the **REGULATOR**

National Offshore Petroleum Safety and Environmental Management Authority



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Message from the CEO

While the Australian oil and gas industry is no stranger to the ups and downs of the market, the collapse of the oil price in 2014 came quickly and surprised many. In navigating the post-boom environment and downturn, each duty holder has sought to address financial and operational challenges in their own way. NOPSEMA recognises actions taken to enhance efficiency and reduce costs are necessary, but this must not come at the expense of strong health, safety and environmental management (HSE) outcomes.

Internationally, the industry is confronting similar challenges in the form of cost-cuts and downsizing and this has resulted in higher risk profiles for certain assets and deteriorating HSE performance in some instances. We do not want to see these trends replicated in Australia.

Initial analysis of industry performance in Australia during 2016 shows some improvement in personal safety with no fatalities and both injuries and accidents decreasing. Reportable environmental incidents also reached a five-year low. Process safety is less definitive with indicators like unplanned hydrocarbon releases increasing. Dangerous occurrences did fall during 2016 but the fall wasn't proportionate to the decline in industry activity. In the coming months, NOPSEMA will publish a detailed analysis of industry performance in our Annual Offshore Performance Report and I encourage duty holders to consider and discuss the relevance of the publication's findings in relation to your own operations.

Looking forward, there are various global scale projects in Australia that are approaching commissioning including many world firsts. Innovation is welcome and commissioning is an exciting stage, but this stage can introduce new risks and new challenges. Other projects are entering the later stages of the asset lifecycle with some of these assets being transferred and new operators entering the market bringing different risk profiles. Each of these changes can create greater uncertainty and must be managed with different duty holders questioning whether their solutions are robust enough to cope with the unexpected, whether they are maintaining the expertise to identify and reduce risk, and whether the decisions being made today are reducing the risk of a major accident event etc.

Community opposition and mistrust is also increasing, particularly in response to proposed exploration in the Great Australian Bight. This issue has attracted environmental campaigns, increased media scrutiny and triggered two parliamentary inquiries. More needs to be done to understand community expectations and address their concerns. Greater transparency and engagement with the community is required to support our social license to operate and regulate. Continued improvement in this area will need to be a high priority for the industry and NOPSEMA throughout the coming year.

How we respond to the present and future challenges will determine our future, including the prevention of major accident events, and whether the industry and NOPSEMA are accepted as part of the community.

Stuart Smith, CEO

Dynamic position control systems must be tolerant to human error

In June 2016, NOPSEMA issued a Safety Alert to bring to industry's attention the necessity for control systems to be tolerant to human error. The alert followed an incident where a vessel facility drifted off location as a result of human error while a diver was working on the seabed. Rather than being an isolated incident in Australia, NOPSEMA is now aware of two recent similar 'loss of position' incidents internationally. Each of these incidents had the potential to result in a major accident event.

What happened?

In Australia, the operator of the vessel's dynamic positioning (DP) system placed a notepad on the console which pressed down on the 'surge' button twice and unintentionally deactivated the auto-position mode. With the auto-position mode deactivated and the vessel crew unaware, the vessel drifted off location while a diver was working on the seabed. The diver alerted vessel personnel as he followed his umbilical and walked with the drifting vessel, making sure to clear any obstacles on the way. The diver was unharmed but could have been killed if the umbilical had snagged on subsea infrastructure. A subsequent inspection by NOPSEMA determined the incident was the result of human error made possible by a weakness in the design of the DP system (see <u>Safety Alert #62</u>).

In the US, a drill ship in the Gulf of Mexico unintentionally drifted off position while circulating drilling mud following detection of a well kick. The <u>US Coast Guard OCSNCE (Outer Continental Shelf National Centre of Expertise</u>) stated that the DP operator inadvertently deactivated the auto-position mode by accidentally double-pressing the manual button while reaching across the console. Upon realising the mistake, the operator re-engaged the auto-positioning to bring the ship back into position. The US Coast Guard OCSNCE stated the incident was the result of 'human errors with a mix of ergonomics'.

In the UK, a semisubmersible drilling rig lost control of position for several minutes due to an accidental disengagement of the DP system while drilling. Although the loss of position was immediately noticed by personnel, it took them six minutes to realise the auto positioning system had been disengaged. In response to the emergency, the drill pipe was sheared and the lower marine riser package disconnected. The <u>UK Health and Safety</u> <u>Executive (HSE)</u> attributed both the loss of position and inadequate initial crew response to the 'poor ergonomic design of the control system'.

It is important to note that if further control measures had failed in either the US or UK incidents it could have led to a blow-out of the well, potentially resulting in multiple fatalities and a significant environmental incident.





What industry should consider

Centralised control systems need to be resilient against human error. No single inadvertent act by an operator should lead to an emergency response situation where there is a high probability of fatalities. Control systems should also provide adequate feedback to operators to allow them to identify the issue promptly and take appropriate recovery action.

Facility operators are reminded to check their systems to ensure they are not susceptible to this design-induced human error and ensure that suitable controls are in place to prevent, identify and adequately recover from this type of error. Operators should consider discussing with DP manufacturers more robust controls in the design of their DP systems. For example, tactile differentiation (error prevention) of safety critical switches, action confirmation dialogue boxes, provision of a high visibility display (error identification and recovery) and audible alarms/warnings. Other industries may have systems that could provide solutions e.g. aircraft auto-pilot controls.

