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| SCE Description | Emergency Depressurisation (Blowdown) System | Teste0000012033 | SCE Custodian |  |

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| SAFETY CRITICAL ELEMENT | Emergency Depressurisation (Blowdown) System |
| OBJECTIVE(S) | - To provide a means of controlled and safe disposal of hydrocarbon gas to the flare system. - To provide controlled pressure reduction of the process plant to a safe pressure in the event of a fire or specified process upset and minimise the potential for escalation by reducing the volume of the inventory. |
| SCOPE / BOUNDARY LIMIT | The following are included in this SCE: - Blowdown valves, control cabling from BDV to ESD panel - Locking system for manual isolation valves on blowdown pipework Note: Blowdown piping is covered under DC-02 Flare and Vent System |
| SYSTEM DESCRIPTION |  |

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| INTERDEPENDENCY | |
| SCE | Relationship |
| PR-08 (Hydrocarbon Containment – Process/Utilities)  DC-02 (Vent & Flare System)  DC-03 (Fire & Gas Detection)  DC-04 (Emergency Shutdown System)  MI-01 (Passive Fire Protection) | Allows blowdown of process hydrocarbons  Provide a means for safely disposal of process fluids  Fire & Gas System initiate shutdown and blowdown  ESD initiates blowdown as per Cause & Effect  Applied to blowdown valves and supporting structures as necessary to protect against fire event |

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| CORPORATE CRITERIAS | |
| CRITERIA NO. | DC-05-09 |
| PROCESS SAFETY SPECIFICATION | Reliability/ Availability |
| STATEMENT | Reliability |
| MODEC CORPORATE PERFORMANCE CRITERIA | The Blowdown System external field equipment shall meet IP66 minimum. |
| REFERENCES |  |

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| FUNCTIONAL SPECIFICATION | | |
| Regulations | Regulations (Internacional/Class/Local) | Reference |
| CLASS REQUIREMENT(S) : ABS |  | - |
| CLASS REQUIREMENT(S) : DNV-GL | 3.1.2 The depressurising system shall be as simple as practicable and shall be designed according to the fail safe principle. This normally implies that blow down valves are spring return, and fail to open position. | DNVGL-OS-E201 Ch2Sc3/3.1.2 (Jul-2015) |
| MODEC Corporate Standards | Blowdown valves shall be air failure open, normally energized ball valves. Loss of signal to the control / shutdown solenoid valves shall result in the valve moving to its Fail Safe position. | 0003-MI20-0006-0050 FPSO Design Philosophy Section 12.2.3.1 0003-MI20-50S1-0240 Instrument and Actuated Valve Specification 6.4 |
| CODES / STANDARD(S) |  | - |
| INTERNATIONAL REGULATION(S) |  | - |
| LOCAL REGULATION(S) (BRAZIL) |  | - |

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| Availability / Reliability Specification | | | |
| Task Num. | Task | Owner | Phase |
|  | Covered in other EPCI assurance task |  | Design |
|  | No commissioning assurance tasks. |  | Commissioning |
| DC-05-09P | Confirm by review of vendor data sheets and relevant certification (type approvals, 3rd party reports, etc.) that the blowdown system field devices purchased are rated as IP66 minimum. | I&C | Procurement |
|  | No construction assurance tasks. |  | Consutuction Quality |

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| CORPORATE CRITERIAS | |
| CRITERIA NO. | DC-05-10 |
| PROCESS SAFETY SPECIFICATION | Reliability/ Availability |
| STATEMENT | Availability |
| MODEC CORPORATE PERFORMANCE CRITERIA | Manual isolation valves installed on blowdown pipework shall be locked open. |
| REFERENCES | (API STD 521) |

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| FUNCTIONAL SPECIFICATION | | |
| Regulations | Regulations (Internacional/Class/Local) | Reference |
| CLASS REQUIREMENT(S) : DNV-GL |  | - |
| CODES / STANDARD(S) |  | IEC-61508/ IEC-61511 |
| INTERNATIONAL REGULATION(S) |  | - |
| LOCAL REGULATION(S) (BRAZIL) |  | - |
| CLASS REQUIREMENT(S) : ABS |  | - |

