

#	Task Title	Step #	Step Description	Error	Consequence	MAH?	Performance Influencing Factors (PIF) - for MAH	Risk controls
1	Transfer fluid from tanker to storage (unload tanker)	1	Park the tanker					TBC
1	Transfer fluid from tanker to storage (unload tanker)	1.1	Confirm alignment	Action misaligned - tanker in wrong location	Cannot connect hose	N		
1	Transfer fluid from tanker to storage (unload tanker)	1.2	Apply drive-away controls	Action omitted - no controls in place to prevent drive away	Tanker drives away during transfer leading to hose failure and LOC	Y	J8 - Equipment (drive away safeguards) P5 - Competence (drive away risks)	TBC
1	Transfer fluid from tanker to storage (unload tanker)	2	Critical checks					TBC
1	Transfer fluid from tanker to storage (unload tanker)	2.1	Confirm correct material in tanker	Check omitted - contents are different.	Incompatible materials leading to hazardous reaction.	Y	J1 - Labels (on tanker and tank) P5 - Competence (incompatible materials)	TBC
1	Transfer fluid from tanker to storage (unload tanker)	2.2	Confirm enough capacity in the storage tank	Check omitted - capacity is less than tanker contents	LOC due to overspill	Y	J2 - Interfaces (level in tank) P5 - Competence (working levels)	TBC
1	Transfer fluid from tanker to storage (unload tanker)	3	Connect					TBC
1	Transfer fluid from tanker to storage (unload tanker)	3.1	Connect earth	Action omitted - earth not connected	Static creates ignition	Y	J8 - Equipment (earth connection) P5 - Competence (static electricity)	TBC
1	Transfer fluid from tanker to storage (unload tanker)	3.2	Connect hose between tanker and tank	Action incomplete - hose not connected properly at either tanker or tank	LOC due to hose / coupling failure	Y	J8 - Equipment (hose connections) P1 - Person (manual handling) P5 - Competence (hose use)	TBC
1	Transfer fluid from tanker to storage (unload tanker)	4	Transfer contents					TBC
1	Transfer fluid from tanker to storage (unload tanker)	4.1	Start pump	Action omitted - pump not started	Delay completing the transfer	N		
1	Transfer fluid from tanker to storage (unload tanker)	4.2	Check for leaks	Check omitted - leaks not detected	LOC	Y	J10 - Lighting (to see leaks) J11 - Access (to see leak points) P5 - Competence (hose use)	TBC
1	Transfer fluid from tanker to storage (unload tanker)	4.3	Confirm material is reaching correct tank	Check omitted or incomplete - material is not reaching the tank or is going to another tank	Material arriving at the wrong tank may contribute to overflow and LOC	Y	J2 - Interfaces (level in tank) P5 - Competence (working levels)	TBC

1	Transfer fluid from tanker to storage (unload tanker)	4.4	Continue until tanker is empty (or specified quantity has been transferred)	Action incomplete - contents remains in tanker	Operational issues. Next delivery require sooner	N		
1	Transfer fluid from tanker to storage (unload tanker)	4.5	Stop pump	Action omitted - pump left running	Damage to pump	N		
1	Transfer fluid from tanker to storage (unload tanker)	5	<b>Disconnect</b>					TBC
1	Transfer fluid from tanker to storage (unload tanker)	5.1	Disconnect hose	Action omitted - hose left connected	Damage to hose when tanker is moved	N		
1	Transfer fluid from tanker to storage (unload tanker)	5.2	Disconnect either	Action omitted - earth left connected	Damage to earth when tanker is moved	N		
2	Prepare a vessel for confined space entry	1	<b>Shutdown the process</b>					TBC
2	Prepare a vessel for confined space entry	1.1	Reduce inventory to minimum possible	Action incomplete - inventory remains higher than necessary	Will take longer to prepare the vessel	N		
2	Prepare a vessel for confined space entry	2	<b>Initial isolation</b>					TBC
2	Prepare a vessel for confined space entry	2.1	Valve isolate process lines	Action incomplete - isolations not effective	LOC when breaking containment to install positive isolations	Y	J1 - Labels (valve ID) J3 - Complexity (isolation method) J11 - Access (to valves) P5 - Competence (isolations)	TBC
2	Prepare a vessel for confined space entry	2.2	Ensure safety relief lines remain open (e.g. PSV)	Action too soon - safety relief lines isolated before positive isolation.	If isolations fail, high pressure causes vessel failure leading to LOC of contents.	Y	J5 - Procedure (when to isolate safety relief) P5 - Competence (isolations)	TBC