Facility operators have a duty of care to take all reasonably practicable steps to ensure equipment at the facility is safe and without risk to health (Clause 9, Schedule 3 to the OPPGS Act).

DP manufacturers are encouraged to review the built in safe guards of their systems to ensure they provide sufficient protection, feedback and recovery against this type of design-induced operator error, noting that all three incidents had a double-press requirement for deactivation of the safety critical auto position mode.

Manufacturers of plant, including control systems, must take reasonably practicable steps to ensure that the plant and equipment is so designed and constructed as to be, when properly used, safe and without risk to health and safety (Clause 12, Schedule 3 to the OPGGS Act).

What NOPSEMA will do

During future planned inspections of DP facilities, NOPSEMA's inspectors will continue to check control measures for DP systems during inspections. If sufficient protection against this foreseeable human error is not in place then NOPSEMA will consider taking further action in accordance with NOPSEMA's graduated approach to enforcement.



Improving MODU mooring system integrity for cyclonic conditions

The integrity of mooring systems on mobile offshore drilling units (MODUs) is a critical barrier in preventing subsea loss of containment events and collisions with surrounding infrastructure. Lessons learned from a mooring failure incident in early 2015 highlight the need for step change in improving mooring system integrity for Australian conditions, specifically cyclonic conditions.

On 12 March 2015, the *Atwood Osprey* MODU experienced a mooring failure during Cyclone Olwyn and was blown three nautical miles off location in the vicinity of subsea and surface infrastructure and an environmentally sensitive shoreline. At the time, the rig had already been powered down and its workforce evacuated. The incident, however, still had the potential for catastrophic consequences to the facilities and infrastructure nearby, their workforce and the environment.

Following the incident, NOPSEMA conducted a formal investigation and hosted a workshop with industry. The workshop aimed at providing insight into the contributory, causal and other relevant factors of the mooring failure incident and sought to identify best practices, opportunities for improvement, regulatory requirements and perspective.

In December 2015, NOPSEMA summarised the findings from the workshop in our <u>MODU mooring systems in</u> <u>cyclonic conditions information paper</u> (IP1631). The information paper identified opportunities for improvement in key areas such as:

- design, including pre-laid system
- installation, management of change, assurance of installation
- operations, inspection and maintenance
- emergency preparedness and response.

In general it is imperative that MODU facility operators ensure mooring systems are designed, maintained and operated for Australian conditions. NOPSEMA recognises that multiple industry stakeholders have contributory roles to play in this area and the required step change in increased mooring system integrity can best be achieved by working together towards a common goal.

Station keeping and loss of position will continue to be a focus topic for NOPSEMA inspections throughout the course of 2017. NOPSEMA will continue to monitor mooring systems, considering the lessons learned from the investigation, to ensure that operators comply with their "specific duties" under Clause 9(2) of Schedule 3 to the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGS Act).

In early 2016, the national body representing Australia's oil and gas industry, the Australian Petroleum Production & Exploration Association (APPEA), agreed to produce and publish a guideline to provide greater clarity on mooring a MODU in cyclonic conditions in Australian tropical waters. The purpose of the guideline was to provide:

- a consistent approach to mooring design, installation and equipment assurance; and
- a framework to improve station keeping reliability and performance in local conditions which are unique to the region.

In October 2016, APPEA published their <u>MODU mooring in Australian tropical waters guideline</u>. The guideline provides recommendations and guidance on MODU mooring risk which is based on a screening process that categorises the risk as low, medium or high. Based on the MODU mooring risk category, guidance and recommendations are provided throughout the guideline with respect to mitigation activities. The guideline is intended to be read in conjunction with company mooring standards and procedures and well known industry codes (such as API and DNV).

APPEA has committed to undertaking a review of the guideline following the first 12 months of its operation and is currently welcoming stakeholder comment on the guideline. Stakeholder comments should be directed to <u>info@appea.com.au</u>.

Industry responds to diving operation recommendations

Diving operations provide vital inspection, maintenance and repair support to offshore oil and gas exploration and production activities. This support can be provided for facility structures, wellheads, manifolds, risers, associated pipelines and mooring systems.

Facility operators may rely on third-party diving contractors to undertake diving operations. However, regardless of the contractual relationship, the primary duties relating to occupational health and safety remain with the facility operator. It is their responsibility to ensure all activities, including diving operations, are undertaken in accordance with the Safety Regulations and the accepted safety case.

In 2016, NOPSEMA highlighted in its <u>Annual Offshore Performance Report</u> (pg 57) deficiencies, identified through inspection, in the monitoring and auditing of diving systems, equipment and emergency response plans. In some cases, NOPSEMA inspectors found facility operators were failing to verify that diving contractors were maintaining diving systems, equipment and emergency response plans to ensure they remained fit-for-purpose.

NOPSEMA is very pleased to see that many facility operators have taken on-board our message. From 2015 to 2016 there was an 84% decrease (from 38 to 6) in the number of inspection recommendations issued to facility operators in relation to the diving operation deficiencies described above.

