultancies and investigations and percentage of completion of follow-up in relation to safety
- rate of improperly performed process 'line breaking' activities
- unannounced observation of work practices to assess conformance with best practice safety procedures
- senior management visits to facilities and discussion with frontline staff
- degree of implementation/conformance to policies & procedures that support the SMS
- relative frequency and emphasis of process safety/MAEs in management communications compared with cost, quality, production etc
- staff surveys of safety attitudes and perceptions across operators, facilities and time including with regard to management commitment to and leadership of safety.

Further examples of leading indicators are provided in the US Center for Chemical Process Safety's excellent 2007 book *Guidelines for Risk Based Process Safety*.

The London-based International Association of Oil and Gas Producers (OGP) has been working on leading indicators for many years but with limited consensus. In Australia, the Australian Petroleum Production and Exploration Association (APPEA) is currently doing so

in liaison with OGP. APPEA is trialling three key leading indicators in the second and third quarters of 2008–09. These are: the numbers of safety tours conducted by senior management per 100,000 hours worked; numbers of high potential incidents reported per million hours worked; and the percentage of identified improvement/corrective actions arising out of planned audits closed off within specified timeframes.

Many mature best practice regulators such as Norway's PSA also continue to seek a meaningful suite of leading indicators.

## Lagging indicators

APPEA publishes a set of indicators which measure the performance of the oil and gas industry in Australia. Important lagging indicators are the set agreed by the International Regulators Forum (IRF) that includes NOPSA. NOPSA has in 2009 published its *Offshore Health and Safety Performance Report 2007–08 (with summary data from 2005–06 and 2006–07): Statistics, Trends and Observations of Health and Safety in the Australian Offshore Petroleum Industry*. This is a significant step forward in benchmarking Australian safety.

Norway's Petroleum Safety Authority (PSA) has an annual *Risk Levels in the Petroleum Industry* publication in which quantitative indicators measure developments for 'serious incidents and near-misses', while the PSA applies qualitative methods in a bid to identify possible models that can explain the trends. The PSA uses a biennial questionnaire-based poll among all employees on offshore installations and at land-based plants to provide an additional dimension.

The Panel was also impressed by the UK HSE's Offshore Division work on asset integrity and its November 2007 publication *Key Programme 3, Asset Integrity Programme*. The HSE also publishes very comprehensive annual data. The very detailed annual planning by the Dutch regulator (SODM) which is based on a matrix of risk-based indicators was also commendable.



# Annex 15:

## Use of standards in the Australian safety case regime for offshore petroleum regulation

### **Introduction**

Standards can take a range of forms. For the context of this discussion,<sup>167</sup> a standard is a specific, industry-recognised, published document which sets out specifications and procedures designed to ensure that a material, product or method of service is fit for its purpose and consistently performs in the way it was intended.

Australian Standard® branded Standards are developed by Standards Australia following the organisation's standards developments process involving voluntary participation from relevant industry, government, community and other interested parties via technical committees. Australian Standards are living documents that are regularly reviewed to allow for research, changes and advancements in community expectations, technical, legal and environmental factors.

Australian Standards are voluntary documents offering a mechanism for self-regulation with which compliance is not mandatory unless the Standard is incorporated into law by government or called up in contractual arrangements.

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167 This annex has been prepared with the assistance of Standards Australia.

For the offshore safety case regime in Australia, the MOSOF regulations under the OPGGSA state:

*The safety case for a facility must specify all Australian and international standards that have been applied, or will be applied, in relation to the facility or plant used on or in connection with the facility for the relevant stage or stages in the life of the facility for which the safety case is submitted.*

All standards listed in the safety case then become legal requirements with which the operator must comply.

Where a standard is revised, industry has advised that it considers good practice requires that the operator undertake a risk assessment to determine the impact of any significant changes that result from this revision, and amended its practices accordingly to continue to ensure risk is reduced to ALARP. Further, MOSOF regulations require an operator to revise their safety case in light of a significant change in circumstances which would include standards revisions.<sup>168</sup>

## Standards development

The Federal Government recognises Standards Australia as the nation's peak, non-government Standards body. Standards Australia is therefore the leader in the development of Australian Standards. Standards Australia prepares voluntary, technical and commercial Standards for use in Australia and accredits other Standards Development Organisations via the Accreditation Board for Standards Development Organisations, an independent entity that is part of the Standards Australia group.

Standards are developed in consultation with key stakeholders, including industry, academia and government regulatory agencies, in order to codify industry good practice. Participation of industry in this process is usually on a volunteer basis, with companies bearing the cost of time spent on the process. The benefits of participating in these fora are well recognised by industry as a learning and information-sharing opportunity for the company.

Standards Australia facilitates the development of Australian Standards by working with Government, industry and the community. Australian Standards set specifications and guidelines to ensure the quality, safety, reliability and consistency of products and services. Every effort is made by Committees to achieve consensus and

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168 S34 'Revision of a safety case because of a change of circumstances or operations' *Petroleum (Submerged Lands) (Management of Safety on Offshore Facility) Regulations 1998.*

ensure that interests of all stakeholders are considered during the development of an Australian Standard.

For any given Standard, the decision on whether to adopt an International Standard normally rests with the appropriate standards technical committees. If an International Standard is identified that fully satisfied local requirements, an assessment needs to be made as to the value of having a local adoption rather than allowing the International Standard to be used directly in the marketplace.

Once an Australian Standard has been aligned with its international counterpart, Standards Australia emphasises the importance of ensuring that amendments to, and revisions of, the International standard are mirrored into the local Standard so that international equivalence is maintained. Similarly, the effect on international equivalence needs to be considered before any local amendment to an adopted Standard is made.

## **The role of the regulator with respect to standards**

In the Australian safety case regime, regulators accept and audit the systems and processes within the safety case. Regulators do not verify each specific detail of a safety case nor, by extension, the operator's adherence to specific standards applied within that safety case. Regulators should, however, review the applicability of the standards applied in a safety case to ensure the operator demonstrates good practice. NOPSA has indicated that it addresses the applicability of standards through a validation process defined in the MOSOF regulations.

Depending on its internal policies the regulator may participate in, the development of standards. Standards Australia Committee ME-038, the committee responsible for developing the Australian Standard AS 2885 for gas and liquid petroleum pipelines, includes participants from the Western Australian Department of Mines and Petroleum (DMP), the South Australian Department of Primary Industries and Resources (PIRSA), and Energy Safe Victoria (ESV).<sup>169</sup>

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169 AS 2885.0-2008, *Australian Standard: Pipelines – Gas and liquid petroleum part 0: General requirements*, SAI Global (2008).

## National and international pipeline standards

Of the standards applicable to the upstream petroleum industry, the Inquiry has identified six standards that would be particularly applicable to upstream petroleum pipeline regulation:

International	ISO 13623	Petroleum and natural gas industries – Pipeline transportation systems.
European	BS EN 14161 <sup>170</sup>	Petroleum and natural gas industries. Pipeline transportation systems.
Canadian	CSA-Z662	Oil and gas pipeline systems.
Norwegian	DNV OS F101	Offshore standard – Submarine pipeline systems
Australian	AS 2312	Guide to the protection of structural steel against atmospheric corrosion by use of protective coatings petroleum
Australian	AS 2832	Cathodic protection of metals
Australian	AS 2885	Pipelines – Gas and liquid petroleum

These standards, in particular AS 2885, are further outlined below.