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| Availability / Reliability Specification | | | |
| Task Num. | Task | Owner | Phase |
|  | No commissioning assurance tasks. |  | Commissioning |
| DC-05-10D | Confirm by review of P&ID that manual isolation valves installed on blowdown pipework are locked open. | Topsides Process | Design |
| DC-05-10C | Confirm via site inspection of LO/LC provision on manual isolation valves blowdown pipework to ensure that they shall be locked open. | Piping/Mechanical | Consutuction Quality |
|  | No procurement assurance tasks. |  | Procurement |

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| CORPORATE CRITERIAS | |
| CRITERIA NO. | DC-05-02 |
| PROCESS SAFETY SPECIFICATION | Functionality |
| STATEMENT | Manual Operation |
| MODEC CORPORATE PERFORMANCE CRITERIA | Blowdown valves shall remain open until manual reset in the CCR. Manual reset (closure) of blowdown valves shall not be possible during an Emergency Shutdown. |
| REFERENCES |  |

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| FUNCTIONAL SPECIFICATION | | |
| Regulations | Regulations (Internacional/Class/Local) | Reference |
| CLASS REQUIREMENT(S) : DNV-GL | 2.1.1 Shutdown or emergency stop commands shall not be reset automatically. Important shutdown devices shall only be reset locally after the initiating shutdown command has been reset by the operator. Guidance note: For ESD valves see DNVGL-OS-E201 for details, however it is accepted that blow down valves are equipped with remote reset. | DNVGL-OS-D202 Ch2Sc7/2.1.1 (Jul-2015) |
| CODES / STANDARD(S) |  | - |
| MODEC Corporate Standards |  | 0003-MI20-0006-0050 FPSO Design Philosophy 0003-MI20-50S1-0240 Instrument and Actuated Valve Specification |
| INTERNATIONAL REGULATION(S) |  | - |
| CLASS REQUIREMENT(S) : ABS |  | - |
| LOCAL REGULATION(S) (BRAZIL) |  | - |

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| Availability / Reliability Specification | | | |
| Task Num. | Task | Owner | Phase |
|  | Covered in other EPCI assurance task |  | Design |
|  | No construction assurance tasks. |  | Consutuction Quality |
| DC-05-02M | Confirm by witness testing and review of Commissioning Records that blowdown valves remain open until manual reset is engaged in the CCR. |  | Commissioning |
| DC-05-02P | Confirm via review of vendor specifications that blowdown valves will remain open until manual reset in the CCR. Manual reset (closure) of blowdown valves will not be possible during an Emergency Shutdown. | I&C | Procurement |

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| CORPORATE CRITERIAS | |
| CRITERIA NO. | DC-05-03 |
| PROCESS SAFETY SPECIFICATION | Functionality |
| STATEMENT | Controlled and safe disposal of fluids |
| MODEC CORPORATE PERFORMANCE CRITERIA | Suitably-sized blowdown orifices shall be used as required to control depressurisation of individual parts of the process system. Blowdown valves and blowdown orifices arrangement (separation distance) shall allow for the ‘cold temperature creep’ effect. |
| REFERENCES |  |

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| FUNCTIONAL SPECIFICATION | | |
| Regulations | Regulations (Internacional/Class/Local) | Reference |
| MODEC Corporate Standards | The standard installation for a BDV associated with topsides processing facilities shall include the installation of a restriction orifice downstream of the BDV. | 0003-MI20-0006-0050 FPSO Design Philosophy Section 8.9.3.2 |
| LOCAL REGULATION(S) (BRAZIL) |  | - |
| INTERNATIONAL REGULATION(S) |  | - |
| CLASS REQUIREMENT(S) : ABS |  | - |
| CODES / STANDARD(S) |  | API 521 |
| CLASS REQUIREMENT(S) : DNV-GL |  | - |

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| Availability / Reliability Specification | | | |
| Task Num. | Task | Owner | Phase |
| DC-05-03C | Confirm by inspection report that correctly-sized blowdown orifice with adequate separation distance from blowdown valve as per the P&ID is installed at site. | Piping/Mechanical | Consutuction Quality |
|  | No commissioning assurance tasks. |  | Commissioning |
| DC-05-03D | Review Flare Blowdown Study and P&ID (to show the separation distance) to confirm that blowdown orifices are adequately sized to meet the performance standard criteria. | Topsides Process | Design |
|  | No procurement assurance tasks. |  | Procurement |