What did operators do?

Several operators incorporated requirements in their diving contracts for diving contractors to close out all outstanding audit items to the operators' satisfaction prior to the commencement of any diving operation. Some operators also included review and approval processes to ensure diving contractors were describing emergency response plans in the Diving Project Plan (DPP) in accordance with Safety Regulations (Regulation 4.16).

While noticeable improvements have been made, there are still further opportunities for improvement in relation to quality assurance of diving system audits, as detailed in <u>Safety Alert #63</u>. Published in December 2016, this Safety Alert provides tangible examples of non-compliance found during inspections in regard to the standard of diving system and equipment audits, and shares key lessons learned to raise awareness within the industry.

In 2017, NOPSEMA will continue to monitor the industry's performance in diving operations. We encourage all facility operators to take the lessons learned so far and apply them to their operations. Furthermore, NOPSEMA has recently updated our <u>Diving Project Plan (DPP) Concordance Table</u> (FM1453) to provide further clarity around DPP content requirements.





Workforce participation is central to improving safety outcomes

NOPSEMA sees the participation of the workforce as a central element of safety risk management on any facility. During the development of a safety case, workforce participation assists with the identification of risks and control measures from a perspective that is honed by practical experience. Participation provides the workforce with greater ownership of the safety case and builds confidence that the arrangements put in place to protect workers are robust.

NOPSEMA's inspection process places considerable emphasis on workforce participation. For example, opening and close out meetings generally do not proceed without Health and Safety Representative (HSR) participation. NOPSEMA also makes every effort to hold separate meetings with HSRs during inspections and discussions are held with interested workers throughout. These meetings and discussions can identify specific issues that warrant attention and can also provide an insight into the prevailing culture and attitudes on-board which may be instrumental in revealing deeper issues.

In addition to direct engagement with the offshore workforce, NOPSEMA also seeks to engage more broadly with organisations that represent the interests of the workforce in relation to health and safety. This includes regular engagement with relevant unions to gain insights and understand any concerns at an industry-wide level. Engagement includes three bilateral meetings per year and consideration of information and feedback received. Most recently, NOPSEMA welcomed feedback from union representatives on our Compliance Strategy; a strategic policy document outlining our compliance framework and the principles we apply in undertaking our regulatory activities.

To drive improved outcomes in health and safety we must also seek to gather better information on how industry is currently performing. To do this, NOPSEMA will consider all credible sources of information in addition to that which is mandated by the regulatory regime. NOPSEMA is committed to continued engagement with the offshore workforce, and those that represent them, to ensure health and safety matters can be addressed effectively.



NOPSEMA takes enforcement action for inadequate testing of TEMPSCs

The OPGGS Act requires operators to take all reasonably practicable steps to implement and maintain equipment to respond to emergencies at their facility. Totally Enclosed Motor Propelled Survival Craft's (TEMPSCs) are commonly installed for emergency use when the workforce must abandon the facility.

During a recent planned inspection at a production facility, NOPSEMA inspectors found the TEMPSCs at that facility had not been lowered to the sea and launched in order to verify their watertight integrity and buoyancy, and test their associated systems ("wet testing"). Examples of these systems include propulsion and steering, water deluge, and hook release mechanisms. In the case referred to above, the TEMPSCs had not been "wet-tested" since 2013. This lack of testing was in contravention of both the operator's own maintenance requirements and good industry practice.

NOPSEMA inspectors responded by taking enforcement action, via an Improvement Notice, against the operator.

Operators are reminded that NOPSEMA expects all facilities will undertake assurance activities such that all TEMPSC components and systems are tested with an adequate frequency to provide assurance of a continuous readiness to safely evacuate the facility during an emergency, and that evacuation risks are reduced to as low as reasonably practicable (ALARP). NOPSEMA inspectors will continue to request evidence of appropriate assurance of TEMPSC systems during planned inspections in 2017.

Operators should make themselves familiar with NOPSEMA's <u>Assurance of TEMPSC and associated systems</u> guideline (GL1643).

Marine oil pollution response arrangements in Western Australia: Are you compliant?

In October 2015, the Western Australian Government formally endorsed *WestPlan: Marine Oil Pollution* (Westplan – MOP) which is the state's emergency management plan for the preparation for, response to, and recovery from a MOP emergency. The revised Westplan – MOP implemented important changes to the emergency management arrangements for a MOP emergency in WA state waters and now represents part of the national arrangements to which titleholders must comply from 1 July 2017.

In April 2016, the WA Department of Transport (DoT) established interim arrangements to allow sufficient time for the *Offshore Petroleum Industry Guidance Note for Marine Oil Pollution: Response and Consultation Arrangements* guidance note to be updated in consultation with NOPSEMA, titleholders and other relevant stakeholders.

Titleholders are advised that on 3 January 2017, DoT updated the guidance note.

The guidance note seeks to assist titleholders in understanding the emergency management arrangements for MOP emergencies where marine pollution originating in Commonwealth waters threatens WA state waters, their obligations under those arrangements, and DoT's expectations regarding consultation with DoT as a relevant person during preparation of an environment plan (including the oil pollution emergency plan) and throughout the life of the activity.