## NOPSA's access to standards

NOPSA has an information system and Information Team that arrange ready access for relevant documentation, including standards for NOPSA inspectors where identified as appropriate or necessary for their tasks.

The Information Team within NOPSA holds subscriptions to several standards publishers, including SAI Global, the publisher of all Australian standards. Of the seven standards listed above, NOPSA's current subscriptions to SAI Global and others includes ongoing online access to AS 2885 only.

NOPSA could access ISO 13623, CSA-Z662, AS 2832.1 and DNV OS F-101 but has not upgraded the relevant subscriptions in order to do so. NOPSA also does not currently have a subscription that would enable access to BS EN 14161. However, it is possible that individual inspectors have access to various standards individually where they are not held centrally within the organisation.

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170 This standard replaced British standard BS 8010 in 2003. The British Standards Institute continues to produce a code of practice BS PD 8010: Code of practice for steel pipelines on land and subsea pipelines.

## **Outlines: national and international standards**

### ***ISO 13623: Petroleum and natural gas industries – Pipeline transportation systems***

This is the international standard for pipeline transportation systems. It specifies requirements and gives recommendations for the design, materials, construction, testing, operation, maintenance and abandonment of pipeline systems used for transportation in the petroleum and natural gas industries.

The standard applies to pipeline systems on land and offshore. It describes the functional requirements of pipeline systems and provides a basis for their safe design, construction, testing, operation, maintenance and abandonment.

A new version of this standard is due for release in 2009. The Inquiry understands that this revision includes an important change to consider pipelines as systems rather than individual pipes.<sup>171</sup> NPSA does not currently have access to this standard.

### ***BS EN 14161: Petroleum and natural gas industries. Pipeline transportation systems***

This European standard replaced British standard BS 8010 in 2003. It specifies requirements and gives recommendations for the design, materials, construction, testing, operation, maintenance and abandonment of pipeline systems used for transportation in the petroleum and natural gas industries.

It applies to pipeline systems on land and offshore, connecting wells, production plants, process plants, refineries and storage facilities, including any section of a pipeline constructed within the boundaries of such facilities for the purpose of its connection.

Although this standard supersedes BS 8010, the British Standards Institute continues to provide guidance to industry through PD 8010: Code of Practice for Steel Pipelines. This Code has three parts:

- PD 8010-1: Steel pipelines on land
- PD 8010-2: Subsea pipelines
- PD 8010-3: Steel pipelines on land.

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171 David Willis, BSI/RSK Group, *Oil & Gas Pipeline Integrity Conference, Amsterdam* 16/02/2009.

*Guide to the application of pipeline risk assessment to proposed developments in the vicinity of major accident hazard pipelines containing flammables. Supplement to PD 8010-1.*

NOPSA does have access to this standard.

### ***CSA-Z662: Oil and gas pipeline systems***

This Canadian standard is designed as the ‘ultimate reference tool’, providing up-to-date requirements on the design, construction operation and maintenance of oil and gas pipeline systems, including those that convey liquid fuels and natural gas products.<sup>172</sup>

NOPSA does not currently have access to this standard.

### ***DNV OS F-101 Offshore standard – Submarine pipeline systems***

This Norwegian standard describes the functional requirements of subsea pipeline systems and provides a basis for their safe design, construction, testing, operation, maintenance and abandonment. A subsea pipeline system is defined as extending to the first weld beyond:

- the first valve, flange or connection above water on platform or floater
- the connection point to the subsea installation
- the first valve, flange, connection or insulation joint at a landfall unless otherwise specified by onshore legislation.

The Standard comprises thirteen sections and six appendices covering design, construction, installation, operation, inspection and repair of subsea pipelines.

It also includes specific sections on corrosion control in design and coating/cathodic protection manufacture and installation as well as integrity management processes as they pertain to corrosion. It does not provide specific requirements for cathodic protection of pipelines at the shore crossing (from the low water to the high water mark). Standards Australia has noted that this is not unusual, as other codes do not have such specific requirements either.

It is worth noting that the superseded 2000 version of this Standard (the Standard was revised in 2007) specifically excluded the shore-crossing area in its section on corrosion protection measures, creating a gap with respect to corrosion protection under the

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172 Canadian Standards Association: <[www.csa.ca](http://www.csa.ca)>, accessed on 19 March 2009.

Standard. The current version of the Standard covers corrosion protection requirements up to the limit of the Standard as defined above.

The Standard also includes reference to several 'Recommended Practices', which are guidance documents developed to sit alongside standards. This includes *DNV-RP-F103: Cathodic Protection of submarine pipelines by galvanic anodes*.

NOPSA does not currently have access to this standard.

### ***AS 2832: Cathodic protection of metals***

Part one of AS 2832 is specific to 'requirements for the cathodic protection of buried or submerged metallic pipes and cables.'

It defines the two types of cathodic protection available as:

- a) Galvanic anode systems, which employ metallic anodes that are consumed to provide the source of direct current for protection of the structure. The driving voltage for the protective current comes from the natural potential difference that exists between the structure and a second metal (the galvanic anode).
- b) Impressed current systems, in which the driving voltage for the protective current between the structure and the anode is supplied by an external direct current power source.

NOPSA does not currently have access to this Standard.

### ***AS 2312: Guide to the protection of structural steel against atmospheric corrosion by use of protective coatings***

This Standard provides information on the modes of corrosion and protective coatings appropriate to a range of atmospheric corrosive environments. It states:

*The Standard covers the protection of structural steel work against interior and exterior atmospheric corrosion and also the protection of items of equipment manufactured from steel which are exposed to exterior atmospheric conditions.*

*The Standard covers, to a limited extent, the protection of steel work which is completely immersed in water or buried in soil, or which is subject to atmospheres severely contaminated with acidic or other chemical vapours such as may be encountered in some chemical manufacturing plants, and also the protection of ships.*

Standards Australia advises that the tables for selection of coatings in this Standard include categories for 'sustained exposure' and 'intermittent splashes' which would be appropriate for a shore-crossing area.

It is not known whether NOPSA has access to this standard.

### ***AS 2885: Pipelines – Gas and liquid petroleum***

This Australian Standard describes requirements for pipelines, including materials, design, construction, installation, inspection, testing, operating, and maintenance. It comprises six parts:

Part 0 (2008): General Requirements

Part 1 (2007): Design and Construction

Part 2 (2007): Welding

Part 3 (2001): Operation and Maintenance

Part 4 (2003): Offshore submarine pipeline systems

Part 5 (2002): Field pressure testing.

NOPSA has an ongoing subscription to all parts of this Standard.

It is worth noting that AS:2885 Part 4 (offshore submarine pipeline systems) defers entirely to a Norwegian standard: *DNV OS-F101: Offshore Standard – Submarine Pipeline Systems*. This requires NOPSA to purchase this separate standard in order to assess compliance with AS 2885.

It should be noted that this Standard is largely written with onshore pipelines in mind, with the exception of Part 4 which is specific to offshore (submarine) pipeline systems.

Further information on these parts is provided below. This information includes comment on:

- differences between the corrosion mitigation sections of the current and the 1987 edition of AS 2885;
- potential deficiencies in risk assessment process in AS 2885; and
- the deferral to DNV OS-F101 in AS 2885.4.
  - *AS 2885:1 – Design and Construction*

This part describes requirements for the design and construction of a pipeline, but also includes:

- a) a description of corrosion mitigation methods; and
- b) an outline of the risk assessment process for managing safety and integrity of a pipeline over its lifetime.