2	Prepare a vessel for confined space entry	3	<b>Remove residual</b>					TBC
2	Prepare a vessel for confined space entry	3.1	Steam out, flush, drain and purge	Action incomplete - hazards remain.	LOC when breaking containment. Harm to people working in the confined space.	Y	J7 - Time (to prepare vessel) J8 - Equipment (utility connections) J11 - Access (to utility connections) P1 - Person (manual handling of hoses) P5 - Competence (vessel cleaning)	TBC
2	Prepare a vessel for confined space entry	3.2	Nitrogen purge after steam out	Action delayed - steam condensation causes vacuum	Vacuum causes vessel failure leading to LOC of hot steam condensate.	Y	J7 - Time (to prepare vessel) J8 - Equipment (utility connections) J11 - Access (to utility connections) P1 - Person (manual handling of hoses) P5 - Competence (purging)	TBC

2	Prepare a vessel for confined space entry	4	Final isolations					TBC
2	Prepare a vessel for confined space entry	4.1	Valve isolate safety relief lines (e.g. PSV)	Action omitted - safety relief lines not isolated	LOC when breaking containment to install positive isolations	Y	J1 - Labels (valve ID) J3 - Complexity (isolation method) J11 - Access (to valves) P5 - Competence (isolations)	TBC
2	Prepare a vessel for confined space entry	4.2	Install positive isolations	Action incomplete - vessel not fully isolated	Harm to people when working inside the vessel	Y	J8 - Tools (breaking joints) J11 - Access (to flanges) P1 - Person (manual handling, effort for bolts) P5 - Competence (isolations)	TBC
2	Prepare a vessel for confined space entry	5	Open					TBC
2	Prepare a vessel for confined space entry	5.1	Create exclusion zone	Action too little - exclusion zone not large enough	People exposed to hazard when manway is removed	N		
2	Prepare a vessel for confined space entry	5.2	Remove manways	Action omitted - manways left in place	Cannot access vessel	N		
2	Prepare a vessel for confined space entry	5.3	Ventilate	Action too short - vessel not ventilated enough	Harm to people when working inside the vessel	Y	J7 - Time (to ventilate) J8 - Equipment (openings for ventilation) J11 - Access (manways) P5 - Competence (purging)	TBC
2	Prepare a vessel for confined space entry	5.4	Gas test	Check omitted - gas test not carried out	Harm to people when working inside the vessel. Potential fire.	Y	J8 - Tools (gas tester) J11 - Access (to take test) P5 - Competence (gas testing)	TBC
3	Start a fired heater	1	Pre-start checks					TBC
3	Start a fired heater	1.1	Confirm fuel supplies to pilots and burners are closed	Check omitted or incomplete - 1 or more valves open	Gas build up in the combustion chamber may explode when first pilot is ignited	Y	J1 - Labels (valve ID) J11 - Access (to valves) P5 - Competence (ignition risks)	TBC
3	Start a fired heater	1.2	Initiate gas valve leak checks	Action omitted - leak check not initiated	Valve that is closed but leaking will not be noticed. Gas build up in the combustion chamber may explode when first pilot is ignited	Y	J2 - Interfaces (leak check start and success indication) J7 - Time (to complete test) P5 - Competence (ignition risks)	TBC
3	Start a fired heater	1.3	Initiate purge	Action omitted - purge not carried out	Gas build up in the combustion chamber (possibly unburnt fuel following previous shutdown) may explode when first pilot is ignited	Y	J2 - Interfaces (purge start and success indication) J7 - Time (to complete purge) P5 - Competence (ignition risks)	TBC

3	Start a fired heater	1.4	Gas test combustion chamber	Action omitted - gas test not carried out	Gas build up in the combustion chamber (due to valves passing and / or inadequate purge) may explode when first pilot is ignited	Y	J8 - Tools (gas tester) J11 - Access (to take test) P5 - Competence (gas testing)	TBC
3	Start a fired heater	2	<b>Start process (through coils)</b>					
3	Start a fired heater	2.1	Open coil inlet/outlet valves	Action incomplete - one or more coil valves left closed	Tubes over heated when burners lit (process flow not removing heat). LOC of process fluid.	Y	J1 - Labels (valve ID) J11 - Access (to valves) P5 - Competence (tube failure scenarios)	TBC
3	Start a fired heater	2.2	Start flow	Action omitted - flow not started	Tubes over heated when burners lit (process flow not removing heat). LOC of process fluid.	Y	J2 - Interfaces (process flow start and success indication) P5 - Competence (tube failure scenarios)	TBC