The interim arrangements will conclude on 1 July 2017. Titleholders are reminded of their responsibility to consider the implications of the new emergency management arrangements in relation to the compliance of their accepted and in force environment plan, internal systems and processes and testing requirements.

NOPSEMA expects that, where applicable, titleholders will update their environment plan to reflect changes to arrangements and DoTs expectations as set out in the guidance note. NOPSEMA does not consider these changes are likely to require the submission of a proposed revision of an environment plan, however, they will likely require a titleholder to test the new response arrangements as described in their environment plan.

When updating their environment plan and associated response arrangements, titleholders are reminded they must still have in place appropriate response arrangements to respond to a MOP incident in WA state waters commensurate with the level of introduced risk. Should there be an escape of petroleum in relation to a petroleum activity, under the legislation a titleholder must eliminate or control the source of the escaped petroleum, clean up, remediate any damage to the environment, and monitor the environment to assess and address any negative impacts.

NOPSEMA planned inspections will focus on ensuring that, where applicable, titleholders have updated their environment plan (including the oil pollution emergency plan) to reflect the new emergency management arrangements, that their plans reflect DoTs expectations as set out in the guidance note and that adequate testing of amended response arrangements has been completed.

<u>Westplan – MOP</u> and the <u>Offshore Petroleum Industry Guidance Note for Marine Oil Pollution: Response</u> <u>and Consultation Arrangements</u> are available at <u>transport.gov.wa</u>. To make an enquiry relating to emergency management arrangements for a MOP emergency in WA state waters email <u>marine.pollution@transport.wa.gov.au</u>.



Inspecting oil spill response service providers and equipment stockpiles

Significant offshore oil spills are very rare events that can require rapid deployment of large amounts of specialist response equipment to mitigate oil spill impacts. It is impractical for each company to separately hold all this equipment and considerable benefits exist in sharing these resources.

To this end, NOPSEMA recognises and supports the offshore petroleum industry adoption of cooperative arrangements with external oil spill response organisations (OSROs) to hold and maintain this equipment in a constant state of readiness on its behalf. Australia has a long-standing system for sharing oil spill resources with access to OSRO equipment stockpiles typically based on a scaled membership system offering different levels of response services.

Given the cooperative nature of oil spill response arrangements and the dependency of titleholders on OSROs to supply critical response equipment specific to their particular needs, NOPSEMA recently undertook an inspection program across a cross-section of titleholders focusing on their arrangements and assurance processes with two of the largest OSROs; the Australian Marine Oil Spill Centre (AMOSC) and Oil Spill Response Limited (OSRL). The inspection program also looked at the status of response equipment and management systems at AMOSC which is the principal non-government OSRO based in Australia.

Over the course of several weeks, NOPSEMA inspected the premises of seven titleholders as well as AMOSC premises in Victoria and Western Australia. The inspectors examined the assurance processes put in place by titleholders to verify OSRO capability in addition to the availability and maintenance process of AMOSC held response equipment. Taking this approach allowed NOPSEMA inspectors to holistically examine industry practice and broadly identify where cooperative approaches to develop joint solutions may require improved oversight by titleholders in line with their environment plan commitments.

NOPSEMA inspectors issued several common recommendations to titleholders aimed at enhancing oil spill preparedness and response. Recommendations focused on strengthening assurance processes between titleholders and their OSROs, for instance:

- · clarifying service delivery requirements
- improving systems for testing and exercising OSRO arrangements and capability
- · enhancing systems used to track the availability and maintenance of OSRO response equipment

NOPSEMA will monitor how titleholders respond to the authority's recommendations and will look to implement similar approaches to inspections in the future as a more efficient means to identify and seek resolution of compliance issues.

An open discussion about environmental management



In December 2016, NOPSEMA hosted four open days in Perth and

Melbourne providing interested stakeholders an opportunity to improve

their understanding of the offshore petroleum environmental management approvals process through

direct engagement with NOPSEMA's environment specialists and managers.

The open days received a high level of interest with over 80 attendees from a variety of oil and gas companies, consultancies, government agencies and environmental non-government organisations. The 'open day' style event provided the attendees an opportunity to seek advice directly from regulatory specialists who carry out environment plan assessments on day-to-day basis.

A key driver of the open days was to discuss NOPSEMA's <u>environment plan decision-making guidelines</u> which clarify how NOPSEMA makes its decisions during the assessment of an environment plan. NOPSEMA's specialists also provided the attendee's their regulatory insight in addressing questions about the regulatory challenges facing petroleum activities and the assessment of impacts and risks relating to those activities.

Based on the encouraging interest shown by stakeholders, NOPSEMA is considering holding future open days on a broad range of topics. NOPSEMA is committed to providing stakeholders further opportunities to interact directly with the regulator.

To register your interest in future open days, or to provide suggestions on potential topics, please email <u>communications@nopsema.gov.au</u>.

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When to submit a revision of an EP

The environment in which petroleum activities are conducted is dynamic and as a result the environmental impacts and risks identified in an accepted environment plan (EP) for an activity may change.

Under certain circumstances, some changes will require a submission of a proposed revision of the EP to NOPSEMA for assessment. To clarify when a change is likely to trigger this requirement NOPSEMA published a draft guideline in November 2016.