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| CORPORATE CRITERIAS | |
| CRITERIA NO. | DC-05-06 |
| PROCESS SAFETY SPECIFICATION | Functionality |
| STATEMENT | Vapour-depressuring system design |
| MODEC CORPORATE PERFORMANCE CRITERIA | Blowdown system shall be designed such that the pressure shall be reduced to at least 6.9 barg or 50% of design pressure in less than 15 minutes from initiation. |
| REFERENCES | (API STD 521) |

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| FUNCTIONAL SPECIFICATION | | |
| Regulations | Regulations (Internacional/Class/Local) | Reference |
| INTERNATIONAL REGULATION(S) |  | - |
| MODEC Corporate Standards | An emergency shutdown and blowdown system shall be provided for the topsides processing facilities to prevent the escalation of abnormal situations into major hazardous events. | 0003-MI20-0006-0050 FPSO Design Philosophy Section 8.9.3.2 |
| LOCAL REGULATION(S) (BRAZIL) | 15.2.3 Automatic systems must exist on platforms that shut down the process, isolate the systems and equipment and, when required, depressurize the equipment in order to limit the escalation of abnormal situations, such as oil spills or fire. | NR30-15.2.3 |
| CODES / STANDARD(S) | Fire as a cause of overpressure in plant equipment is discussed in 5.15. A provision for initiating a controlled shutdown or installation of a depressuring system for the units can minimize overpressure that results from exposure to external fire. More often, depressuring systems are used toreduce the failure potential for scenarios involving overheating (e.g. fire). When metal temperature is increaseddue to fire or exothermic or runaway process reactions, the metal temperature can reach a level at which stressrupture can occur. | API 521 Section 4.3.14 API 521 Section 5.20 |
| CLASS REQUIREMENT(S) : DNV-GL |  | DNVGL-OS-A101 (Jul-2018) |
| CLASS REQUIREMENT(S) : ABS |  | ABS FOI |

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| Availability / Reliability Specification | | | |
| Task Num. | Task | Owner | Phase |
|  | No commissioning assurance tasks. |  | Commissioning |
|  | No construction assurance tasks. |  | Consutuction Quality |
|  | No procurement assurance tasks. |  | Procurement |
| DC-05-06D | Confirm by review of the Flare Blowdown Study that blowdown system shall be designed such that the pressure shall be reduced to at least 6.9 barg or 50% of design pressure in less than 15 minutes from initiation. | Topsides Process | Design |

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| CORPORATE CRITERIAS | |
| CRITERIA NO. | DC-05-11 |
| PROCESS SAFETY SPECIFICATION | Survivability |
| STATEMENT | Fire and Explosion MAE |
| MODEC CORPORATE PERFORMANCE CRITERIA | Blowdown Valves shall be fire safe as per API 6FA and API 607, or a recognized international standard. |
| REFERENCES | (FPSO Design Philosophy 0003-MI20-0006-0050, Section 12.2.3.1 & Instrument and Actuated Valve Specification 0003-MI20-50S1-0240, Section 6.2) |

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| FUNCTIONAL SPECIFICATION | | |
| Regulations | Regulations (Internacional/Class/Local) | Reference |
| CODES / STANDARD(S) |  | IEC 60079 |
| INTERNATIONAL REGULATION(S) |  | - |
| LOCAL REGULATION(S) (BRAZIL) |  | - |
| MODEC Corporate Standards | 12.3.3 Ingress Protection of Instrumentation For all field mounted equipment, the degree of ingress protection shall be IP56 to EN 60529, irrespective of the requirements of the hazardous area. INGRESS PROTECTION • Electronic Instruments, Local Panel, and Control Panel: - Weather Protection: IP 66 (Outdoor) - Weather Protection: IP 54 (Indoor) | 0003-MI20-0006-0050 FPSO Design Philosophy Section 12.3.3 '0003-MI20-50S1-0240 Instrument and Actuated Valve Specification Section 4.1 |
| CLASS REQUIREMENT(S) : DNV-GL |  | - |
| CLASS REQUIREMENT(S) : ABS |  | - |