3	Start a fired heater	2.3	Confirm flow is greater than minimum	Check omitted - flow is too little	Tubes over heated when burners lit (process flow not removing heat). LOC of process fluid.	Y	J2 - Interfaces (flow rate) P5 - Competence (tube failure scenarios)	TBC
3	Start a fired heater	3	<b>Light pilots</b>					TBC
3	Start a fired heater	3.1	Open fuel supply to 1st pilot	Action omitted - fuel supply left closed	Cannot light the pilot	N		
3	Start a fired heater	3.2	Initiate pilot ignition	Action omitted - pilot is not ignited	May result in delayed ignition of fuel passing through the pilot leading to explosion when subsequent pilot is lit.	Y	J2 - Interfaces (ignition start and success indication) P5 - Competence (ignition risks)	TBC
3	Start a fired heater	3.3	Repeat for remaining pilots	Action incomplete - one or more pilots not lit	May result in delayed ignition when starting main burners leading to explosion when the fuel reaches one of the lit pilots.	Y	J7 - Time (to light all pilots) P5 - Competence (ignition risks)	TBC
3	Start a fired heater	4	<b>Light main burners</b>					TBC
3	Start a fired heater	4.1	Confirm correct combustion air flow	Check omitted - air flow is incorrect	High or low air flow may lead to delayed ignition when starting main burners leading to explosion when the fuel reaches one of the lit pilots.	Y	J2 - Interfaces (air flow) P5 - Competence (ignition risks)	TBC
3	Start a fired heater	4.2	Confirm minimum number of pilots are lit	Check omitted - too few pilots have been lit	May result in delayed ignition when starting main burners leading to explosion when the fuel reaches one of the lit pilots.	Y	J2 - Interfaces (pilot status) P5 - Competence (ignition risks)	TBC
3	Start a fired heater	4.3	Open fuel supply to 1st burner	Action omitted - fuel supply left closed	Cannot light the burner	N		

3	Start a fired heater	4.4	Confirm ignition	Check omitted - ignition has not occurred	May result in delayed ignition leading to explosion when the fuel reaches one of the lit pilots.	Y	J2 - Interfaces (burner status) P5 - Competence (ignition risks)	TBC
3	Start a fired heater	4.5	Repeat for remaining burners	Action incomplete - one or more burners not lit	Operational issues due to lack of heating capacity.	N		
4	Export to ship	1	Prepare for vessel arrival					TBC
4	Export to ship	1.1	Determine quantity to be loaded	Incorrect information obtained - wrong quantity determined	If quantity determined is higher than ship's capacity this may contribute to overfill and LOC	Y	J9 - Communication (site to ship) P5 - Competence (overfill scenarios)	TBC
4	Export to ship	1.2	Confirm supply tank has been sampled and approved for export	Check omitted - sample has not been taken or results are not acceptable	Commercial issues of wrong quality product.	N		
4	Export to ship	2	When the vessel has berthed, prepare for connection					TBC
4	Export to ship	2.1	Set-up safe access to the ship	Action omitted - ship / shore ladder not used	Personal harm to jetty and ship personnel using an unsafe method of boarding.	N		
4	Export to ship	2.2	Establish communication between ship and shore (give ship a plant radio)	Action omitted - communication not set up	In an emergency a delay in communication would mean the export continues, increasing the likelihood of escalation	Y	J8 - Tools (handheld radio) J9 - Communication (jetty to ship) P5 - Competence (emergency response)	TBC
4	Export to ship	2.3	Ensure the vessel's fire fighting monitors are positioned correctly	Check omitted - monitors are not positioned correctly	If there was a fire it may not be possible to use water to prevent escalation.	Y	J2 - Interfaces (monitor status) P5 - Competence (emergency response)	TBC
4	Export to ship	2.4	Confirm ship's tanks are empty and clean	Check omitted or incomplete - one or more tanks already contain product	Capacity of tank would be less than expected. May contribute to overfill and LOC. Commercial issues due to product contamination	Y	J9 - Communication (jetty to ship) P5 - Competence (overfill scenarios)	TBC
4	Export to ship	2.5	Carry out Jetty Safety check list	Action incomplete - checklist is not completed and hazards are not identified	Undetected problems with the ship may cause safety problems during the export. May increase the likelihood of an incident or likelihood of an unrelated incident escalating (depending on the issue)	Y	J5 - Procedures checklists J7 - Time (to complete checks) P5 - Competence (safety system status)	TBC