The guideline was developed in collaboration with a working group comprising representatives from APPEA, BHP Billiton, Chevron, ConocoPhillips, INPEX, PTTEPAA, Quadrant Energy, Santos, Shell, Vermilion, and Woodside. It was also released for a 30 day public comment to provide stakeholders with an opportunity to share their views.

Stakeholder feedback has been taken into account and the final <u>When to submit a proposed revision to an EP</u> guideline (GL1705) is now available and published on NOPSEMA's website.



NOPSEMA seeks feedback on transparency initiatives

In 2015, NOPSEMA invited over 200 industry, government and non-government stakeholders to complete a survey to gather their views on the current state and future direction of environmental management consultation and the environment plan approval process.

Based on the results of the survey, NOPSEMA implemented a number of initiatives, including:

- publishing information on the status of environmental assessments
- proactive online notifications of assessment submissions to stakeholders
- requiring environment plan summaries to include full reports on consultation
- working with stakeholders to explore potential changes to increase the transparency of environment plans.

NOPSEMA is now seeking feedback to evaluate how effective the improvement initiatives have been. Stakeholders are invited to provide feedback by participating in a survey, noting the closing date to complete the survey is Friday, 31 March 2017. To begin the survey, see the <u>Stakeholder engagement and transparency page</u>.

Revised oil pollution risk management information paper open for comment

NOPSEMA has revised its IP1488 - Oil pollution risk management - Rev 1 - February 2017 (PDF 804KB). NOPSEMA developed the updated information paper based on feedback received during titleholder liaison meetings, observations during the assessment of EP submissions as well as a targeted online questionnaire of titleholders during 2016.

The information paper is now open for comment and NOPSEMA is seeking feedback from stakeholders about:

- the clarity of the revised information paper
- any suggestions for improvement to aspects not understood or in need of further explanation
- any significant absences or omissions that stakeholders can identify.

All comments should be made in writing and addressed to <u>feedback@nopsema.gov.au</u> by Friday, 31 March 2017. NOPSEMA will consider all feedback and will publish a summary of the feedback we receive along with NOPSEMA's response.

New safety case guidance for vessel facilities open for comment

Much of the Australian offshore petroleum industry will recall the PTTEP Australasia Montara blowout in 2009 and the associated Montara Wellhead platform and West Atlas rig fire. Fewer people may recall that at the time of the incident a moored pipelay/construction vessel was working in close proximity to the production and drilling facilities.

The investigation by the National Offshore Petroleum Safety Authority (now NOPSEMA), in the context of the vessel facility, identified a range of deficiencies associated with external hydrocarbon hazards. For example, ignition controls, emergency communication and training, appropriate muster stations and means of escape. At the time, the regulator issued the operator of the vessel facility five improvement notices and two requests to revise the vessel facility's safety case.

Since mid-2014, NOPSEMA has assessed 49 safety case submissions for vessel facilities (i.e. vessels undertaking accommodation support, well servicing, construction/installation and pipelay activities). Of these submissions, 25 (covering 15 vessel facilities) included activities that would expose the facility to external hydrocarbon hazards. Subsequently, NOPSEMA selected the management of this risk as an assessment scope item. Of the 25 safety cases, NOPSEMA rejected 11 (44%) primarily due to inadequacies in how the safety cases addressed the legislated content requirements relating to the management of external hydrocarbon hazards.

In early 2016, NOPSEMA held a workshop with the <u>International Marine Contractors Association (IMCA)</u> to highlight and discuss identified deficiencies in the management of external hydrocarbon hazards identified during safety case assessments. NOPSEMA has since finalised a draft guidance note regarding <u>Vessel facilities subject to</u> <u>external hydrocarbon hazards</u> (GN1733), effectively as a supplement to the substantive <u>Safety case content and</u> <u>level of detail guidance note</u> (GN0106). The new draft guidance note is intended to assist vessel facility operators to more effectively document in their safety cases how they will address external hydrocarbon hazards and reduce the associated risks to a level that is as low as reasonably practicable.

The draft guidance note is now available for industry comment and can be downloaded from the <u>Safety Case</u> <u>Guidance Notes page</u> on the NOPSEMA website. Comments, with or without a marked-up copy of this document, should be emailed to <u>safetycaseguidance@nopsema.gov.au</u> no later than Friday, 14 of April 2017.



Are you complying with your financial assurance obligations?

During recent inspections, NOPSEMA inspectors have identified areas where titleholders need to improve systems for ongoing compliance with the duty to maintain sufficient financial assurance for offshore petroleum activities throughout the life of a title.

NOPSEMA has found many titleholders are using the Australian Petroleum Production and Exploration Association (APPEA) method to calculate the level of financial assurance required to undertake offshore petroleum activities. While these titleholders are applying the method appropriately to initially provide assurance of the sufficiency of their financial assurance, NOPSEMA inspections have identified that over 80% of the inspected titleholders are not adequately maintaining processes to be able to evaluate and ensure their level of financial assurance continues to be sufficient. This has resulted in a number of NOPSEMA inspection recommendations being raised.

