

Assessment findings

Assessment ID 3309

Duty holder: Woodside Energy Ltd

Facility/Activity: Northern Endeavour

Facility type: Floating production storage and offloading facility

Assessment type: Safety Case

Findings relating to OPGGS(S)

Regulation Clause ID	Regulation Clause	Topic Scope	Comment
2.10	Permit to work system for safe performance of various activities	General	Adequately described in Part 3 section 7 of the safety case.
2.11	Involvement of members of the workforce (a) & (b)	General	Adequately described in Part 3 section 5 (5.4) of the safety case.
2.12	Design, construction, installation, maintenance and modification	General	Adequately described in Part 2 sections 2.10, 2.11, 5.5 & 5.6 and Part 3 section 6 of the safety case.
2.13	Medical and pharmaceutical supplies and services	General	Adequately described in Part 2 section 5.17 of the safety case.
2.14	Machinery and equipment	Dropped Objects	Described in Part 2 section 3.9.19 and Part 4 section 4.6.2 of the safety case.
		General	Described in Part 2 section 3, Part 3 section 6 and Part 4 section 4.6 of the safety case. (Same RFFWI as under 2.5(1)).
		Loss of Containment	Part 2, s.5 describes safety design and systems. There is not a sufficiently detailed description of segmentation of the topsides system and the disposition of ESDVs and BDVs. RFFWI - Please provide a full description of the segmentation of the topsides system and the disposition of ESDVs and BDVs. (Same RFFWI as under 2.5(1)) - response accepted CB 12/10/2015
2.15	Drugs and intoxicants	General	Adequately described in Part 2 section 5.17 and Part 3 section 3.4.1 of the safety case.
2.16	Evacuation, escape and rescue analysis	General	Adequately described in Part 3 section 9 and Part 4 sections 4.3, 4.4 & 5 of the safety case.
2.17	Fire and explosion risk analysis	Accommodation Fire	DG - FSA section 4.1 4.1 Formal Safety Assessment Summary Table 3 identifies the Accommodation and Machinery Space Fire Study that was undertaken. DG - FSA section 4.2.1 Accommodation and Machinery Space Fires Study provides a summary of the Accommodation and Machinery Space Fire Study DG - FSA section 4.2.2 Fire & Explosion Events identifies the threats associated with MAE-08
		General	Described in Part 4 sections 4.2 & 5 of the safety case. RFFWI below.

2.17	Fire and explosion risk analysis	Loss of Containment	<p>Part 4, s.4.2 The MSDS for this MAE 02 discusses turbine disintegration, and the FD describes active fire fighting in the turbine enclosures. There does not appear to be a description of ESD for the turbines and clarification as to whether the gas flooding in the turbine enclosures and compressor units is automatically activated, or not - RFFWI - response accepted - CB 12/10/2015</p> <p>Part 4, s.4.2.3.6 (FERA description) states that, "In the event of a release from the oil meter skid, the rigid off-loading line or the floating hose, the duration would be limited by shutdown of the cargo pumps." It is not stated whether this shutdown is automated, or manual. If it is automated - what is the activation trigger? - RFFWI - response accepted - CB 12/10/2015</p>
2.18	Emergency communications systems	General	<p>Described in Part 2 sections 5.7.2, 5.8 & 5.9 of the safety case. RFFWI for 2.5(3)(e) - impairment of CCR - response accepted - CB 12/10/2015 .</p>
2.19	Control systems	General	<p>Described in Part 2 sections 3.9.1.3, 3.9.1.4, 3.9.4, 5.5 & 5.7.1 of the safety case. RFFWI - Black start arrangements and equipment supplied by emergency generator (including ballast/stability control arrangements) not described - response accepted - CB 12/10/2015 .</p>
2.20	Emergency preparedness	General	Adequately described in Part 3 sections 4.3.2.2 & 9 of the safety case.
2.21	Pipes	General	N/A
2.22	Vessel and aircraft control	General	Adequately described in Part 2 sections 2.6.10, 2.6.12, 2.6.13, 5.8, 5.9 & 5.16.3 and Part 3 section 8 of the safety case.
2.23	Arrangements for records	General	Adequately described in Part 1 section 4.3 and Part 3 section 6.1 of the safety case.
2.26/34(1)	Safety Case is appropriate	General	
2.32	Revision after 5 years	General	<p>Part 2, s.2.10 - Facility Integrity & class verification program. Part 2, s.2.11.3.1 - Management System Based Controls. Part 3, s.10.1 Monitoring & Assurance & "Annual Compliance Statement". Part 3, s.10.2 - Assurance</p>
2.40	Validation - Measures consistent wth FSA	General	N/A
	Validation - Measures to protect health & safety	General	N/A
	Validation - Statement agrees with scope	General	N/A
	Validation - Validator access to data	General	N/A
	Validation - Validator competence & ability	General	N/A
	Validation - Validator independence	General	N/A