4	Export to ship	2.6	Record required loading rates	Information incorrect - wrong loading rates recorded	If loading rate is higher than the ship can handle it may result in a high back pressure leading to hose failure and LOC	Y	J5 - Procedures checklists J9 - Communication (jetty to ship) P5 - Competence (hose failure scenarios)	TBC

4	Export to ship	2.7	Confirm the export stop message is clear	Information incorrect - ship / shore stop not recorded correctly	In an emergency a delay in communication would mean the export continues, increasing the likelihood of escalation	Y	J5 - Procedures checklists J9 - Communication (jetty to ship) P5 - Competence (emergency response)	TBC
4	Export to ship	3	<b>Connect between jetty and ship</b>					TBC
4	Export to ship	3.1	Identify correct ship's manifold connection point	Information in correct - wrong connection point identified	Delay connecting the hose	N		
4	Export to ship	3.2	Ensure lifting gear is correctly coded and inspected	Check omitted - lifting gear is not suitable	Hose may be dropped leading to damage and harm to personnel	N		
4	Export to ship	3.3	Determine the number of hose lengths required	Action omitted or incorrect - wrong number of hose lengths determined	Hose assembly may be too short. May experience excessive strain during loading leading to failure and LOC.	Y	J8 - Tool (hoses) P5 - Competence (use of hoses)	TBC
4	Export to ship	3.4	Visually confirm condition of hoses.	Check omitted or incomplete - one or more hoses are in poor condition.	Hose may failure during loading leading to LOC.	Y	J8 - Tool (hoses) J10 - Lighting (see hose condition) J11 - Access (to hoses) P5 - Competence (use of hoses)	TBC
4	Export to ship	3.5	Lift hose end to ship manifold connection	Action misaligned - blank is not over the drip tray	If any product is present in the hose it could be released when the blank is removed and may not be contained, leading to environmental issues.	N		
4	Export to ship	3.6	Connect the hose to the ship's manifold	Action incomplete or misaligned - hose not connected properly	Connection may leak at start of export or may fail completely during the export.	Y	J8 - Tools (hand tools to make connection) J11 - Access (to coupling) P5 - Competence (making joints)	TBC
4	Export to ship	4	<b>Set-up supply for export to ship</b>	Action on wrong object - wrong tank set-up for loading	Hazardous or incompatible material may be loaded to the ship.	Y	P5 - Competence (incompatible materials)	TBC
4	Export to ship	4.1	Select tank to be used for export	Wrong information - wrong tank selected	May export wrong product or quality. Hazardous or incompatible material may be loaded to the ship.	Y	J2 - Interfaces (tank status) P5 - Competence (incompatible materials)	TBC
4	Export to ship	4.2	Select pump to be used	Wrong selection - wrong pump selected	Pump may not be available to operate. Will not export	N		
4	Export to ship	4.3	Open valves between supply tank, via pump to jetty	Action incomplete - one or more valves left closed	Cannot export	N		
4	Export to ship	5	<b>Commence export</b>					TBC

4	Export to ship	5.1	Confirm with the ship that vessels valves & tanks are open & loading operations may commence.	Check omitted - ship is not ready	Hose may be over pressurised when pump starts. May fail leading to LOC	Y	J9 - Communication (jetty to ship) P5 - Competence (hose failure scenarios)	TBC
4	Export to ship	5.2	Start pump at low rate	Action omitted - valve left closed	Hose may be over pressurised when pump starts. May fail leading to LOC	Y	J2 - Interface (pumping rate control) P5 - Competence (hose failure scenarios)	TBC
4	Export to ship	5.3	Visually inspect hose or arm for any signs of leaks	Check omitted - hose not inspected	Delay detecting problems with hose. If export continues the hose may fail leading to LOC.	N		
4	Export to ship	5.4	Ramp up discharge rate	Action omitted - rate not increased	Will take longer to complete the export	N		
4	Export to ship	5.5	Ensure pressure at pump discharge is in range	Check omitted - high pressure not detected	Hose may be over pressurised causing it to fail and LOC	Y	J2 - Interfaces (pump discharge pressure) P5 - Competence (hose failure scenarios)	TBC