## **A. Corrosion mitigation methods**

Section 8 of AS 2885.1 describes various corrosion mitigation methods for both internal and external corrosion. This part is worthy of note as it has changed in content over time from the 1987 edition of AS 2885.

Both editions of AS 2885 require the operator to test the efficacy of corrosion mitigation measures. AS 2885-1987 differs in that it includes some prescriptive measures stipulating the methodology to be followed and time intervals to be adhered to in this testing. The current edition, on the other hand, does not include prescription, opting instead to refer the operator to risk-based decision making for this testing.

The removal of this prescriptive condition should prompt the operator to reassess its risk assessment regarding corrosion mitigation and, from this assessment determine the ongoing corrosion mitigation testing required for their operations to achieve ALARP. This is both good industry practice and a requirement in Australia under the MOSOF regulations.

## **B. Risk assessment processes**

The risk assessment process outlined in AS 2885.1 is best described through guidance developed by APIA for Standards Australia. This guidance notes that the AS 2885 risk assessment philosophy differs from the conventional risk analysis in which risks are evaluated by aggregating a number of different types of events.

The guidance summarises the AS 2885 procedure as follows:

- Identify threats to the integrity of a pipeline and the consequence of a loss of integrity of a pipeline. Each threat is considered in relation to the location or range of locations relevant to the threat
- Apply the design and operation/maintenance requirements of AS 2885 to reduce (to the level of accepted risk) threats which can be dealt with by design/procedures
- Evaluate the remaining threats for their potential to cause loss of integrity to the pipeline threats which would result in loss of integrity are then identified as hazardous events
- Evaluate each hazardous event by the allocation of a qualitative measure of its frequency and its consequence. Derive a risk ranking from the combined resultant frequency and severity measures
- Implement risk management actions appropriate to the risk ranking of the hazardous event.

While the above procedure seems adequate, it is important to note three key features of AS 2885.1 that could compromise this risk assessment process:

1. In describing potential threats to a pipeline, AS 2885 describes corrosion as a threat that exists 'over the entire length of the pipeline', indicating that a location analysis may not be required, and that the shore crossing area may not need any particular attention in this regard.

The APIA Guidance confirms this by stating: 'Most threats are location-specific. However, some threats, such as corrosion, apply uniformly over extended lengths and are treated as such.'

2. The process to identify hazardous events notes that a threat should be further analysed 'where controls may not prevent failure for a particular threat.' The context of this statement, and detailed information on external corrosion mitigation within AS 2885, mean that an operator may interpret this statement in such a way that a full risk assessment for pipeline integrity at a shore crossing may not occur.
3. Where a location analysis is performed, locations are classified into a primary (high consequence) or secondary (low consequence) class. The class impacts the consequence and threat analysis of the pipeline. The secondary location class includes:
  - Land defined as a common infrastructure corridor (CIC), which includes where several pipelines are located within the same easement.
  - Land that is continuously or occasionally inundated with water (W).

While it is true that these locations pose less of a threat to human life, the threat to integrity of the pipeline is certainly not 'low.'

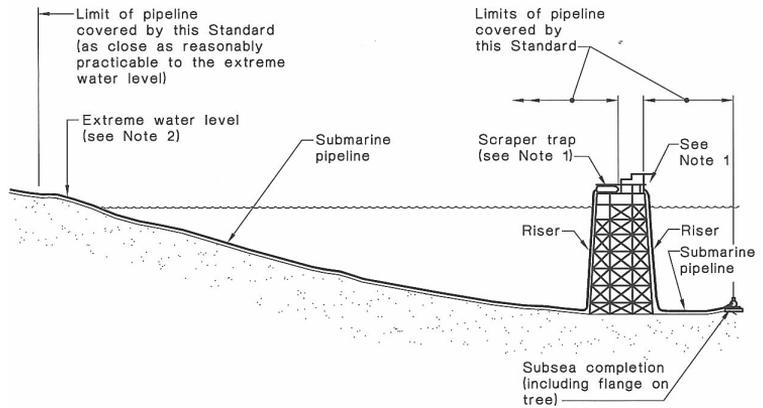
- AS 2885:4 – *Offshore submarine pipeline systems*

AS 2885 Part 4 defines the scope of offshore pipeline systems as per the figure below:<sup>173</sup>

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173 Australian Standard AS 2885:Part 4 – Offshore Submarine Pipeline Systems.

**Figure 13: Offshore pipeline systems' scope as per AS 2885.4**



NOTES:

- 1 Where there is no scraper trap, the Standard's limit shall be the riser and including the emergency shutdown (ESD) value.
- 2 Extreme water level is that water level resulting from the design environmental event being a combination of tide, storm surge and wave run-up.

FIGURE 1.1 APPLICATION LIMITS—SUBSEA COMPLETION TO PLATFORM AND PLATFORM TO SHORE  
(The arrangement shown is typical only)

The Standard then specifies that:

*All requirements for offshore submarine pipeline systems with respect to safety, design, materials, fabrication, installation, testing, commissioning, operation, maintenance, requalification and abandonment shall be in accordance with the latest edition of DNV OS-F101. The requirements of AS 2885.1, AS 2885.2, AS 2885.3 and AS 2885.5 are not applicable.*

AS 2885.4 also specifies that:

*Should DNV OS-F101 be silent with regard to any aspect of the scope then, subject to Clause 6, guidance shall be sought in the first instance from other relevant Australian Standards.*

This clause was especially relevant to the superseded (2000) version of DNV OS-F101 as that standard excluded 'onshore sections at any landfall of pipelines.' The exclusion prompted the re-application of AS 2885 (Parts 1, 2, 3 and 5) for corrosion protection measures for the shore crossing area. However, as these parts of AS 2885 were not written with the shore crossing area (below the extreme high water mark) in mind, the corrosion protection measures mentioned in the Standard may not have been ideal for this area, presenting a gap in its coverage.

The revised 2007 version of DNV-OS-F101 has been expanded to include corrosion protection measures across the entire scope of the Standard, including the shore crossing area of the pipeline route.



# Annex 16:

## Buncefield Inquiry in the UK, and Seveso I and II in Europe

### **Buncefield**

On 11 December 2005 a petrol storage tank was overfilled at a large fuel tank farm in Hemel Hempstead in England and the uncontained vapour cloud ignited causing a massive explosion. Subsequent fires destroyed 23 tanks in the farm, which was a major source of jet fuel for Heathrow airport. Economic losses as a result totalled about GBP 1 billion.

The major incident was investigated on behalf of the regulator and 'competent authority' (the UK Health and Safety Executive or HSE) by a six member board headed by Lord Newton of Braintree and included a secretariat drawn from the HSE and a number of external experts. The three-year inquiry involved 83,000 staff hours and cost GBP 15 million, leading to a final report in late 2008. Interim reports and recommendations were released throughout the inquiry and focussed on technical safety issues for tank farms and particularly in the context of location of highly hazardous facilities near high density urban areas.

The investigation was undertaken through the regulator and explicitly did not seek to assess any regulatory failure that may have contributed to the incident. The final report states that:

*The major constraint on such openness has been the need to avoid prejudice to the criminal investigation or any person who may be affected thereby. We have published information on what happened and how but have been cautiously circumspect in suggesting why the incident occurred.*

The final report argues that:

*It is rightly the task of those conducting the criminal investigation to establish whether any acts or omissions of HSE and/or the Environmental Agency had any bearing on the Buncefield incident. The Board has not sought to make any determination of its own in this regard.*

In contrast with major NTSB, TSB, CSB and ATSB systemic investigations, not seeking to establish 'why' is a very serious omission – the lack of detailed organisational analysis of the safety culture of companies that were involved in the incident and of any role by the regulator, has led to a report that is much less comprehensive and valuable for future safety than it could have been. The omission is all the more glaring given that the final Buncefield report extensively cites reports on the 2005 Texas City refinery explosion that do include much broader organisational analysis.

