



NOPSEMA briefing and MODU mooring systems in cyclonic conditions

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- Triennial independent review of NOPSEMA
 - Stakeholder engagement continues to be a focus
- Legislative change
 - [Amended Wells Regulations](#) commence 1 Jan 2016
- NOPSEMA focused topic inspection program



Maintenance management

- management of deferral of work
- equipment strategies - inspection and monitoring
- structural integrity - inspection and monitoring
- safety-critical equipment meeting performance standards.



Contractor management

- Contractor agreements and performance governance by the operator in relation to:
 - how the operator of a diving project effectively ensures diving contractors are complying with their DSMS/DPP
 - third party contractors & equipment management
 - asset integrity monitoring programs conducted by third parties.
- Contractor selection and competency
- Operator and contractor interface management e.g. SIMOPS.

Blowout source control contingency planning

- Currently the degree of contingency planning for a well blowout (relief well, cap and contain etc) varies between titleholders. NOPSEMA will inspect titleholders arrangements for compliance with the legislation.
 - *Note: new well regulation RMAR Part 5, Reg. 5.09(k) now specifically addresses the matter.*



Position keeping systems

- Stability management including Ballast & Bilge Systems.
- Dynamic positioning systems
- Pre-lay mooring design
- Inspection testing and maintenance including software updates
- Integrity of safety critical elements
- Competence (operators and maintainers of position keeping systems).