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| Availability / Reliability Specification | | | |
| Task Num. | Task | Owner | Phase |
|  | No commissioning assurance tasks. |  | Commissioning |
|  | No construction assurance tasks. |  | Consutuction Quality |
| DC-05-11P | Confirm via review of vendor valve certificates that all blowdown valves shall be fire safe as per API 6FA and API 607, or a recognized international standard. | I&C | Procurement |
|  | Covered in other EPCI assurance task |  | Design |

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| CORPORATE CRITERIAS | |
| CRITERIA NO. | DC-05-05 |
| PROCESS SAFETY SPECIFICATION | Functionality |
| STATEMENT | Controlled and safe disposal of fluids |
| MODEC CORPORATE PERFORMANCE CRITERIA | Depressurisation (blowdown) facilities shall be provided for hydrocarbon-containing systems which have the potential to result in a loss of system integrity during a fire and present a significant escalation hazard. |
| REFERENCES | (FPSO Design Philosophy 0003-MI20-0006-0050 Section 8.9.3.2) |

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| FUNCTIONAL SPECIFICATION | | |
| Regulations | Regulations (Internacional/Class/Local) | Reference |
| LOCAL REGULATION(S) (BRAZIL) |  | - |
| CLASS REQUIREMENT(S) : DNV-GL | 2.1.5 Line pockets shall be avoided as far as possible in all piping systems, and in particular in the following: — blowdown and relief valve discharge lines — compressor suction lines — lines where water can accumulate and freeze — lines carrying caustic or acidic fluids, or other fluids that may freeze — lines which contain solids which may settle out — piping in which corrosive condensate may form. | DNVGL-OS-E201 Ch2Sc6/2.1.5 (Jul-2015) |
| MODEC Corporate Standards | All lines shall be sloped from the source of discharge into their respective flare KO drums to allow for free drainage. If low points cannot be avoided, drains shall be installed to keep pockets free of liquids Pockets in the flare header system shall be prohibited | 0003-MI20-0006-0050 FPSO Design Philosophy Section 8.9.3.4 0003-MI20-00S1-0190 Design of Piping Specification Section 5.1.6 |
| CLASS REQUIREMENT(S) : ABS |  | - |
| INTERNATIONAL REGULATION(S) |  | - |
| CODES / STANDARD(S) | 7.3.1.3.8 Disposal system piping should be self-draining toward the discharge end. Pocketing of dischargelines should be avoided. If pressure-relief devices handle viscous materials or materials that can solidify as they cool to ambient temperature, the discharge line should be heat-traced. A small drain pot or drip leg can benecessary at low points in lines that cannot be sloped continuously to the knockout or blowdown drum. The use of liquid drain traps or other devices with operating mechanisms should be avoided. | API 521 Section 7.3.1.3.8 |

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| Availability / Reliability Specification | | | |
| Task Num. | Task | Owner | Phase |
|  | No commissioning assurance tasks. |  | Commissioning |
| DC-05-05D | Confirm by review of the Flare Blowdown Study and P&IDs that depressurisation (blowdown) facilities are be provided for hydrocarbon-containing systems which have the potential to result in a loss of system integrity during a fire and present a significant escalation hazard. | Topsides Process | Design |
|  | No procurement assurance tasks. |  | Procurement |
|  | No construction assurance tasks. |  | Consutuction Quality |

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| CORPORATE CRITERIAS | |
| CRITERIA NO. | DC-05-04 |
| PROCESS SAFETY SPECIFICATION | Functionality |
| STATEMENT | Controlled and safe disposal of fluids |
| MODEC CORPORATE PERFORMANCE CRITERIA | Piping upstream of blowdown valves shall have no pockets and downstream piping shall be free draining to the collection header. |
| REFERENCES |  |