The problems with Buncefield truncating its investigation because of the HSE regulatory and blame focus furthers the case for such an investigation to be managed by an appropriately resourced and legislatively empowered no-blame safety investigator.

The Buncefield Inquiry reports are certainly not without merit, and the discussion of high reliability organisations (HROs) and requirements for a stronger safety culture generally and for more focus on integrity, in particular, are among their many strengths. But in future safety terms there was clearly an opportunity lost.

## **Seveso I and II in Europe**

A chemical plant accident on 10 July 1976 on the outskirts of a small town 20 km north of Milan led to a dioxin cloud over a densely populated area about 6 km long and 1km wide that included the municipality of Seveso with up to 2,000 people treated for dioxin poisoning. It prompted the adoption of legislation aimed at the prevention and control of such accidents and the 1982 EU Directive 82/501/EEC known as the Seveso Directive.

On 9 December 1996 this was replaced by the so called Seveso II EU Council Directive 96/82/EC which includes general and specific obligations, the need for information to and consultation with the public, safety management systems, incident reporting, inspections, land use planning, and emergency plans – many of the areas dealt with in the recent Buncefield reports. Seveso II excludes the transportation of dangerous substances by pipeline. The Seveso II Directive has in turn been extended by Directive 2003/105/EC which among other matters picks up new research on both carcinogens and impacts on the environment. The Seveso Directives have

included increasing levels of prescription. This is contrast to the Safety Case objective-based or goal setting approach adopted since the Cullen Inquiry into Piper Alpha which is more in keeping with the 1972 Robens approach to OHS in the UK and Australia. Buncefield seems to be moving the UK towards more prescription for high hazard facilities in populated areas in common with much of the rest of Europe.

*The F-Seveso: study of the effectiveness of the Seveso II Directive Final Report* was completed on 29 August 2008. It utilised survey and interview data from targeted high hazard industry sectors in 8 EU member states as well as independent analysis.

The report found that all targeted groups thought that the implementation of the requirements of the Seveso II Directive has led to a recognizably higher level of safety in comparison with non Seveso establishments. Respondents agreed that the approach of the Seveso II Directive is well-suited to prevent major accidents and mitigate their consequences and that the requirements are adequate to meet these aims, and valuably complement the other directives dealing with safety related issues, like Occupational Health and Safety and Integrated Pollution and Prevention Control (IPPC) Directives.

The 'two tier approach, implementing the proportionality principle', was recognised as appropriate. However, the great majority of the respondents indicated that the implementation of the Seveso II Directive was not uniform within Europe and even in a given country. This was seen to represent a problem, especially for multi-national companies operating in several Member States because most of them have internal safety standards or approach.

A report recommendation is to extend

*the obligation for lower tier establishments to prepare a Safety Report (or at least an identification of major accident scenarios) and the provision of a Safety Management System.*



# Annex 17:

## Relevant regulation and safety cases: US, UK, Netherlands, Norway

In order to inform our consideration of the Australian Safety Case (SC) regime, we explored the regulatory regime for safety and integrity management in the US, the UK, the Netherlands and Norway. Characteristics of the regimes and lessons applicable to the Australian regime are as follows.

### **United States**

The Minerals Management Service (MMS) in the US Department of the Interior has regulatory responsibility for offshore oil and petroleum resources on the US outer continental shelf. They regulate all aspects of offshore resources including acreage release, resource management, environmental management, and integrity and safety management. The regulatory environment is primarily prescriptive, but an element of the management plans/safety case philosophy has, of necessity, been adopted to overcome the fast-moving nature of technology in the industry.

MMS has five inspection teams in the Gulf of Mexico and several others working across other regions. Each team consists of a manager, a drilling engineer, a production engineer, a workover engineer, an environmental regulator and a supervisory inspector. Overall, the organisation has around 50 offshore inspectors with two-three participating in each audit. Regulation requires audits to be carried out once per year per facility, however, the MMS is now transitioning to a more risk-based, rather than calendar-based, approach to auditing. MMS has designed a risk matrix based on the output of the facility, whether the facility is manned, and whether the operator is considered a 'poor performer'. This approach is freeing up time to increase accident investigations, conduct more

unannounced inspections and to perform 'blitz' inspections where the inspection team visits as many facilities as possible to inspect identified problem areas such as cranes. In addition, the MMS runs a performance review for each operator every year, investigating the operator's history of compliance, action on any issue raised following audits, accidents and incidents, and the safety and environmental management program as it relates to accidents and non-compliance concerns.

The MMS has a range of penalties available as enforcement tools. Inspectors in the field can order a 24 hour or 7 day warning to correct an issue, a component shut in, or a facility shut in. The MMS can issue penalties of up to \$35,000/day/violation for civil offences such as bypassing safety systems. At the extreme end of the scale, the MMS can pursue a criminal case with potentially very high penalties, such as a US\$50m fine for flaring gas and falsifying records related to flaring, or can place the operator on probation at which point the company is not permitted to operate any facility. The MMS publishes financial penalties for safety breaches on its website and includes details about the incident.

## **United Kingdom**

The Offshore Division of The Health and Safety Executive (HSE) is responsible for regulating safety of offshore facilities in the UK, while pipelines are regulated by the Onshore Division. This is undertaken through a safety case methodology developed following Lord Cullen's report on Piper Alpha. The regulatory approach has developed over time and now has a lower reliance on QRA than Cullen originally envisaged because it is difficult to quantify some qualitative risks. The organisation is now also moving away from just using ALARP and towards more legally definable and defensible requirements. The Division's focus is on major accident events (MAEs) as their experience suggests that companies with MAE risks under control generally have personnel safety covered as well.

The HSE aims, where resources allow, to carry out two structured visits to each facility each year noting that, if resources are restricted, larger facilities with more people are considered higher priority, as are poor performing companies and higher risk installations. Each audit team has a range of facilities for which it is responsible, both for auditing and for assessing the risk posed by the facilities. The Division has a range of technical specialists available, as well as operations and human and organisational factors specialists, reflecting their focus on management systems and culture.

The basic philosophy of the Offshore Division is one of enforcing good industry practice through a safety case methodology, and then using an educational, cooperative process with the companies to achieve incremental improvements in the 'good practice' benchmark. The Division has found big variations within and between companies, corporate memory loss, 'short termism' in management, lack of understanding of systems, huge problems with maintenance backlogs, and fundamental issues. Educating senior management and boards is an important response, as are more meaningful Key Performance Indicators. Ageing infrastructure and asset integrity is another key theme.

## **The Netherlands**

Safety of offshore facilities in Dutch waters is managed by the State Supervision of Mines (SODM), an independent agency which reports to four Ministers, though with a primary reporting line to the Minister of Economic Affairs. SODM has delegated authority to monitor health and safety, incidents, environment and integrity and describes itself as the 'eyes and ears' of other agencies with marginal non-delegated authority for issues such as helicopters.

The Dutch Government exercises a high level of control over offshore development, partially through its 100 per cent state owned oil and gas company, EBN, which is a 40–50 per cent active partner in all offshore developments, and partly through its small fields policy which restricts extraction from the massive Groningen field in favour of maximising extraction from the available smaller fields which, between them, are equivalent to approximately one third of the Groningen resource.