2.5(1)	The description of the facility	Accommodation Fire	<p>DG - FD section 2.4 provides a general overview of accommodation</p> <p>DG - FD section 3.4.4 provides a description of the accommodation arrangements</p> <p>DG - FD section 3.9.1.3 Lighting & Small Power states "All accommodation General Purpose Outlets (GPOs) have Residual Current Devices (RCDs) including laundry and galley appliances. (controls ignition potential caused via circuit fault)</p> <p>DG - FD section 5.4.1 describes the Flame, Heat and Smoke Detection system</p> <p>DG - FD section 5.7.2.1 describes the PA arrangement in the accommodation</p> <p>DG - FD section 5.10.1 describes Non Hazardous Area Ventilation</p> <p>DG - FD section 5.11.3 describes the layout & location of the accommodation to mitigate explosion overpressure from the process areas</p> <p>DG - FD section 5.12.1 describes the Passive Fire Protection associated with the accommodation</p> <p>DG - FD section 5.12.2 Table 5 – Firewater/Foam Systems by Area describes the protection system provided to accommodation</p> <p>DG - FD section 5.12.2.2 describes the use of Portable Firefighting Equipment in accommodation areas</p> <p>DG - FD section 5.12.2.4 describes the Galley Fire Suppression System</p>
		Dropped Objects	<p>Material handling systems described in Part 2 Section 3.9.19</p> <p>Dropped Object Protection described in Part 2 Section 5.2</p>
		General	<p>Described in Part 2 of the safety case.</p> <p>RFFWI in the following sections.</p>
		Loss of Containment	<p>Part 2, ss.2.6.5 & 2.6.6 describe cargo operations including tank washing & crude oil offtake operations.</p> <p>Part 2, s.2.10 describes class society annual verification of facility integrity against performance standards.</p> <p>Part 2, s.3.4.3 describes the FPSO Topsides Layout; s.3.7 describes Topsides Process Overview</p> <p>Part 2, s.3.9.16 describes the Inert Gas System</p> <p>Part 2, s.4.1.1 describes helifuel storage</p> <p>Part 2, s.4.1.4 describes Methanol storage & fire-fighting controls. RFFWI - please describe any fire detection system that has been implemented to specifically detect methanol fires - the flames from which are near-invisible in daylight conditions. Response accepted CB 12/10/2015</p> <p>Part 2, s.5 describes safety design and systems. There is not a sufficiently detailed description of segmentation of the topsides system and the disposition of ESDVs and BDVs. RFFWI - Please provide a full description of the segmentation of the topsides system and the disposition of ESDVs and BDVs. Response accepted CB 12/10/2015</p> <p>Part 2, s.3.6 refers to Part 3, s.6.2 which describes the "Technical Integrity Envelope"</p> <p>Part 3, s.8.2 describes helicopter refuelling ops.</p> <p>Part 4, Table 2, Hazard ID 2.6 identifies "loss of hydrocarbon containment from utility equipment resulting in jet / spray fire". The FD does not describe the use of anti-spray tape on the LP components of diesel / fuel fittings . RFFWI - please clarify whether anti-spray tape has been implemented on the diesel systems identified in Part 2, s.4.1.3. The response does not refer to the Favco crane diesel inventories referred to in Part2. S.4.1.3. However, the response is accepted on the basis that this issue is amenable to planned inspection – see existing recommendation 1175-10 (CB 12/10/2015).</p>
2.5(2)(a)	FSA HAZID	Accommodation Fire	<p>DG - FSA section 3.2 Major Accident Events Identification Table 2 identifies the hazards that make up MAE-08 Accommodation Fire</p>
		Dropped Objects	<p>Part 4, table 2 identifies the hazards that make up this MAE.</p>
		General	<p>Described in Part 4, section 3 and Part 3 section 2.2</p>
		Loss of Containment	<p>Part 4, s.3.1 describes updating of Hazard Register in 2014 for this SCR.</p> <p>Part 4, table 2 identifies the hazards that make up this LoC MAE</p>
2.5(2)(b)	FSA Risk assessment	Accommodation Fire	<p>DG - FSA section 3.2 Major Accident Events Identification Table 2 identifies the consequence & likelihood for MAE-08 as B0 - medium (Multiple fatalities & Remote: Unheard of in the industry). [see Woodside response #7 in Rev 9b - Rejection Comments A440160]</p> <p>DG - FSA section 4.1 4.1 Formal Safety Assessment Summary Table 3 identifies the Accommodation and Machinery Space Fire Study that was undertaken.</p> <p>DG - FSA section 4.2.1 Accommodation and Machinery Space Fires Study provides a summary of the Accommodation and Machinery Space Fire Study</p>
		Dropped Objects	<p>Dropped object study described in Part 4 section 4.6.2</p> <p>MAE datasheets and bowties provided in Part 4 section 6.3.5</p>
		General	<p>Described in Part 4 section 4 of the safety case.</p>