4	Export to ship	6	<b>During export</b>					TBC
4	Export to ship	6.1	Monitor at jetty continuously	Monitoring omitted - problems not identified	Delay detecting problems with hose. If export continues the hose may fail leading to LOC.	Y	J10 - Lighting (see leaks) J11 - Access (to check for leaks) P5 - Competence (critical monitoring)	TBC
4	Export to ship	6.2	Ensure the ship's crew are adjusting the mooring lines	Check omitted - mooring lines are not adjusted	Ship may move putting the hose under strain. Hose may fail causing LOC	Y	O5 - Roles & responsibility jetty vs ship P5 - Competence (ship mooring)	TBC
4	Export to ship	6.3	Complete checks of the ship / shore access ladder	Checks omitted - do not carry out 2 hourly checks	Personal harm if damage ladder is not detected or dealt with	N		
4	Export to ship	6.4	Adjust hoses against rise and fall of tide.	Action misaligned - lifting arms not used properly	Hose may experience straining causing it to fail and LOC.	Y	A9 - Jetty side arms (cranes) P5 - Competence (hose strain failure scenarios)	TBC
4	Export to ship	6.5	Carry out regular checks of the radio to ensure communications with ship are intact at all times	Check omitted - problems with radio not detected	If there was an incident a delay in communication could contribute to escalation	Y	J5 - Procedures checklists J7 - Time (to complete checks) P5 - Competence (safety system status)	TBC
4	Export to ship	6.6	Update estimated time to finish	Communication omitted - agent not informed	Delay releasing ship for departure	N		
4	Export to ship	7	<b>When notified by ship, complete load (manually)</b>					
4	Export to ship	7.1	Stop pump	Action omitted or too late - export continues after instruction from shop	Ship over filled and LOC	Y	J2 - Interface (pump start/stop) P5 - Competence (stop signals)	TBC

4	Export to ship	7.2	Drain back the hose	Action omitted - drain back not carried out	Product will remain in the hose and may be released when the hose is disconnected causing environmental issues	N		
4	Export to ship	7.4	Close the manual isolation valve on the Jetty	Action omitted - valve left open	May be LOC from hose during subsequent operations or if pump is started in error	Y	J1 - Labelling (valve ID) P5 - Competence (plant status)	TBC
4	Export to ship	7.5	Disconnect hose and return to normal status	Action omitted - hose left connected	Damage to hose when ship is moved	N		
5	Start a compressor (electric motor)	1	<b>Complete manual line-up</b>					
5	Start a compressor (electric motor)	1.1	Electrically energise all motors and heater	Action omitted or incomplete - motor or heater left isolated	If main motor is isolated , cannot start compressor.	N		
5	Start a compressor (electric motor)				If other electrical systems are isolated, start will be delayed.	N		
5	Start a compressor (electric motor)	1.2	Line-up all instrument transmitters	Action omitted or incomplete - instrument transmitter left isolated	May not be able to establish surge control.	N		
5	Start a compressor (electric motor)	1.3	Confirm manual drain and vent valves are shut	Check omitted or incomplete - drain or vent left open	Release to flare or closed drain. Potential for liquid carry over from drain system to flare.	Y	J1 - Valve ID P5 - Competence (pre-start status)	TBC
5	Start a compressor (electric motor)	1.4	Open motorised suction valve	Action omitted - valve left closed		N		
5	Start a compressor (electric motor)	1.5	Open motorised discharge valve	Action omitted - valve left closed	Cannot achieve forward flow and compressor will go to recycle	N		
5	Start a compressor (electric motor)	1.6	Line-up seal gas system	Action omitted or incomplete - do not line-up seal gas	Potential gas release from seals	Y	J1 - Valve ID P5 - Competence (seal gas arrangements)	TBC
5	Start a compressor (electric motor)	1.7	Line-up lube oil system	Action omitted or incomplete - do not line-up lube oil	Damage to compressor	N		
5	Start a compressor (electric motor)	1.8	Line-up working oil system	Action omitted or incomplete - do not line-up working oil	Will not be able increase speed	N		
5	Start a compressor (electric motor)	2	<b>Initiate auxiliary start sequence</b>					
5	Start a compressor (electric motor)	3	<b>Obtain permission from power station to start main motor</b>	Communication omitted - do not obtain permission	Will not be able to start motor	N		