Management of safety on offshore facilities is through a company Safety Management System, with a safety case then required for each facility. In order to avoid accepting any responsibility for safety on facilities, SODM does not accept or reject SMSs or SCs, but simply asks questions/requires additional information until satisfied that no further questions need to be raised. Under this approach, the company retains full 'ownership' of the SC. While SODM expects companies to collect data relevant to management of integrity and safety on the facility (eg through testing, monitoring etc), and to be able to produce it if required, the regulator is far less interested in the data itself than in the company's response to that data.

SODM audits facilities on the basis of the SC, the company's own annual monitoring plan, and on those risks which SODM has decided will form the focus of its audits for the year. We were very impressed with the logical and thorough matrix used to underpin SODM's prioritisation.

## Norway

Norway manages the safety of onshore and offshore facilities through the Petroleum Safety Authority (PSA). The PSA is an independent regulatory authority which, through a broad definition of 'safety', ensures the adequate protection of human life and health, environment, facility integrity, assets and security of supply. The PSA has whole-of-chain responsibility to regulate safety across the whole spectrum of activities from drilling operations through to the refinery. In 2004 the PSA split from the Norwegian Petroleum Directorate (NPD), creating a clear delineation between 'safety' and industry development/resource management. The PSA works cooperatively with the NPD and other agencies but has the authority to override other considerations and halt development or production if it feels that safety has been compromised.

The Norwegian regulation uses a 'consents' system to regulate safety, whereby the PSA and an operator engage in extensive discussions prior to the operator seeking, and the PSA granting, a consent to operate. This consent to operate, which is the overarching safety management document, includes the operator's current safety management system and a number of binding commitments specific to that facility. Within this system, there are minimum standards which the company must meet in order to gain consent; however, any commitments over and above the minimum become legal requirements for that operation. The PSA can seek further information prior to granting a consent, but restricts itself to the minimum information required to accurately assess the adequacy of the operators systems, based on the risk presented by the individual operator and the facility itself.

This approach continues through the auditing process during which the PSA is more interested in measuring the effectiveness of the safety management system than in the nuts and bolts of the operation – although it should be noted that the PSA has the authority to inspect every nut and bolt if it deems it necessary. Primarily, audits centre on an annual supervisory plan and are systems oriented/risk based rather than calendar based. This supervisory plan is an ambitious program which responds to a range of current factors including industry risk trends (in Norway and worldwide), PSA experience and the current focus of the Ministry. Overall, the PSA would expect to audit each facility once each year, but the frequency, focus and nature of the audit responds to the risk posed by that particular facility/operator.

The PSA has a 'step' approach to enforcement ranging from dialogue as the first step to removal of an operator's permission to operate in Norway, although this last step has never been used. The majority of issues are resolved through dialogue, perhaps due to the fact that

orders (and the notification of an order which occurs 14 days prior to an order being issued) are published on the PSA website from which they are rapidly picked up by the media. The PSA has the option of a coercive fine, which they do not currently use as it implies a company can 'pay their way out of an issue' rather than deal with it. At the upper end of the 'steps', they can stop activity to maintain safety and they can prosecute, although this is a rare occurrence. Both the PSA and the companies prefer to manage issues through dialogue rather than resort to the other, more public, enforcement options.



# Annex 18:

## Developments in, and lessons from, Victoria's safety case law and practice

### **Purpose of this annex**

In this annex, we consider how the development of law and practice in Victoria in relation to safety cases for major hazard facilities may guide improvements in respect of safety cases in the offshore and WA petroleum and gas industries. We have undertaken this examination because the Victorian system is well developed and has been the subject of a number of useful reviews and studies. We also briefly consider some reviews and research that were prepared in other contexts but which support the approach taken in Victoria.

### **Background**

Victoria has, by regulation, provided a safety case regime for major hazard facilities (MHFs) since 2000.<sup>174</sup> The background to the adoption of this form of 'permissioning' scheme is discussed in the 2004 Review of the *Victorian Occupational Health and Safety Act*<sup>175</sup> and need not be further considered here.

An MHF is defined in the Victorian regulations<sup>176</sup> as a facility. Under the definition, a facility is any building or other structure on land that

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174 The Occupational Health and Safety (Major Hazard Facilities) Regulations took effect in June 2000. The requirements relating to MHFs and safety cases are now part 5.2 of Chapter 5, Hazardous Industries, of the *Occupational Health and Safety Regulations 2007*. Further requirements are at Schedules 9 – 12 of the Regulations.

175 Maxwell, C, *Occupational Health and Safety Act Review*, State of Victoria, 2004, pp145, 146.

176 Reg.1.1.5.

is a workplace at which prescribed materials<sup>177</sup> are present or likely to be present and:

- at which the quantity of such prescribed materials exceeds a specified level; or
- which the regulator has determined to be an MHF because a smaller amount of the prescribed materials is present, or is likely to be present, at the facility and the regulator considers that there is a potential for a major incident<sup>178</sup> to occur.

Under the regulations, a person cannot operate an MHF unless an MHF licence has been granted or the MHF has been registered.<sup>179</sup> Provision is made for licence fees.<sup>180</sup> An application for a licence must be accompanied by a copy of a safety case that conforms to the regulations, and by certain other information.<sup>181</sup> The safety case must contain specified information<sup>182</sup>, including a summary of the Safety Management System (i.e., a documented comprehensive and integrated management system for all aspects of risk control measures adopted in relation to the MHF for the purposes of Part 5.2 of the Regulations).<sup>183</sup>

Forty-one MHFs were registered by Victorian WorkSafe as at October 2008.<sup>184</sup>

## Reviews of the Victorian approach to safety cases

The Victorian Safety Case regime was evaluated in three studies published in 2004. Two were undertaken by WorkSafe and the third by an independent market research organisation. Haines and Phung (2009) recently undertook an independent examination of the regime. Details are given in the 'key to references' below.

WorkSafe has conducted a further evaluation of safety case submissions. This was undertaken in the context of the second round of reviewed and revised safety cases submitted as required

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177 Such materials are prescribed in Schedule 9. A reference to the quantity that is 'likely to be present' at the facility is defined by reg.5.2.3.

178 Under reg 1.1.5, a *major incident* is an 'uncontrolled incident' that involves the prescribed materials and which '... poses a serious and immediate risk to health and safety'.

179 Reg.5.2.34 and Part 6.

180 Reg. 6.1.23.

181 Regs 6.1.1 and 6.1.20

182 Reg.5.2.15

183 Reg.5.2.5

184 A list is available at <[www.workcover.vic.gov.au](http://www.workcover.vic.gov.au)>

by the 2007 regulations. We understand the results to be positive, showing improvements in terms of lower risk, better documentation, lower safety case costs and more positive responses from licence holders about their relationship with WorkSafe and its performance. As the evaluation is not publicly available, we do not use it for the purposes of our discussion of the Victorian experience, except to note that there appears to have been a process of ongoing improvements underpinned by the 2007 regulations and by a commitment to continuous improvement by WorkSafe and the Major Hazards Advisory Committee. That committee is established with members from industry and unions to provide independent advice to the Victorian WorkCover Authority.<sup>185</sup>

Key publicly available results are summarised in the following table. This is not a full exposition of the findings and recommendations. For a full understanding of the context, scope, content and methodology of each review, interested persons should refer to the original material.