2.5(2)(b)	FSA Risk assessment	Loss of Containment	<p>Part 4, s.7 describes ALARP review process for this 5Y SCR.</p> <p>Part 4, s.7.3 describes HAZOP & SIL studies undertaken within the last 5 years. see also Part 3, s.2.2</p> <p>Consequences & likelihood for MAE 02 hazards assessed (Multiple fatalities x highly unlikely)</p> <p>NB: The submission will comply with this regulation if a satisfactory to the RFFWI against 2.5(2)(c) are received</p>
2.5(2)(c)	FSA controls to achieve ALARP	Accommodation Fire	<p>DG -FSA section 4.10.2 Potential Loss of Life Table5 provides the calculated QRA for MAE-08</p> <p>DG - FSA section 5.2.1 Safety Critical Elements Table 8 identifies the Safety Critical equipment for MAE -08</p> <p>DG - FSA section 6.3.8 provides the Major Accident Event Datasheet for MAE-08.</p> <p>DG - FSA section 7.2.2 RRM / ALARP Review provides the outcome of the risk reduction measure & ALARP workshop; 3 measures were considered (15-17 incl) with 2 accepted for implementation</p>
		Dropped Objects	<p>Dropped object study described in Part 4 section 4.6.2</p> <p>MAE datasheets and bowties provided in Part 4 section 6.3.5</p>
		General	<p>DG - FSA section 6.1 MAE Datasheet Overview Figure 4 notes associated with section 7 states "It also includes summary of safety critical & management elements for each MAE" & "Sheet B also lists all safety critical and management elements associated with the MAE". This information has not been provided for any of the MAEDS</p>
		Loss of Containment	<p>Part 4, s.7.2.2 describes Risk Reduction Measures for MAE 02 identified and accepted.(2) / declined (2) in Bowtie Workshop - April 2015.</p> <p>Part 4, s.7.2.2 discusses and appears to decline RRM for protection of cargo tanks from dropped objects (MAE 05). The discussion is unclear as to what mitigating controls are in place against this identified cause for an MAE 02 top event. RFFWI - please clarify. Response accepted CB 12/10/2015</p> <p>MAE 02 outcomes bowtie diagram mentions CCTV as a detection control but then says CCTV is "not safety critical". RFFWI - is CCTV a control for this MAE or not? Response accepted CB 12/10/2015</p> <p>See RFFWIs under reg 2.5(1)</p>
2.5.(3)(a)	SMS comprehensiveness and integration	General	Adequately described in various sections of Part 3 of the safety case.
2.5.(3)(b)	SMS scope	General	Adequately described in various sections of Part 3 of the safety case.
2.5.(3)(c)	SMS HAZID	General	Adequately described in Part 3 section 2 of the safety case.
2.5.(3)(d)	SMS assessment of OHS hazards & risks:	General	Adequately described in Part 3 section 2 of the safety case.
2.5.(3)(e)	SMS risk reduction (ALARP)	Accommodation Fire	<p>DG - The management system based controls identified in the MAE-08 MAEDS are addressed in</p> <p>SMS section 6.5 describes maintenance and inspection</p> <p>SMS section 3.3 Competence & Training</p> <p>SMS section 8 Contractor Management</p> <p>SMS section 9 Emergency Management</p> <p>DG - FSA section 4.3.1 states the "Though not considered MAEs at the time, the EERA also included assessment of the EER facilities performance for Accommodation and Machinery Space Fire events."</p> <p>DG - FSA section 4.4 Temporary Refuge Analysis concludes "None of the accident events have the potential to directly impair the structural or command integrity of the TR", however this appears to be inconsistent with FSA section 6.3.8 MAE-08 MAEDS which states "This has the potential for impairment of the TR, CCR and evacuation systems. Impairment of the CCR would result in loss of control functionality" In addition FSA section 4.10.4 Table 7 indicates the Impairment Frequency of the TR for this MAE.</p> <p>** RFFWI Please provide further written information that clarifies whether an accommodation fire has the potential to impair the TR, CCR and evacuation systems. Response accepted CB 12/10/2015</p> <p>DG - FSA section 4.10.4 Temporary Refuge Impairment Frequency Table7 assesses the impairment potential on the temporary refuge by MAE-08</p>