5	Start a compressor (electric motor)	4	<b>Initiate motor start</b>	Action omitted	Do not start compressor	N		
5	Start a compressor (electric motor)	5	<b>Load compressor to required discharge pressure and put to auto</b>					
5	Start a compressor (electric motor)	5.1	Gradually increase speed on motor in manual	Action too fast	May cause vibration that can lead to damage	N		



5	Start a compressor (electric motor)	5.2	Confirm anti-surge valve closes	Check omitted - anti-surge valve does not close	Will be running compressor without achieving forward flow = waste of energy	N		
5	Start a compressor (electric motor)	5.3	Confirm speed on other machines reduces	Check omitted - speed on others does not reduce	Other compressors will recycle then reduce speed due to high discharge pressure	N		
5	Start a compressor (electric motor)	5.4	When loads across all compressors are equal, switch to auto	Action omitted - compressor left on manual	No significant consequence as other compressors will be in auto. May not be able to achieve required production	N		
6	Drain water from a tank	1	<b>Plan the draining</b>					
6	Drain water from a tank	1.1	Determine the time required to drain the water	Plan omitted or incorrect - accurate time to drain is not determined	If the time is over estimated the water will be removed sooner than expected. May result in excess product flowing exceeding sewer capacity and resulting in release to the environment.	Y	J6 - Preparation (planning) P5 - Competence (time to drain)	TBC
6	Drain water from a tank	1.2	Allocate an operator to complete the draining within a shift	Plan omitted or incorrect - draining will continue over a change in personnel	Draining status may not be properly handed over between personnel. May contribute to draining continuing too long. May result in excess product flowing exceeding sewer capacity and resulting in release to the environment.	Y	J7 - Time available (to drain) P5 - Competence (critical monitoring) O4 - Staffing (person available to monitor)	TBC
6	Drain water from a tank	2	<b>Start draining</b>					
6	Drain water from a tank	2.1	Confirm correct tank is being drained	Check omitted - wrong tank is drained	Tank may contain less water and may contain a more hazardous material. May result in loss of containment via the drain because the water will be removed sooner than expected.	Y	J1 - Tank ID P5 - Competence (wrong tank scenarios)	TBC
6	Drain water from a tank	2.2	Open handwheel drain valve	Action in wrong order - quarter turn valve opened first	No significant consequence. Only concern is if product flows and requires fast valve closure because the quarter turn valve can be closed.	N		
6	Drain water from a tank	2.3	Open quarter turn drain valve	Action in wrong order - quarter turn valve opened first	No significant consequence. Only concern is if product flows and requires fast valve closure because the quarter turn valve can be closed.	N		

6	Drain water from a tank	2.4	Confirm water is flowing from drain	Check omitted - product flows	Product flows to the sewer. There will be no change of state (water to product) to detect so operator may allow draining to continue. May result in excess product flowing exceeding sewer capacity and resulting in release to the environment.	Y	J10 - Lighting (see draining) J11 - Access (to check draining) P5 - Competence (critical monitoring)	TBC
6	Drain water from a tank	2.5	Confirm the water is flowing to the sewer	Check omitted - water is flowing to the bund	Water flows to the bund instead of the sewer. Will have to be removed, which creates extra workload.	N		
6	Drain water from a tank	3	<b>Monitor draining</b>					
6	Drain water from a tank	3.1	Ensure the flow from the drain can be seen at all times	Monitoring is ineffective - flow from the drain cannot be seen	May delay detecting change from water to product. May result in excess product flowing exceeding sewer capacity and resulting in release to the environment.	Y	J10 - Lighting (see draining) J11 - Access (to check draining) P5 - Competence (critical monitoring)	TBC
6	Drain water from a tank	3.2	If product is observed stop draining immediately by closing the quarter turn valve	Action too late - delay stopping draining	Product will flow to the sewer. May result in excess product flowing exceeding sewer capacity and resulting in release to the environment.	Y	J10 - Lighting (see draining) J11 - Access (to check draining) P5 - Competence (product draining scenarios)	TBC