NOPSEMA's inspections have also identified good practices by some titleholders to ensure they continue to fulfil their ongoing obligation to maintain financial assurance throughout the life of title. Practices include integrating mechanisms into operational procedures to trigger reviews of financial assurance at appropriate events or intervals, for example when joint venture arrangements are modified or where the scope of an activity is changed.

NOPSEMA encourages titleholders to consider internal systems and processes to determine the best approach to incorporating review mechanisms to maintain sufficient financial assurance throughout the life of a title. Future NOPSEMA planned inspections will continue to include inspection of titleholders' internal systems and processes.

For further information on financial assurance requirements see the Financial assurance page on the NOPSEMA website.

The APPEA financial assurance method is currently under review. APPEA has engaged a consultancy to undertake the review against Terms of Reference agreed by NOPSEMA and will be further subject to independent validation to determine whether the revised method continues to provide a robust approach to complying with the legislative requirements. The review will consider additional case studies to build on the existing method and is scheduled to be completed in early 2017. NOPSEMA has extended the endorsement of the current APPEA method until April 2017.



Meeting the requirements of the amended well regulations

On 1 January 2016, amendments to Part 5 of the Offshore Petroleum and Greenhouse Gas Storage (Resource Management and Administration) Regulations 2011 (the Well Regulations) commenced. The amendments reflected the expanded scope and nature of the well operations management plan (WOMP) as the sole permissioning document for well activities across the lifecycle of a well(s).

To assist titleholders in meeting the requirements of the Well Regulations, NOPSEMA has published three new guidance notes:

- <u>GN1613 Hazard assessment and risk assessment</u>
- GN1616 ALARP in the context of well integrity
- GN1617 Well integrity control measures and performance standards

The three new documents are part of a suite of six that provide guidance to titleholders on the preparation of a WOMP as well as direction in how to approach the description of how risks will be managed and reduced to a level that is as low as reasonably practicable (ALARP). NOPSEMA encourages those industry stakeholders with responsibility for well integrity, particularly those developing a WOMP for well activities, to consider the guidance.

The purpose of the guidance is to explain the objectives of the Well Regulations, discuss good practice and suggest possible approaches that can be taken in the preparation of a WOMP. NOPSEMA acknowledges that what is good practice, and what approaches are valid and viable, will vary according to the nature and scale of a well activity. NOPSEMA's assessments will continue to be undertaken strictly in accordance with the requirements of the Well Regulations and in the context of the particular nature and scale of the well activities described in a WOMP.

NOPSEMA reminds all titleholders that an 'old WOMP', that is a WOMP accepted prior to 1 January 2016, must be transitioned to a 'new WOMP' before the transitional period ends on 31 December 2017. So far NOPSEMA has assessed 44 WOMPS; 42 have been accepted and two refused with 11 requests for resubmission and 23 written requests for further written information. Titleholders should allow adequate time for the assessment process as the amended Well Regulations require significantly more detail and as such assessments may take up to 90 days.

Titleholders are encouraged to contact the NOPSEMA Well Integrity Team at <u>wompguidance@nopsema.gov.au</u> to discuss any queries they may have.



An alignment of failures

In March 2016, NOPSEMA was notified of a dangerous occurrence on an offshore platform where a 7.5 tonne motor-operated valve (MOV) was being lifted and removed by a spreader bar when the device failed and the MOV dropped 0.3 metres to the deck below. Given the size and weight of the MOV this 'dropped object' incident had the potential to cause death or serious injury. The failure of the spreader bar to safely lift the MOV was not the result of a single mistake but an alignment of failures across the design, procurement and assembly of the lifting equipment.

What happened?

To lift and remove a 7.5 tonne MOV, the operator contracted an engineering firm to **design** a spreader bar that could safely complete the task. The engineering drawings that were developed, however, were ambiguous and lacked sufficient written information to show that a standard component had to be modified before it could form part of the lifting equipment.

During the **procurement** process, the rigging supplier quoted an incomplete bill of materials (the list of components that make up the spreader bar) based on what they assumed the engineering drawings required. Not realising the discrepancy between the engineering drawings and the proposed bill of materials, the operator signed off on the rigging supplier's quote.

At this stage, the components ordered to assemble the spreader bar were incomplete and the engineering drawings lacked sufficient written information to show that a standard component had to be modified for the lifting equipment to be assembled correctly.

During **assembly**, the rigging personnel on the facility identified the discrepancy between the components supplied to them and the spreader bar's engineering drawings. To get the job done, the rigging personnel made certain assumptions and decisions without obtaining appropriate approval. Specifically, the spreader bar was assembled using another component instead of the modified component that was required.

Due to the alignment of failures during the design, procurement and assembly of the lifting equipment the spreader bar dropped the MOV and presented an unacceptable risk of death or serious injury to the workforce.

Lessons learned

Operators, manufacturers and suppliers all have duties with regards to equipment that will be used by members of the workforce at a facility.

A manufacturer of equipment supplied to an offshore facility has a duty of care under the OPGGS Act to take all reasonably practicable steps to make available adequate written information about the design, construction and safe use of the equipment. Equally, it is the operator's responsibility to ensure manufacturers are providing them with adequate written information in the engineering drawings, particularly if modification is required to a standard component.

