Design a *facility* rather than build a vessel

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What we will cover

• Context
• Definition of *facility*
• As Low As Reasonably Practicable (ALARP)
• Performance-based vs. prescriptive
• FPSO performance
• Case Studies
• NOPSEMA’s Role
• Questions

Objectives:

• To secure the health, safety and welfare of persons at or near facilities
• To protect people at or near facilities from risks arising out of activities being conducted at facilities

Key duty holder - operator of a ‘facility’
Facility Definition

Includes vessels:

- Providing accommodation for persons working on another facility
- Drilling or servicing a well for petroleum or associated work
- Laying pipes or doing work on an existing pipe
- Erecting, dismantling or decommissioning another facility
An operator of a *facility* must take all reasonably practicable steps to ensure that the facility, and its operations, are safe and without risk to the health of any person at or near the *facility* – reduce risk As Low As Reasonably Practicable (ALARP)
Where a vessel or structure is a *facility*, there is a legal obligation on the operator of that *facility* to submit a safety case to NOPSEMA for acceptance prior to commencement of operations.
• **Vessel rules, codes and standards**
  – typically prescriptive
  – intended for marine vessels

• **Aspects of these prescriptive requirements may be used to make a part of the case for safety,**

• **Compliance with prescriptive marine requirements may not meet ALARP requirements for a *facility***
% Incidents per Facility Type

Over 40% of all incidents reported to NOPSEMA occur on FPSO/FSOs
Comparison – FPSOs and other facilities

Number of Incidents Notified - 2011

- Unplanned Event - Implement ERP
- Damage to safety-critical equipment
- Could have caused Incapacity (LTI>3)
- Could have caused Death or Serious Injury
- Accident - Incapacitation >=3 days LTI
- Other kind needing immediate investigation
- Uncontrolled HC gas release >1-300 kg
- Fire or Explosion
- Uncontrolled PL release >80-12 500L
- Accident - Death or Serious Injury
- Collision marine vessel and facility
- Uncontrolled HC gas release >300 kg
- Pipelines - kind needing immediate investigation

Comparison of incidents notified in 2011 for all facility types and FPSOs/FSOs.
Hydrocarbon Releases

Rate per million hours

- All Facility Types
- FPSO/FSOs

Year:
- 2005
- 2006
- 2007
- 2008
- 2009
- 2010
- 2011
Damage to Safety Critical Equipment

**WARNING**

What is this telling us?

Rate per million hours

2005 2006 2007 2008 2009 2010 2011

All Facility Types
FPSO/FSOs

**WARNING**

What is this telling us?
Case Study 1: Lifeboats

- Offshore construction vessel intending to conduct construction activities associated with an operating petroleum facility
- Operator’s safety case says vessel is Special Purpose Ships (SPS) Code Compliant
- The SPS Code (in Reg 8.2) allows compliance with SOLAS Ch III (Passenger Ships)
Totally Enclosed Motorised Survival Craft (TEMPSC)
Case Study 1 cont’d

- SOLAS Ch III - lifeboats may be substituted (up to 37.5%) by life rafts
- For vessels (facilities) which may be exposed to hydrocarbon risks
  - good industry practice - provide lifeboats for 100% POB capacity on each side of the **facility** (depending on major accident events)
  - Used by operators of vessels that are facilities
  - Generally considered a practicable option (ALARP principle)
Case Study 2: Gas detectors

- Few IMO / SOLAS / Class requirements for gas detection
- Vessels *(facilities)* in hydrocarbon hazard environments require:
  - immediate indication of hydrocarbon releases
  - prompt emergency action
- Some vessel operators choose to:
  - fit gas detection equipment
  - link it to ESD actions e.g. shut-off of dampers to engine intakes to prevent ignition
Revised safety case - risks from hydrocarbon hazards:

- Gas detection system fitted to vessel
- $4 \times TEMPSC = 200\% \ POB$  
  (100\% capacity + 100\% redundancy)
- POB weight monitoring system to avoid overloading the lifeboat davit
NOPSEMA’s Role
Case Study 3 - Dynamically Positioned Offshore Construction Vessel

Activities proposed:
- Diving;
- Well intervention; and
- Construction near petroleum production facility

NOPSEMA Challenge:
- How does the operator ensure the health and safety of persons on the vessel facility in the event of a loss of containment of hydrocarbon on the adjacent petroleum production facility?
Some of the responses received from operators:

- “The vessel is not built to that standard. As the vessel is not a hydrocarbon producing facility it does not need ESD and Gas detection”
- “The other facility will tell us there is a gas release”
- (In relation to lifeboats ‘TEMPSC’) “The Special Purpose Ships Code does not require enclosed lifeboats... we have life-rafts”
- “We would always be able to move off”
- “You would be able to see a gas vapour cloud”
- “If you were in a gas cloud, what would be the point of a gas detection system anyway (at that stage)?”
- “Class don’t require any of these measures, the vessel meets their standards”
What can happen?

- Hydrocarbon vapour cloud ingested into diesel engine turbo charger intakes and ignited (Macondo)
Jascon 25 salvage vessel alongside Montara / West Atlas Wreck
• Vessels undertaking well intervention or similar work
  – standards available which describe options for vessel design which contribute to mitigation of hydrocarbon risks
• These standards address matters such as:
  – Location of Air intakes
  – ESD shut down principles
  – Hazardous Area Classification
  – Considerations for combustion engines (eg Ignition, Over-speed)
  – Rating of electrical equipment in hazardous Areas
• e.g. DNV-OS-A101
• Incident: Fire and explosion

• Issues:
  – Facility Design
  – Commissioning, QA/QC, carry-over into operations
  – Competency and training
  – Control room alarm flooding
  – Maintenance management
• **Regulatory intervention: Inspections**
• **Major deficiencies identified in:**
  – Maintenance backlog management
  – Effectiveness of operational control
  – SCEs not meeting performance standards
  – Reportable incidents
  – Housekeeping
• **Enforcement action included:**
  – Improvement Notices
  – Prohibition Notice
• **Initial response to intervention:**
  – Delegation to contractor
  – Completion dates not fully met
  – Over reliance on NOPSEMA to identify health and safety issues

• **Intervention options:**
  – Inspections
  – Potential escalation of enforcement
    • notice of intent to withdraw safety case
    • request revised safety case
It should not be assumed that the risk control measures that may be considered suitable for a *vessel* will necessarily meet the ALARP requirements for a *facility*.
Any Questions?