2.5.(3)(e)	SMS risk reduction (ALARP)	Dropped Objects	The management system based controls identified in s.5.3.1 of the FSA are adequately described in the SMS (Part 3), including: Part 3, s.3.2 describes GSRs including Process / Mechanical Isolations & PTW Part 3, s.4.1 describes roles and accountabilities related to technical integrity Part 3, s.5.4 describes workforce involvement, including HAZIDs & risk assessments Part 3, s.6 describes Integrity Management including the Facility Integrity Envelope & performance standards for MAE controls & MOPO Part 3, s.6.5 describes maintenance and inspection Part 3, s.6.6 describes Technical Change Management
		General	DG - SMS section 6.4 Management System Based Controls states "Woodside has commenced a review to ascertain the presence or otherwise of deficiencies in its current method for verifying the performance of safety critical procedural controls and management system assurance. This work is ongoing." **RFFWI - Please provide further written information on the nature of this review and describe what systems are currently in place to ensure the veracity of the management controls that have been identified as barriers to MAEs. CB 12/10/2015 - The response does not usefully add to the information in the safety case. DG 12/10/2015 – Response not accepted, to refer to an earlier meeting does not satisfy the requirement to provide a detailed description of the system of controls nor does the text in the current version of the SC which states a review is ongoing to “ascertain the presence or otherwise of deficiencies in its current method for verifying the performance of safety critical procedural controls and management system assurance”. Section 10.2 provides an overview of the Assurance process however there is no elaboration on the work being undertaken in this area with respect to verifying the Management System Controls
		Loss of Containment	The management system based controls identified in s.5.3.1 of the FSA are adequately described in the SMS (Part 3), including: Part 3, s.3.2 describes GSRs including Process / Mechanical Isolations & PTW Part 3, s.4.1 describes roles and accountabilities related to technical integrity Part 3, s.5.4 describes workforce involvement, including HAZIDs & risk assessments Part 3, s.6 describes Integrity Management including the Facility Integrity Envelope & performance standards for MAE controls & MOPO Part 3, s.6.5 describes maintenance and inspection Part 3, s.6.6 describes Technical Change Management Part 3, s.8.2 describes helicopter refuelling operations
2.5.(3)(f)	SMS provides for inspection, testing and maintenance	General	SMS section 6.5 Maintenance and Inspection provides an overview of the maintenance & inspection objectives, system & philosophies & refers to the "Production Maintenance and Inspection Operating Standard". The issue of ageing facility &/or end of field life strategies are not addressed.
		Inspection Maintenance and Repair	DG - FD section 2.6.4 Inspection, Testing & Maintenance provides generalised overview & refers to SMS section 6.5 DG - FD section 2.11.3.1 Management System Based Controls identifies Maintenance & Inspection as a key management control measure DG - SMS section 6.5 Maintenance and Inspection provides an overview of the maintenance & inspection objectives, system & philosophies & refers to the "Production Maintenance and Inspection Operating Standard". The issue of ageing facility &/or end of field life strategies are not addressed. **RFFWI - Please provide further written information with respect to what strategies are being employed with respect to the ageing nature of the facility and the potential end of field life to ensure that the risks are being managed to ALARP. DG12/10/2015 – response accepted however recommend this matter be included in the next planned inspection to ensure maintenance/inspection programmes have been reviewed/revised cognisant of the ageing facility.
2.5.(3)(g)	SMS provisions for adequate communications	General	Adequately described in Part 3 sections 5, 8.1 and 8.2 of the safety case. Description of the communications systems provided in Part 2 of the safety case.
2.5.(3)(i)	SMS performance standards.	General	Adequately described in Part 3 section 6.3 of the safety case.
2.6	SMS Implementation and improvement	General	Adequately described in Part 3 section 10 of the safety case.

2.7	Standards to be applied	General	<p>PD - The safety case does not specify the Australian and international standards that have been applied for the OPERATIONS stage in the life of the facility. Standards have been specified for the design stage of the facility. Operator response to the RFFWI raised in relation to this deficiency accepted - CB 12/10/2015</p> <p>DG - SMS section 4.2.2 Marine Group support function makes reference to "The Australia Offshore Support Vessel Code of Safe Working Practice". This is a superseded standard, it was initially replaced by Australian Supplement to Version 2 of the NWEA Guidelines for the Safe Management of Offshore Supply and Rig Move Operations however NWEA Guidelines also superseded by Guidelines for Offshore Marine Operations 2013.</p>
2.8	Command structure (Refer to N-4300-PL0052 with respect to FPSOs)	General	Adequately described in Part 3 section 4 of the safety case.
2.9	Members of the workforce must be competent	General	Adequately described in Part 3 section 4 of the safety case.