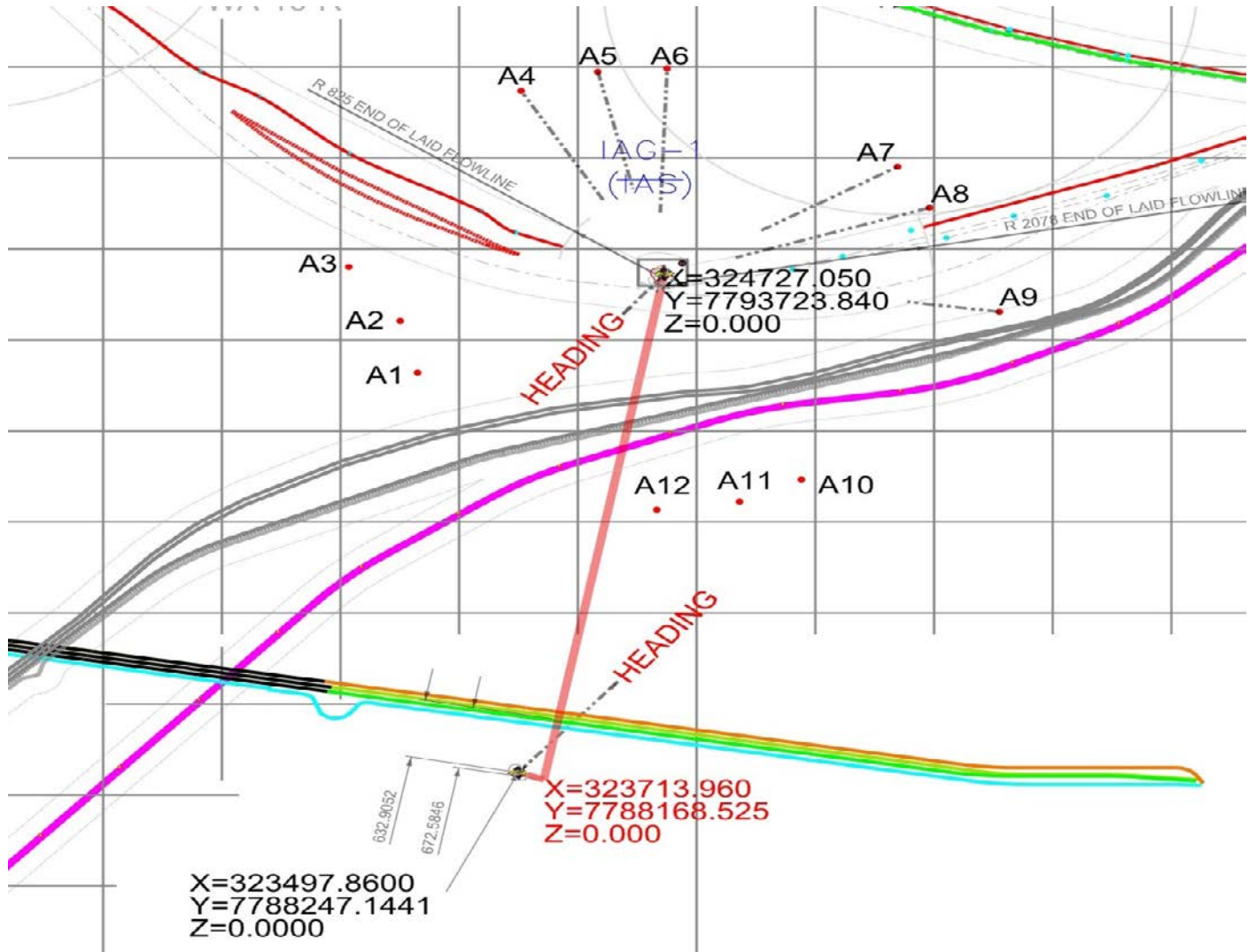


MODU mooring systems in cyclonic conditions



- The *Atwood Osprey* experienced a mooring failure during cyclone Olwyn and was blown some three nautical miles off location in the vicinity of subsea and surface infrastructure and environmentally sensitive shorelines
- Investigations have been conducted by NOPSEMA and Atwood who have both committed to sharing lessons learned from this incident with industry.

- **9 March** – Commence well suspension in preparation for rig evacuation
- **10-11 March** – Osprey completes well suspension, power- down and evacuation
- **12 March** – TC Olwyn strikes *Atwood Osprey*
- **12-13 March** – AHTSV reports rig off location ~3nm
13-man team arrives on board to take the rig in tow by the AHTSV and holds station; team departs rig
- **14 March** - Commence ROV operations to assess seabed and condition of infrastructure.



Four known Incidents of MODU loss of position due to Cyclone activity

- Mar 2004 – MODU dragged anchors Cat-3
- Dec 2008 – MODU dragged anchors Cat -2
- Feb 2011 – MODU dragged anchors Cat -3
- Mar 2015 – MODU snapped anchor wire Cat -3

Six documented instances where MODUs have failed to down-man in the face of impending cyclones.

- Semi-Sub MODU 2004
- Jack-Up MODU 2006
- Semi-Sub MODU 2007
- Semi-Sub MODU 2009
- Semi-Sub MODU 2011
- Semi-Sub MODU 2015



Inconsistency in safety case design and performance standards utilised in mooring design and analysis.

- “50 year return period” - 1 case
- “API RP 2SK using 20 year return period” - 2 cases
- “API RP 2SK using 10 year return period” - 1 case
- “specification to ABS rules and MODU code” - 1 case
- completely silent on design and performance standards for mooring systems. - 3 cases



- Hind-cast computer modelling
- ROV survey of the seabed
- Review of the mooring system design and its component parts
- Inspection of critical components
- Visual inspection, metallurgical analysis and destruction testing of the mooring lines



- Design including pre-laid systems
- Assurance, installation and managing change
- Inspection and maintenance.



- Return period (20,50,100 year RP environmental conditions)
- Component positioning
- Lack of detailed risk assessment at the mooring design stage involving all parties
- Deficiencies in the assurance processes at the interfaces between the responsible parties.



Combination of rig and pre-laid mooring components

- Pre lay mooring installation procedures
- Drag anchor pull test tensions
- Management of change.



- Records of inspection history
- Frequency of inspections
- Competency assurance system for mooring equipment/rope inspectors
- Lack of performance standards and the necessary associated assurance tasks for the mooring system – ongoing availability and reliability of the SCE



Opportunities for improvement

- Procedures for managing mooring line tensions for survival conditions/MODU cyclone evacuation
- MODU real time position indication - GPS
- Mooring line tension/weather recording and UPS
- MODU recovery – preparedness for towing



- Reliability of the mooring system under foreseeable cyclone conditions
- Assurance of mooring design, installation and critical component materials – quality control
- The interface: SCE - inspection, maintenance, MoC and operations procedures
- Recovery preparedness and. response

Regulatory approach and expectations

Provided an opportunity for industry and NOPSEMA to collectively examine better ways to manage this significant risk.

- Provide information about the incident and lessons learned
- Communicate regulatory requirements and perspective
- Discuss opportunities for improvement
 - identify any actions on which immediate consensus can be reached
 - identify areas for which there is consensus in direction but require more work to define detail.

- NOPSEMA and Atwood investigation findings
- Information paper provided for context
- Consideration of existing standards and practices from elsewhere



To strengthen requirements with a view to improving the situation:

- Achieve consensus on what is best practice in relation to each of these issues;
- Determine current industry knowledge and approach with respect to mooring design criteria;
- Assess and manage the risks arising from these issues with respect to the impending cyclone season and longer term.



Safety case considerations:

- rig operators - mooring systems are safety critical

Current considerations:

- understand the design basis and integrity of current hardware

NOPSEMA will issue regulatory guidance:

- to address key issues identified and recognized in the workshop and in the information paper;
- to raise awareness and prompt a review of arrangements in place for the immediately forthcoming cyclone season; and
- to provide guidance on key interface points between titleholders and operators which should be addressed in the rig safety case

Methodology for topics requiring further work



Thankyou