GN Outline - Vessel facilities exposed to external hydrocarbon hazards

Jeremy Dunster – Manager A & I
IMCA/NOPSEMA Workshop – NOPSEMA Offices Perth
23 February 2016
Agenda

- Introduction
- Facilities, AOPs and Vessels
- GN Outline
Introduction
Why – a key driver
 Specifically for vessel facilities exposed to external hydrocarbon hazards
• Focus on activities, HAZID, FERA, EERA and hydrocarbon emergency control measures
• Links to existing SC GNs
Facilities, Associated Offshore Places and Vessels
OPGGSA Schedule 3, clause 4

(1) A vessel or structure is taken to be a facility for the purposes of this Schedule while that vessel or structure:

(a) is located at a site in Commonwealth waters; and
(b) is being used, or prepared for use, at that site:

(i) for the recovery of petroleum, for the processing of petroleum, or for the storage and offloading of petroleum, or for any combination of those activities

(4) A vessel or structure used for a purpose referred to in subparagraph (1)(b)(i) includes:

(a) any wells and associated plant and equipment by means of which petroleum processed or stored at the vessel or structure is recovered; and
(b) any pipe or system of pipes through which petroleum is conveyed from a well to the vessel or structure; and
(c) any secondary line associated with the vessel or structure.
“Production” Facilities (2)
OPGGSA Schedule 3, clause 4

(1) A vessel or structure is taken to be a facility for the purposes of this Schedule while that vessel or structure:

(a) is located at a site in Commonwealth waters; and

(b) is being used, or prepared for use, at that site:

(ii) for the provision of accommodation for persons working on another facility, whether connected by a walkway to that other facility or not; or

(iii) for drilling or servicing a well for petroleum or doing work associated with the drilling or servicing process; or

(iv) for laying pipes for petroleum, including any manufacturing of such pipes, or for doing work on an existing pipe; or

(v) for the erection, dismantling or decommissioning of a vessel or structure referred to in a previous subparagraph of this paragraph
• OPGGS(S) Reg 1.6 – activities that exclude a vessel or structure from being a facility
• OPGGS(S) Reg 1.7 (1) – activities that exclude a vessel or structure from being an AOP
• Diving and dumb barge hipped up to facility not excluded from being an AOP
• Reg 1.7(1) does not apply where “a facility is causing a risk (other than an ordinary marine risk) to the vessel or to persons on the vessel”, e.g. from hydrocarbon hazards
GN Outline
Activities: Operational Boundaries (1)

• What
  – Activities

• Where
  – Location and associated features

• When
  – Time of year and associated met ocean implications

• How
  – Techniques, equipment and people
• **Project Specific scope**
  – Operational boundaries well defined, access to actual data from facility operator
  – Likely to be a simpler case with less uncertainty >> less conservatism anticipated
  – Should result in the incorporation of only additional control measures that will be required
  – Revisions on a per project basis as required
• Generic (non-project specific) scope
  – Requires operational boundaries to be assumed and associated data sourced or estimated
  – Potentially more complex case with higher levels of uncertainty >> more conservatism expected.
  – May result in the incorporation of additional control measures that are seldom required.
  – Revisions based on proposed work vs operational boundaries of case, requires review for each project
• Hazards with the potential to cause an MAE
• Hydrocarbon hazards associated with vessel facility activities, and;
• Hydrocarbon hazards from concurrent activities by other facilities and / or vessels with the potential to impinge on vessel facility
• Hydrocarbon inventories:
  – Wells
  – Risers
  – Flowlines/Pipelines
  – Topsides facilities
    • Platforms
    • FPSO/FSO
• Fluid compositions
• Fires & explosion that could occur at the facility

• Consider a range of measures for:
  – Detection, Elimination & Risk reduction
  – Manual and automatic detection, control & extinguishing fires and leaks or escapes of petroleum
  – Isolating & storing hazardous substances

• Consider the EERA for fires and explosions

• Identify measures to reduce risks to ALARP
• Considerations:
  – Jet fires from a production facility
  – Sea fires
  – Pool fires on the vessel facility
  – Gas and vapour cloud explosions
    • At an adjacent facility
    • At the vessel facility
• Considerations:
  – Provision of fixed gas detection at key locations such as:
    • Around outer decks and elevated locations,
    • Moon-pools,
    • large cranes,
    • ventilation inlets for engine room(s), machinery spaces, emergency generators and accommodation spaces and muster areas.
• Vessel ESD systems typically:
  – focused on containing internal fires (engine rooms & machinery spaces, accommodation, cargo holds).
  – do not address redundant systems used to contain and control such internal fires

• Production facility ESD systems typically:
  – Focused on **minimising fires & explosions**
  – Cascaded from local to entire facility black-out
• Considerations:
  – What to shutdown (deck loads, cranes, → everything except emergency systems)
  – Where (local, Bridge, Bridge & local)
  – When (inputs, criteria)
  – Why (fire & explosion prevention)
• Considerations
  – EX rated emergency equipment, lighting, PA etc
  – Isolation of cranes and other vessel equipment
  – Isolation of 3rd party deck equipment
  – Emergency disconnect/release systems
  – Ventilation Shutdowns & damper closures
• Client provided controls
  – How do you assure yourself they are functional
• Details of fluids
  – composition, pressure, volume
• Dispersion modelling
  – Input into FERA
Emergencies that could occur at the facility

Consider a range of measures for:
- Primary & secondary evacuation & escape routes
- Procedures for managing evacuation, escape & rescue
- Means of, & equipment for, evacuation, escape & rescue
- Amenities and emergency communication for TR
- Life saving equipment

Identify measures to reduce risks to ALARP
Considerations:
- Vessel position vs hydrocarbon hazards
- Drift-on, drift-off
- Drive-off
- Black ships + drift-off
- TEMPSC
• Considerations:
  – Emergency disconnect/fail-safe
  – Soft tethers
  – Cranes with Manual Override Protection Systems
  – TEMPSC vs lifeboat
• Considerations:
  – Location with respect to hydrocarbon hazards and means of evacuation
  – Level of protection from hydrocarbon events
  – Capacity
  – Communications
  – Ventilation
• ESSA - A technique for demonstrating that equipment intended to function, or to be used, in an emergency— is fit for its function or use in the emergency (OPGGS(S) Reg 2.14 (2) (b))

• Dispersion modelling – commonly used for subsea releases.
Considerations

- Clear linkage to emergencies identified in FSA
- Unambiguous descriptions of hydrocarbon event emergency responses
- Drills and exercises for hydrocarbon related events
- Timeliness of hydrocarbon related event drills
- Interface with production facility plan
- Performance standards
Control measure selection

• Considerations
  – Existing vessel controls & new additions
  – Prevention vs mitigation
  – Uncertainty & conservatism
  – Client provided controls
  – Risk reduction & ALARP
• A description that gives **details** of facility:
  – Layout
  – Technical control measures
  – Activities

• Specific provisions eg:
  – Safety related machinery and equipment
  – Medical and Pharmaceutical supplies
  – Emergency comms, control systems
• A **detailed** description of the SMS, that is:
  – Is comprehensive and integrated
  – Provides for risk management
  – Inspection testing and maintenance of control measures

• Specific provisions for:
  – Command structure
  – Workforce competency
  – Emergency preparedness and medical services
Any further questions or suggestions?