Operators must refrain from making assumptions about engineering drawings during the procurement and assembly phase. Clarification of the design basis with the appropriate person in charge of the project work or task must be sought if there is any ambiguity, and any changes must be communicated and authorised appropriately.



Failure to manage valve locking and car sealing systems

Recent inspections by NOPSEMA have identified that some facilities have failed to appropriately manage safety critical valve locking and car sealing systems. NOPSEMA's inspectors have identified several instances where valve locks or car seals were either degraded to the point of being ineffective, were installed in a way that didn't prevent inadvertent operation of the valve, or were not installed at all. These findings point to a number of deficiencies in the respective valve locking and car sealing programs which could lead to the failure of a safety critical device; stopping it from preventing loss of containment and a potential major accident event.

Almost all offshore facilities have process safety devices such as pressure safety valves (PSVs) and safety instrumented functions (SIFs), and it is critical to the overall safe operation of a facility that these devices continue to operate effectively. Process safety devices generally require some form of maintenance or proof testing to ensure they will function correctly when required to do so. In most instances, it is not practical to shut down an entire process to conduct such work. Therefore, isolation valves are commonly provided to enable a device to be maintained or tested while the process remains online. Therein lies the problem.

The presence of an isolation valve introduces the risk the valve will be in the incorrect position (i.e. closed) rendering its safety function ineffective. Depending on the process safety device, the problem may persist undetected for an extended period of time until the device is tested or required to perform its safety function. This may give personnel working and living on an offshore facility a false sense of security; believing safety critical devices can be relied upon, when this may not be the case.

To address this problem, valves that can prevent the continued and effective functioning of a safety device, such as a PSV or SIF, are typically sealed or locked in the safe position. The operation of the valve is strictly controlled and risk assessments are undertaken so alternative measures can be put in place for the duration of time that the valve is in its 'unsafe' position. For the locking or sealing system to be effective, it must have the following basic features as a minimum:

- The lock or seal should provide a reasonable mechanical barrier to inadvertent or accidental operation of the valve to an unsafe position.
- The lock or seal should be checked regularly to ensure that it is in place according to the master P&IDs or alternative document which is controlled and approved by a competent person.
- The lock or seal should be inspected regularly to ensure that it is effective as a mechanical barrier and that there is no significant degradation.
- Temporary removal of the lock or seal should be approved by an authorised competent person and a risk assessment undertaken to ensure that the risks are managed to ALARP.
- Following temporary removal of the lock or seal, the valve must be returned to its safe position and the lock or seal reinstated as soon as reasonably practical at the conclusion of the work for which the lock or seal was removed.

Because of the importance of these safety critical valve locking and sealing programs, NOPSEMA will continue to inspect and assess facilities against the principals highlighted in this article and enforcement action may be taken where deficiencies are observed.







In 2008, facility workers in the US closed an isolation valve between the heat exchanger shell and a relief valve to replace a burst rupture disk. Maintenance workers replaced the rupture disk on the day, however, they forgot to reopen the isolation valve. The next day, other facility workers closed a block valve to isolate the pressure control valve from the heat exchange so that they could connect a steam line to the process line to clean the piping. The steam flowed through the heat exchanger tubes, heated the liquid in the exchanger shell, and increased the pressure in the shell. The closed isolation and block valves prevented the increasing pressure from safely venting through either the pressure control valve or the rupture disk and relief valve. The pressure in the heat exchanger shell increased until it violently ruptured.

An effective car sealing program could have prevented this incident. Typically the valve isolating the relief valve would have been locked open. An effective program would have ensured that the valve was restored to its 'safe' open position at the conclusion of the maintenance work.



Are you analysing your failure rate data for process safety valves?



IEC 61511 (Functional Safety – <u>Safety instrumented systems</u> for the process industry sector) is an international industry standard requiring the failure rate of the devices, which make up the <u>safety instrumented functions</u> (<u>SIFs</u>) on offshore facilities, to be analysed to assess whether their reliability meets the requirements defined by their respective <u>safety integrity level (SIL</u>). Periodically, operators should use that data to re-evaluate the testing frequency of those devices.

Process safety valves such as Riser Emergency Shutdown Valves (RESDVs), Shutdown Valves (SDVs) and Blowdown Valves (BDVs) are found on most production facilities to minimise the impact of a loss of containment event either topsides or subsea. To be effective, IEC 61511 states that end devices, such as process safety valves, need to have a <u>probability of failure on demand (PFD)</u> which supports its SIL. The SIL depends on the risk the device is protecting against and what other layers of protection are in place to mitigate that risk. For a RESDV, the acceptable PFD is typically less than 1 in 100. In other words, if you tested a RESDV 100 times it shouldn't fail more than once.

To demonstrate the PFD of a valve supports its SIL, it must be proof tested on a regular basis to reveal undetected faults, at a frequency that depends on the level of reliability required of the device. During design, the engineer estimates that reliability based on industry and manufacturer data; however this general data cannot account for the unique operating circumstances in which each valve is required to operate. Actual failure rates, specific to the installation, need to be compared against the original design assumptions. If the failure rates are higher than the original design assumptions then the test frequency should be re-evaluated.