For the table below, the key to references is:

- A. WorkSafe Victoria, *Review Report on Safety Case Assessment 2002 to 2003, 2004*
- B. WorkSafe Victoria, *Oversight and Safety Case Feedback Survey Report, 2004*
- C. Sweeney Research, *Evaluation of Major Hazards Implementation, 2003*
- D. Haines, F and Phung, C. P., *Thoughts, Feelings Action: Survey of Victorian Managers of Major Hazard Facilities*, National Research Centre for OHS Regulation, 2009.

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185 Maxwell (2004) commented on the role and work of the Major Hazards Advisory Committee, which was limited to reviewing the formulation and implementation of the major hazards regulatory framework. Maxwell (Report, p. 66, para 240) noted that the committee's role in OHS regulation was well defined by virtue of that limited focus and did not propose any change.

**Relevant findings in recent evaluations of Victorian safety case regulation**

Issue	Reference	Summary of finding
Structure and content of safety case	A.	The Safety Case should contain only necessary and relevant information. The information should be set out within a carefully considered structure, which makes evident the operator's basis for the required demonstrations of the safety case's adequacy and the linkages between the compliance activities.
Content and operation of a Safety Management System	A.	<p>Many operators are likely to need to undertake significant additions or modifications to management systems in order to achieve compliance with MHF regulations. Even those operators that have mature major hazards management systems prior to undertaking a safety case may need to make modifications to comply with the regulations. WorkSafe's advice was to commence such work as early in the process as feasible.</p> <p>There are likely to be efficiency benefits from integrating systems for management of major hazards and processes for management of general OHS hazards. The overall management systems should reflect the resourcing and capacity at the local level to apply them.</p> <p>There must be effective systems for auditing, monitoring and review, to ensure that the systems comply with the requirements and are being implemented in practice.</p>
Tripartite involvement	A.	MHF regulators should consider the ongoing role of consultation with key stakeholders post introduction of their regulations. Special consideration should be given to the seniority of membership and the breadth of representative organisations and expertise.

Education, advice and guidance	A.	<p>Regulators should ensure that their education, guidance and oversight activities address the full range of the operators' regulatory duties, and avoid overemphasis on any one duty.</p> <p>Where MHF Regulators wish to intensively oversight the operators' Safety Case development, they should put in place processes to ensure that consistent advice is given, so far as is practicable.</p> <p>Regulators should use the findings of Safety Case assessment to update the information and guidance that is provided to industry. In addition, Regulators should work with and encourage industry groups to contribute to the dissemination of examples of good Safety Case practice relevant to their members.</p>
Assessment and verification	A.	Regulators should implement processes for desk-top assessment and on-site verification. If their regulatory regime includes a licence, then verification should precede the licence decision.
Licensing	A.	Where the regime includes a licence, a 'panel' approach (to discuss issues before the delegate makes a licensing decision) is helpful.
Problems identified by operators	B, C.	Lack of information about what the regulator required. Guidance notes were not available in a timely way and should be in clear and simple language. Guidance notes should be prepared in consultation with stakeholders. Advice from regulator's field staff was sometimes inconsistent, too legalistic and not provided early enough. Responsiveness was sometimes lacking.
What makes a successful safety case regime	D.	Effective regulation combined with adequately resourced, skilled and problem focused regulator.

## Other relevant research findings

We have also considered some other research relating to safety cases that is relevant to safety case regimes and, in particular, research that is relevant to the findings of the Victorian-related reviews that are discussed above. In general, the outcomes of that research are consistent with or otherwise support the conclusions in the Victorian-related reviews.

The HSE commissioned a literature review in 2003 to collate and assess published views on UK safety case regimes.<sup>186</sup> Key findings in the published material that was examined in the review include the following:

- a) while safety case regimes are seen as having an initial positive effect, they may have less impact over time unless treated as dynamic ('live');
- b) the management approach of the enterprise concerned is an important determinant of whether the overall safety culture and communications improve;
- c) for a safety case to have a positive cost/benefit ratio, it is important that it be a 'live' working document and not an end in itself.

The literature review was complemented by a number of interviews with persons with experience of safety case regimes. Some respondents criticised the workload inherent in preparing safety cases and questioned the value that was added by such regimes.

The review of the literature led to a number of recommendations, which are consistent with the research and studies referred to above. In particular, the review underscored the need to consider how to integrate safety management into business processes and decision-making more effectively. In addition, a positive and proactive relationship between the regulator and the regulated was a crucial factor in the effectiveness of a safety case regime. Action should also be taken '... to ensure costs are driven down and that the impact of the safety case remains high'.<sup>187</sup>

Hopkins and Wilkinson (2005), discussing the possibility of safety cases in the mining industry,<sup>188</sup> reflected on the role of inspectors. They noted that regulatory staff must have credibility with senior company staff if changes that have been identified as necessary

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186 Vectra Group Ltd, *Literature Review on the Perceived Benefits and Disadvantages of UK Safety Case Regimes*, 2003.

187 *Ibid*, p5.

188 Hopkins, A and Wilkinson, P, *Safety Case Regulation for the Mining Industry*, National Research Centre for OHS Regulation, Working Paper 37, 2005.

are to be both accepted and made. In their view, knowledge is a key aspect of such credibility and accordingly at least some of the regulatory staff must have first-hand experience of the industry to be regulated.<sup>189</sup>

Gunningham (2007), in considering the suitability of a safety case regime in the mining industry, pointed to four issues to be addressed for such an approach to be viable for 'a wider group of enterprises than just OHS leaders'.<sup>190</sup> These were:

- a) a regulator must provide incentives to induce an enterprise to take its safety case obligations seriously (e.g., effective enforcement, positive and negative financial incentives, public access to compliance information, and requiring the CEO of the enterprise to sign off key regulatory requirements);
- b) institutionalising commitment to the safety case in the enterprise concerned by making the policy in the safety case integral to corporate objectives, standard operating procedures, individual responsibilities and reward systems;
- c) ensuring that there was genuine worker participation in the safety case regime; and
- d) having a skilled and effective regulator.

In the Regulatory Impact Statement prepared for WorkSafe Victoria for public comment on the then proposed *Occupational Health and Safety Regulations 2007* (Vic), Allen Consulting referred to various items of evidence supporting safety cases, including an estimate of the reduction of thirty to fifty per cent in risks associated with incidents and improvements in the control of major hazards under the then applicable regulations.<sup>191</sup>

## **Relevance for law and practice in the offshore and WA petroleum and gas industries**

We consider that key lessons include the following:

- a) the legislation should be clear and useful to those with responsibilities under it;
- b) the legislation should also facilitate a process of ongoing safety improvement and entrench the continuous pursuit by

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189 Ibid, pp8,9.

190 Gunningham, N, *Mine Safety, Law Regulation Policy*, Federation Press, 2007, pp76-78

191 Allen Consulting, *Regulatory Impact Statement for the Occupational Health and Safety Regulations 2007* (Vic), 'The Case for Regulatory Control', p120.

- the obligation holders and other stakeholders of the safety objectives reflected in the relevant safety cases;
- c) there should be effective and ongoing interaction between the regulator and the principal stakeholders (operators, industry associations and unions), including, for example, by the involvement of an expert advisory committee drawn from those stakeholders;
  - d) there should be periodic external examinations of the effectiveness of the regulator's performance and the effectiveness of the safety case regime;
  - e) inspectors (however described) should have recognised skills and be actively supported in their professional development;
  - f) the regulator should provide guidance to applicants for licences and licence holders, with periodic consideration of the views of stakeholders on the effectiveness of the guidance;
  - g) the regulator should be vigilant about ensuring that advice and guidance, however provided, are relevant, timely, clear and consistent;
  - h) such guidance should be developed through consultation with the stakeholders;
  - i) the workforce must be actively supported in understanding the safety case structure and use and effectively represented in its development the regulator must not only be prepared to take enforcement action where that is warranted, but the legal consequences of non-compliance must be meaningful;
  - j) KPIs should include leading indicators and allow valid comparison within and across industries.