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| FUNCTIONAL SPECIFICATION | | |
| Regulations | Regulations (Internacional/Class/Local) | Reference |
| LOCAL REGULATION(S) (BRAZIL) |  | - |
| CLASS REQUIREMENT(S) : ABS |  | - |
| CLASS REQUIREMENT(S) : DNV-GL | 1.1.5 Supply and discharge piping to and from relieving devices shall be self-draining away from the relief device back to pressure source and to knockout drum, as applicable. The tie-in to collection header shall normally be at the top of the header, preferably at 45° to the flow direction in the header. | DNVGL-OS-E201 Ch2Sc3/1.1.5 (Jul-2015) |
| CODES / STANDARD(S) |  | API 521 |
| MODEC Corporate Standards | The flare system shall be sloped approximately 1 degree to cater for the maximum stern trim to prevent liquid hold up. Routing of flare and vent lines shall take account of vessel static trim and heel as well as wave induced vessel motions. Flare Piping HP flare / LP flare headers shall be sloped towards flare knock-out drums. Only horizontal loops shall be provided for the requirement to accommodate thermal / non-thermal movements. The desired slope shall be ensured throughout, including flat loops. Flare headers shall be supported on shoes of height ranging from 100mm to 300mm. | 0003-MI20-0006-0050 FPSO Design Philosophy Section 8.9.3.4 0003-MI20-00S1-0190 Design of Piping Specification section 5.1.12 0003-MI20-00S1-2000 Engineering and Fabrication of Modules Specification |
| INTERNATIONAL REGULATION(S) |  | - |

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| Availability / Reliability Specification | | | |
| Task Num. | Task | Owner | Phase |
|  | No procurement assurance tasks. |  | Procurement |
|  | No commissioning assurance tasks. |  | Commissioning |
| DC-05-04C | Confirm by inspection report that piping upstream of blowdown valves shall have no pockets and downstream piping shall be free draining to the collection header as per the piping isometrics. | Piping/Mechanical | Consutuction Quality |
|  | Covered in other EPCI assurance task |  | Design |

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| CORPORATE CRITERIAS | |
| CRITERIA NO. | DC-05-08 |
| PROCESS SAFETY SPECIFICATION | Functionality |
| STATEMENT | Fail safe |
| MODEC CORPORATE PERFORMANCE CRITERIA | Blowdown valves shall be fail-open on loss of electrical power to the solenoid control valve, or loss of instrument air pressure to the actuator. |
| REFERENCES | (FPSO Design Philosophy 0003-MI20-0006-0050, Section 12.2.3.1) |

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| FUNCTIONAL SPECIFICATION | | |
| Regulations | Regulations (Internacional/Class/Local) | Reference |
| MODEC Corporate Standards | The actuator shall be fitted with an easily visible mechanical position indicator. The actuator shall be supplied complete with a speed control valve (externally mounted if not an integral part of the actuator), filter regulator (complete with inlet and outlet gauges and drainage), and pressure safety valve. Blowdown valves shall be fitted with a secured instrument air buffer vessel to allow the valve to be actuated independently of the instrument air supply. Wherever two limit switches are specified in the valve, operation shall be as follows: • For ESDV/SDV/BDV/On-Off valves, - Close limit switch located at 0% open position - Open limit switch located at 100% open position - The actuator shall be supplied complete with: a speed control valve (externally mounted if not an integral part of the actuator), filter regulator (complete with inlet and outlet gauges and drainage), and pressure safety valve. | 0003-MI20-0006-0050 FPSO Design Philosophy section 12.2.3.2 0003-MI20-50S1-0240 Instrument and Actuated Valve Specification section 6.4 |
| CLASS REQUIREMENT(S) : ABS | Automatically actuated shutdown, blowdown or diverter valves are to be equipped with position indicators at the valve operating station, or be of a type that valve position (open or closed) is externally obvious. | ABS FOI Chpt 3 Section 7 / 19 |
| CLASS REQUIREMENT(S) : DNV-GL |  | - |
| LOCAL REGULATION(S) (BRAZIL) |  | - |
| CODES / STANDARD(S) |  | - |
| INTERNATIONAL REGULATION(S) |  | - |