Failures of shutdown valves during <u>demand scenarios</u> such as proof testing do occur; however in reviewing the operator response to these failures NOPSEMA has observed that there is a tendency to simply lubricate and cycle the valve, and then put it back into service without appropriate consideration of the overall rate of failure. Occasional valve failures are to be expected, but the most important question is whether the actual failure rates are consistent with the PFD assumed in the original design. If the failure rate is higher than expected, the testing frequency should be reevaluated.

NOPSEMA expects operators to be able to demonstrate that the facility process safety valves will be effective control measures. If the operator has adopted the international standard IEC 61511 then the requirement to analyse failure rate data and periodically re-assess testing frequency is mandatory. NOPSEMA will be inspecting operator arrangements for collecting and analysing failure rate data and periodic re-evaluation of test frequency. If any deficiencies are identified the issue will be raised directly with operator.

Safety instrumented function (SIF): A safety function to be implemented by the safety instrumented system (SIS) that consists of the initiating elements (e.g. temperature, pressure and level sensors), the final elements (e.g. shutdown valves) and the logic solver (e.g. programmable logic controller).

Safety instrumented system (SIS): Instrumented systems sued to implement one or more SIFs.

Safety integrity level (SIL): Discrete level (one to four) allocated to the SIF for specifying the safety integrity requirements to be achieved by the SIS.

Probability of failure on demand (PFD): The probability that the device will fail dangerously, such that the safety action is impeded, when placed under demand.

Demand scenario: A SIF is placed under demand when it is required to enact its safety functions, such as closing a valve on high pressure.



Hazardous chemicals information, instruction and training

Since 2014, NOPSEMA inspections have found many operators have implemented comprehensive systems for managing the risk of workforce exposure to hazardous chemicals and, furthermore, are continuously improving these systems. However, over the same period, 12 different operators (across 15 facilities) were issued 63 recommendations relating to deficiencies in the provision of adequate hazardous chemical information, instruction and training. A summary of some of the observed implemented systems and the deficiencies are shown in the table below.

Summary of observed inspection findings			
Implemented systems	Deficiencies		
 Appropriately identifying and labeling hazardous chemicals. Substituting chemicals for less hazardous alternatives. Modifying activities and automating systems to reduce personal exposure. Performing health risk assessments for hazardous chemicals and their associated handling activities. Providing up-to-date (no older than 5 years) Safety Data Sheets (SDS) in either hardcopy or on an electronic database. Providing personal protective equipment to the workforce that is appropriate for handling hazardous chemicals. 	 Lack of training for members of the workforce in handling hazardous chemicals including those providing supervision. Inconsistently identifying hazardous chemicals contained or being transferred in pipework. Inadequately segregating incompatible chemicals. Irregular auditing of hazardous chemicals. Deficiencies in the implementation of procedures for managing hazardous chemicals. Failing to maintain a chemical inventory which accurately reflects the quantity and location of the hazardous chemicals stored on the facility. Failing to test fire deluge systems in chemical storage areas e.g. paint stores. 		

In considering the above findings, NOPSEMA reminds operators of the requirement to take all reasonably practicable steps to provide all members of the workforce (in appropriate languages) with the information, instruction, training, and supervision necessary for them to carry out their activities in a manner that protects the health and safety of persons at the facility. This includes those members of the workforce who use hazardous chemicals and those who supervise others using hazardous chemicals.

Operators should be aware that chemical manufacturers and suppliers have adopted the *Globally Harmonised System (GHS)* of *Classification and Labelling of Chemicals and,* as of 31 December 2016, chemical manufacturers and suppliers are required to determine the hazards of the chemicals they produce or import and provide a label with a signal word, pictogram, hazard statement, and precautionary statement for each hazard class and category. Your information, instruction and training should therefore cover the updated GHS and be relevant to the chemicals at the facility.

Further information regarding the GHS system is available on the <u>Safe Work Australia</u> website and via their recently published <u>'Are you GHS ready' seminar</u>.

Schedule of events

Events listed below are those at which NOPSEMA is presenting or exhibiting or has an organisational role.

April

- 4-6 April: SPE Asia Pacific Health, Safety, Security, Environment and Social Responsibility Conference, Kuala Lumpur
- 5 April: NOPSEMA cost recovery meeting, Perth and Melbourne

May

- 15-18 May: International Oil Spill Conference 2017, Long Beach
- 14-17 May: 2017 APPEA Conference and Exhibition, Perth

November

• 16 November: INSTOK Well and Reservoir Technologies Conference, Perth



Data reports and statistics

NOPSEMA continuously collects and receives data on the safety, well integrity and environmental management performance of the offshore petroleum industry, as well as its own regulatory performance. This data is regularly analysed and converted into a series of datasets. The latest datasets are published both quarterly and annually under the 'Resources' tab at <u>nopsema.gov.au</u>. They contain many familiar performance indicators such as incident rates, injury rates, hydrocarbon releases and international benchmarks.

Feedback

NOPSEMA welcomes your comments and suggestions. Please direct media enquiries, requests for publications, and enquiries about NOPSEMA events to <u>communications@nopsema.gov.au</u>. Operators and other employers are encouraged to circulate this newsletter to their workforce.

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