We note that the findings and recommendations of the 2008 Review of the NOPSAs operational activities are generally consistent with these lessons.<sup>192</sup>

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192 In particular, that review recommended, among other things, that (a) the regulations be made clear; (b) clearer guidelines should be prepared in consultation with stakeholders; (c) there should be a tripartite reference group that would, among other things, agree on improvement actions, have oversight of performance and disseminate information to stakeholders; (d) suitable accredited education modules should be established for employees; (e) there should be better KPIs that are related to the industry's risk profile and that are comparable with the industry's performance in other part of the world and with that of other industries.

# Annex 19:

## Biographies of panel and inquiry members

### **Expert Panel**

#### *Mr David Agostini*

David Agostini is a consultant in the Oil and Gas sector having worked in the industry since 1957. He worked for Texaco as a petroleum engineer and production specialist, and later joined Woodside in a similar capacity. He subsequently managed drilling operations and offshore production. On secondment to Shell in the Hague he worked as deputy strategy manager for downstream oil and gas. Mr Agostini managed Woodside's LNG business, and was involved in marketing gas into Asia.

Mr Agostini is currently a non executive director of Neptune Marine, Chairman of the Western Australian Energy Research Alliance, and Chairman of the Australian Resources Research Centre (ARRC) advisory group. He chaired the state government Electricity Industry Reference Group (EIRG) and was a member of the COAG Energy Markets Review Panel. He holds engineering qualifications from the North Carolina State University, and is an Adjunct Professor in Oil & Gas Engineering at the University of Western Australia.

#### *Mr Kym Bills*

Kym Bills is Executive Director of the Australian Transport Safety Bureau, and has held that position since 1 July 1999 when the ATSB was established.

Mr Bills was head of the Commonwealth Maritime Division from 1994 when he was on the Board of ANL Limited and the Australian Maritime Safety Authority and chaired the Commonwealth/State Marine and Ports Group. In 2005 he worked with the Rt Hon Sir John Wheeler reviewing Australia's airport security and policing.

Mr Bills's initial degrees were a B.A (Hons I) from the University of Adelaide and a M.Sc from the University of Oxford. He holds professional fellowships with the Chartered Institute of Logistics and Transport, the Safety Institute of Australia, the Australian Institute of Management, and the Australian Institute of Company Directors.

## **Main report research team Consultants**

### ***Mr Bruce Gemmell***

Bruce Gemmell is working as an independent consultant having retired in 2007 after 34 years in the Commonwealth public sector. Prior to retirement Mr Gemmell was Deputy Chief Executive Officer and Chief Operating Officer in the Civil Aviation Safety Authority (CASA) for six years from 2001 and had a lead role in overseeing and regulating Australia's aviation safety activities.

Prior to joining CASA Mr Gemmell worked in senior policy roles in aviation, rail, road transport, urban development and housing in a variety of Commonwealth government departments and was a Commissioner of Australian National Railways. Mr Gemmell was an inaugural member of the (then) Civil Aviation Authority and worked in the finance, air traffic services and project management areas of the Authority until 1991. He previously worked for about three years in the Department of Aviation and 11 years in the Department of Finance and the Treasury.

Mr Gemmell holds a degree in Economics from the University of Sydney and is a Fellow of the Australian Institute of Company Directors.

### ***Professor Andrew Hopkins***

Professor Andrew Hopkins is Professor of Sociology at the Australian National University in Canberra. His research focuses on the organisational and cultural causes of major accidents. Professor Hopkins has been involved in various government OHS reviews and has done consultancy work for major companies in the resources sector. He speaks regularly to audiences around the world about the causes of major accidents.

Professor Hopkins was an expert witness at the Royal Commission into the causes of the fire at Esso's gas plant at Longford in Victoria in 1998. In 2001 he was the expert member of the Board of Inquiry into the exposure of Air Force maintenance workers to toxic chemicals.

Professor Hopkins was a consultant to the US Chemical Safety Board in their investigation of the Texas City accident. His book on that accident, *Failure to Learn: the BP Texas City Refinery Disaster*, was published in October 2008.

Professor Hopkins has a BSc and a MA from the Australian National University, a PhD from the University of Connecticut and is a Fellow of the Safety Institute of Australia. He is the winner of the 2008 European Process Safety Centre safety award.

### ***Mr David Lesslie***

David Lesslie is a Consultant specialising in providing advisory services in upstream oil and gas and Health, Safety and Environment (HSE) management. He is an experienced oil and gas executive with more than twenty-five years professional background in corporate, managerial, technical and consulting roles. He has held various positions with Woodside Energy Ltd from 1981–2006. He has significant experience in upstream oil and gas developments, including LNG, and has worked as an operational manager of two offshore facilities in Australia.

Mr Lesslie has a Master of Engineering Science and a Bachelor of Mechanical Engineering (Honours) from the University of Melbourne.

### ***Mr Robin Stewart-Crompton***

Robin Stewart-Crompton has been a consultant on OHS and industrial relations policies, law and practice since 2005. He recently chaired the National Review into Model OHS Laws.

Mr Stewart-Crompton was a Commonwealth public servant from 1975 to 2005, holding a position of Deputy Secretary of the Department of Employment and Workplace Relations from 1995 to 2000. He was member of the National OHS Commission from 1996 to 2004 and the Commission's CEO from 2000 to 2004. He has represented Australia at numerous international meetings and conferences.

Mr Stewart-Crompton's tertiary qualifications are an LL.B (Adelaide), a Graduate Diploma in International Law (ANU) and an LL.M (ANU). He was admitted as a legal practitioner in South Australia in 1972.

## Public Servants

### *Ms Dianne Bravo*

Dianne Bravo is a research officer for the Inquiry Secretariat. She is on secondment from the Department of Resources, Energy and Tourism, Energy and Environment Division. Most recently, Ms Bravo has been involved in technology policy issues for renewable and clean energy including assisting with the development of a geothermal framework and roadmap and development of an international partnership. She has also managed the division's Senate Estimates hearing process for a range of energy matters including offshore petroleum issues on Varanus Island. Ms Bravo holds a BB (International Business & Economics) and an advanced certificate in accounting.

### *Ms Joanna Bunting*

Joanna Bunting is Assistant Manager to the Inquiry Secretariat, on secondment from the Energy Security Branch of the Commonwealth Department of Resources, Energy and Tourism. In the Energy Security Branch, Ms Bunting specialises in domestic energy security issues such as security of supply and critical infrastructure protection. Her role includes significant liaison with the upstream and downstream energy industries through various Government-Industry fora including the Energy Infrastructure Assurance Advisory Group and the International Electricity Infrastructure Assurance Forum. Ms Bunting has a BSc and BA (Hons) from the University of Melbourne (2005) and a Diploma of International Relations from l'Institut d'Etudes Politiques (Sciences-Po) in Paris (2004).