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| Availability / Reliability Specification | | | |
| Task Num. | Task | Owner | Phase |
| DC-05-08M | Confirm by witness testing and review of commissioning records (B-ITRs) that blowdown valves fail-open: • on loss of electrical power/signal to the solenoid control valve; and • on loss of instrument air pressure to the actuator |  | Commissioning |
|  | No construction assurance tasks. |  | Consutuction Quality |
|  | No procurement assurance tasks. |  | Procurement |
| DC-05-08D | Confirm by review of P&IDs, Valve Specifications and Data Sheets that blowdown valves shall be fail-open on loss of electrical power to the solenoid control valve, or loss of instrument air pressure to the actuator | I&C | Design |

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| CORPORATE CRITERIAS | |
| CRITERIA NO. | DC-05-01 |
| PROCESS SAFETY SPECIFICATION | Functionality |
| STATEMENT | Automatic Operation |
| MODEC CORPORATE PERFORMANCE CRITERIA | The ESD system shall, upon confirmed detection from the F&G System or manual activation via ESD pushbutton, undertake the appropriate automatic executive actions (includes open blowdown valves) to prevent, control or mitigate hazards in accordance with the Safety Shutdown Hierarchy. |
| REFERENCES | Refer to DC-04 Emergency Shutdown System |

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| FUNCTIONAL SPECIFICATION | | |
| Regulations | Regulations (Internacional/Class/Local) | Reference |
| MODEC Corporate Standards | Blowdown shall be initiated automatically (with manual intervention and/or with blowdown hold) on confirmed fire or gas detection. | 0003-MI20-0006-0050 FPSO Design Philosophy section 8.9.3.2 |
| INTERNATIONAL REGULATION(S) |  | - |
| CODES / STANDARD(S) |  | API RP 521 |
| CLASS REQUIREMENT(S) : ABS |  | ABS FOI |
| CLASS REQUIREMENT(S) : DNV-GL | 4.4.15 Blowdown shall preferably be carried out automatically on fire detection in hazardous areas. If manual blowdown is chosen, activation shall initiate ESD low level, and blowdown must also be activated directly from highest level of ESD, AVS 3.1.1 The depressurising system shall ensure safe collection and disposal of hydrocarbons during normal operations and during emergency conditions. Guidance note: Elements of the system will normally be regarded as part of the safety systems and should be designed to integrate with the overall safety strategy for the plant. It is normally recommended that detection of fire or gas release in the process area results in automatic depressurisation of the production plant. See also [3.2.9]. Where this is not the case, it is the designer's responsibility to ensure that adequate fire integrity of the process plant to avoid rupture is provided, including allowance for the additional delay caused by the manual activation. | DNVGL-OS-A101 Ch2Sc7/4.4.14 (Jul-2018) DNVGL-OS-E201 Ch2Sc3/3.1.1 (Jul-2018) |
| LOCAL REGULATION(S) (BRAZIL) | 15.2.3 Automatic systems must exist on platforms that shut down the process, isolate the systems and equipment and, when required, depressurize the equipment in order to limit the escalation of abnormal situations, such as oil spills or fire. | NR30-15.2.3 |

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| Availability / Reliability Specification | | | |
| Task Num. | Task | Owner | Phase |
|  | Addressed in DC-04 Emergency Shutdown System (DC-04-01D; DC-04-01M) |  | Design |

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| CORPORATE CRITERIAS | |
| CRITERIA NO. | DC-05-07 |
| PROCESS SAFETY SPECIFICATION | Functionality |
| STATEMENT | Status Indication |
| MODEC CORPORATE PERFORMANCE CRITERIA | Blowdown valve open/close position indicator shall be provided in the CCR. Mechanical indication shall also be provided locally. |
| REFERENCES | (FPSO Design Philosophy 0003-MI20-0006-0050, Section 12.2.3.2) |