### *Mr Vince D'Angelo*

Mr D'Angelo headed the Western Australian Secretariat. He is within the Department of Mines and Petroleum (DMP), Royalties Division as the Manager for Systems and Analysis. In this role he has extensive experience in analysing complex issues, handling negotiations and liaison at a high level between the mining industry and government. His past roles within DMP also include policy formulation, problem solving and establishing effective management systems and tools within an IT environment. Mr D'Angelo has a Bachelor of Business degree and has attained the level of Certified Public Accountant within the Australian Society of Accountants since 1995. He has recently completed an Advanced Management Program.

### ***Ms Juliet Lautenbach***

Juliet Lautenbach headed the Commonwealth Secretariat on secondment from the Department of Resources Energy and Tourism, Resources Division. Ms Lautenbach has worked in industry and defence policy over a period of 13 years in the Commonwealth Public Service. During three years in the Resources Division, she has worked on offshore regulation, including a major project to consolidate regulations under the PSLA, and onshore minerals industry development. Ms Lautenbach has a BA (Hons) and a Master of Management (Industry Strategy) from the ANU.

### **Inquiry Secretariat**

Secretariat support to the Inquiry was provided by the Commonwealth and Western Australian governments.

The Secretariat comprised:

- Juliet Lautenbach – headed the Commonwealth Secretariat on secondment from the Department of Resources Energy and Tourism, Resources Division.
- Vince D’Angelo – headed the Western Australian Secretariat on secondment is from the Department of Mines and Petroleum, Royalties Division.
- Joanna Bunting – is an assistant manager on secondment from the Department of Resources Energy and Tourism, Energy and Environment Division.
- Dianne Bravo – is a research officer seconded from the Department of Resources, Energy and Tourism, Energy and Environment Division.
- Lee Furner – was Executive Assistant to the Inquiry and provided administrative support.
- David Hope – from the Australian Safety Transport Bureau provided desktop publishing services.



# Annex 20:

## Submissions, visits and meetings held

The wider Inquiry requested and sought submissions. Those listed below are of particular relevance to this report.

### **Submissions**

- 1 International Association of Drilling Contractors (IADC)
- 2 Chevron Australia Pty Ltd
- 5 Peter Clark & Associates (Aust) Pty Ltd
- 6 Woodside Energy Ltd
- 9 INPEX BROWSE, Ltd
- 15 Australian Petroleum Production & Exploration Association Limited (APPEA)
- 17 National Offshore Petroleum Safety Authority (NOPSA)
- 21 Department of Primary Industries, Victoria
- 25 National Offshore Petroleum Safety Authority Board

### **Scheduled meetings**

The Review Team met with the following at least once, with multiple meetings with key regulators and stakeholders:

### **Ministers**

#### ***Commonwealth***

- Minister for Resources & Energy, Minister for Tourism  
The Hon Martin Ferguson AM MP and senior staff

#### ***State/Territory***

- WA Minister for Mines & Petroleum, The Hon Norman Moore  
MLC and senior staff

## **Government bodies**

### ***State***

- WA Department of Mines and Petroleum, Director Petroleum & Environment Mr Bill Tinapple and Ms Beverley Bower
- WA Department of Mines and Petroleum, Business Division, Petroleum Branch, Principal Legislation & Policy Officer Mr Colin Harvey
- WA Department of Mines and Petroleum, Deputy Director-General, Strategic Policy Mr Stedman Ellis
- Primary Industries & Resources SA, Chief Engineer, Petroleum and Geothermal Group Mr Michael Malavazos and colleagues
- Victorian Department of Primary Industries, Manager, Petroleum & Geothermal Operations Mr Terry McKinley and former Director Mr Phil Roberts
- Energy Safe Victoria, Director of Energy Safety, CEO Mr Ken Gardner and Mr Mike Ebdon
- Worksafe Victoria, Director, Hazard Management Division Mr Trevor Martin, Rod Gunn, Geoff Cooke, Mike Connell and Sean Byrne.

### ***Commonwealth***

- National Offshore Petroleum Safety Authority, CEO Mr John Clegg and Perth headquarters staff
- National Offshore Petroleum Safety Authority, Victorian team leader, Wayne Vernon
- National Offshore Petroleum Safety Authority Board of Directors
- Chairman, National Offshore Petroleum Safety Authority Board Mr William F Bloking
- National Offshore Petroleum Safety Authority Board Member Mr Rob King
- National Offshore Petroleum Safety Authority, Ex NOPSA Advisory Board Member (2004-2008) Mr Barry Adams
- Department of Resources, Energy & Tourism, A/g Head of Resources Division Mr Bob Pegler, A/g General Manager Offshore Resources Branch Mr Peter Livingston and staff
- Department of Resources, Energy & Tourism, Manager Safety Security and Environment Ms Kristina Anastasi and colleagues
- Productivity Commission, Commissioner Mr Philip Weickhardt and Mr Peter Garrick

## Industry and associations

- Exxonmobil, Manager, Safety, Health, Environment & Security  
Mr Ron H Reiten
- Santos Ltd, Adelaide, Manager EHS, Sustainability & Indigenous  
Affairs Technical Mr Andrew Anthony and colleagues
- Woodside Energy Ltd, Executive Vice President, Health and  
Safety Dr Agu Kanstler
- Woodside Energy Ltd, Executive Vice President Production  
Mr Vince Santostafano
- Vermilion Oil & Gas Australia Pty Ltd, Managing Director  
Mr Bruce Lake
- Chevron Australia, WA Oil Asset Corrosion & Materials Specialist  
Mr Matthew Shield
- Australian Petroleum Production & Exploration Association,  
Director Skills & Safety Ms Miranda Taylor
- ConnocoPhillips, Darwin, HSE Manager, Mr Wesley Heinold (by  
telephone)
- Eni Australia, Development Project Manager, Blacktip project  
Mr Paolo Guaita, HSE Manager Sue Capper and colleague

## International meetings

- UK Health & Safety Executive, Head, Offshore Division, Mr Ian  
Whewell
- US Department of Transportation, Pipeline & Hazardous  
Materials Safety Administration, Associate Administrator, Office  
of Pipeline Safety Mr Jeffrey D Wiese and Mr Byron Coy
- US National Transportation Safety Board, Director, Office of  
Railroad, Pipeline & Hazardous Materials Investigations Mr  
Robert J. Chipkevich
- US Department of the Interior, Minerals Management Service,  
Chief, Offshore Regulatory Programs Mr Elmer P (Bud)  
Danenberger III
- Netherlands State Supervision of Mines, Inspector General of  
Mines Mr Jan de Jong
- Netherlands Shell Gas & Power, HSSE + Sustainable  
Development Manager Mr Alistair Hope, Mr René P.G.A. de Nier,  
Mr Rob Klein Nagelvoort and colleagues
- UK OGP International Associations of Oil & Gas Producers,  
Executive Director Mr Charles Bowen

- UK International Marine Contractors Association, Chief Executive Mr Hugh Williams and Ms Jane Bugler
- Norway Petroleum Safety Authority, Special Adviser Mr Odd Bjerre Finnestad and Mr Thor Gunner Dahl

## **Industry technical conferences and seminars**

- 2009 Integrity Management Summit, Houston USA  
11 February 2009
- 3rd annual Oil & Gas Pipeline Integrity Conference, Amsterdam, the Netherlands 16–18 February 2009
- International Standards Workshop for Australian Oil and Gas Industry, Perth 19–20 February 2009

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*Petroleum (Submerged Lands) (Management of Safety on Offshore Facilities) Regulations 1996, Statutory Rules 1996 No.298 as amended (Cwlth).*

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*Petroleum (Submerged Lands) (Occupational Health and Safety) Regulations 1993 (Cwlth).*

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