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| FUNCTIONAL SPECIFICATION | | |
| Regulations | Regulations (Internacional/Class/Local) | Reference |
| LOCAL REGULATION(S) (BRAZIL) |  | - |
| CODES / STANDARD(S) | A vapour-depressuring system should have adequate capacity to permit reduction of the vessel stress to a level at which stress rupture is not of immediate concern. For pool-fire exposure and with heat input calculated from Equations (6) or (7), this generally involves reducing the equipment pressure from initial conditions to a level equivalent to 50 % of the vessels design pressure within approximately 15 min. | API 521 Section 5.20 |
| CLASS REQUIREMENT(S) : DNV-GL |  | DNVGL-OS-A101 (Jul-2018) |
| MODEC Corporate Standards | The hot blowdown calculation shall be using a target of 15 minutes to final pressure at 50% MAWP for selected carbon steel systems with wall thickness greater than 25 mm and 15 minutes to final pressure of 6.9 barg for all other carbon steel systems. | 0003-MI20-0006-0050 FPSO Design Philosophy Section 8.9.3.2 |
| INTERNATIONAL REGULATION(S) |  | - |
| CLASS REQUIREMENT(S) : ABS | 15.1.5 Vapor Depressurizing (1 July 2012) i) An emergency vapor depressurizing system is to be provided for all equipment processing light hydrocarbon with operating pressures of 17.5 kg/cm2 (250 psig) and above, as specified in API Std. 521. ii) To gain rapid control of a situation in which the source of a fire is the leakage of flammable fluids from the equipment to be depressurized, the equipment is to be depressurized to 7 kg/cm2 (100 psig). iii) In cases where the equipment is handling high pressure and large inventories of hydrocarbon, and depressurizing to 100 psig is impractical, it is acceptable to depressurize to 50% of the equipment design pressure if such depressurization is achieved within 15 minutes. This is provided the equipment has been designed with ample margin of safety to prevent the vessel from failing due to overheating. iv) Calculations, showing the maximum allowable temperature of the equipment would not exceed the equipment rated temperature, are to be submitted for verification. See API Std. 521 for information on the effect of heat input to uninsulated steel vessels. | ABS FOI Chpt 3 Section 3/ 15.1.5 |

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| Availability / Reliability Specification | | | |
| Task Num. | Task | Owner | Phase |
| DC-05-07M | Confirm by witness testing and review of commissioning records (B-ITRs) of blowdown system that the following facilities are provided: • Open/close position of blowdown valves is indicated in the CCR; and • Mechanical indication provided locally |  | Commissioning |
|  | No procurement assurance tasks. |  | Procurement |
|  | No construction assurance tasks. |  | Consutuction Quality |
| DC-05-07D | Confirm by review of P&IDs/ Valve Specifications or Data Sheets that the following facilities are specified to be provided; • Open/close position of blowdown valves is indicated in the CCR; and • Mechanical indication provided locally. | I&C | Design |

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| CORPORATE CRITERIAS | |
| CRITERIA NO. | DC-05-12 |
| PROCESS SAFETY SPECIFICATION | Survivability |
| STATEMENT | Fire and Explosion MAE |
| MODEC CORPORATE PERFORMANCE CRITERIA | All blowdown valves and associated actuators shall withstand the expected explosion drag loads as identified from the Explosion Risk Analysis (ERA). |
| REFERENCES |  |

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| FUNCTIONAL SPECIFICATION | | |
| Regulations | Regulations (Internacional/Class/Local) | Reference |
| CLASS REQUIREMENT(S) : DNV-GL |  | - |
| CLASS REQUIREMENT(S) : ABS |  | - |
| INTERNATIONAL REGULATION(S) |  | - |
| CODES / STANDARD(S) |  | IEC 61000 |
| MODEC Corporate Standards | 12.3.4 Radio Frequency Interference Electronic systems shall be designed so that under normal operating conditions they shall be unaffected by radio transmissions (particularly hand-held radios) and conversely interfere with other systems.All equipment shall comply with the international requirements for Electromagnetic Compatibility (EMC). | 0003-MI20-0006-0050 FPSO Design Philosophy Section 12.3.4 |

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| --- | --- | --- | --- |
| Availability / Reliability Specification | | | |
| Task Num. | Task | Owner | Phase |
|  | No commissioning assurance tasks. |  | Commissioning |
| DC-05-12P | Confirm via review of vendor calculations that all blowdown valves shall be capable to withstand project defined explosion drag loads. | I&C | Procurement |
|  | No construction assurance tasks. |  | Consutuction Quality |
|  | Covered in other EPCI assurance task |  | Design |