6	Drain water from a tank			Action on wrong object - handwheel valve is used instead of quarter turn	Will take longer to close the valve and stop the flow. Will result in more product flowing to sewer. May result in excess product flowing exceeding sewer capacity and resulting in release to the environment.	Y	J1 - Valve ID P5 - Competence (product draining scenarios)	TBC
6	Drain water from a tank	3.3	If the area has to be left unattended at any time stop draining	Action omitted - draining continues whilst unattended	If water contents is removed whilst unattended product will flow to the sewer. May result in excess product flowing exceeding sewer capacity and resulting in release to the environment.	Y	J7 - Time available (to drain) P5 - Competence (critical monitoring) O4 - Staffing (person available to monitor)	TBC
6	Drain water from a tank	4	<b>Stop draining</b>					

6	Drain water from a tank	4.1	Shut the quarter turn drain valve	Action omitted - valve left open	If both valves are left open, product will flow to the sewer. May result in excess product flowing exceeding sewer capacity and resulting in release to the environment. If only one valve is closed and it fails the contents of the tank will drain to sewer.	Y	J1 - Valve ID P5 - Competence (product draining scenarios)	TBC
6	Drain water from a tank	4.2	Shut the handwheel drain valve	Action omitted - valve left open	If both valves are left open, product will flow to the sewer. May result in excess product flowing exceeding sewer capacity and resulting in release to the environment. If only one valve is closed and it fails the contents of the tank will drain to sewer.	Y	J1 - Valve ID P5 - Competence (product draining scenarios)	TBC
6	Drain water from a tank	4.3	Complete the documentation	Action omitted - documentation not completed	Following shift may not know that tank has been drained. May assume it needs to be done and not detect product starts to flow. May result in excess product flowing exceeding sewer capacity and resulting in release to the environment.	Y	J9 - Communication (shift handover) P5 - Competence (product draining scenarios)	TBC
7	Recertify a Pressure Safety Valve (PSV)	1	Identify the PSV					
7	Recertify a Pressure Safety Valve (PSV)	1.1	Identify the PSV location	Action on wrong object - wrong PSV location identified	May remove wrong PSV. If it is not isolated this could result in a LOC	Y	J1 – PSV ID J6 – Preparation (work order etc.)	TBC
7	Recertify a Pressure Safety Valve (PSV)	1.2	Confirm the PSV tag matches the work order	Check omitted - tags do not match	May remove wrong PSV. If it is not isolated this could result in a LOC	Y	J1 – PSV ID J6 – Preparation (work order etc.)	TBC
7	Recertify a Pressure Safety Valve (PSV)	1.3	Confirm the serial number on the PSV matches the work order	Check omitted - serial numbers do not match	May remove wrong PSV. If it is not isolated this could result in a LOC	Y	J1 – PSV ID P5 – Competence (importance of PSV ID)	TBC
7	Recertify a Pressure Safety Valve (PSV)	1.4	Confirm the recertification date shown on the PSV matches the work order	Check omitted - dates do not match	PSV records may be incorrect (error made at last update). Recertification dates may not be correct to ensure required reliability.	Y	J1 – PSV ID J6 – Preparation (work order etc.)	TBC
7	Recertify a Pressure Safety Valve (PSV)	2	Confirm the PSV is isolated					

7	Recertify a Pressure Safety Valve (PSV)	2.1	Walk through the isolation with operations	Action omitted - do not walk through with operations	PSV may not be isolated leading to LOC	Y	J1 – Valve ID J6 – Preparation (isolation) P5 – Competence (isolations)	TBC
7	Recertify a Pressure Safety Valve (PSV)	2.2	Confirm the isolation points identified on the plan are in the correct status	Check omitted - isolation points are not in correct status	PSV may not be isolated leading to LOC	Y	J1 – Valve ID J6 – Preparation (isolation) P5 – Competence (isolations)	TBC
7	Recertify a Pressure Safety Valve (PSV)	2.3	Use vents/drains to confirm the system is depressurised	Check omitted - system is still under pressure	PSV may not be isolated leading to LOC	Y	J1 – Valve ID J6 – Preparation (isolation) P5 – Competence (isolations)	TBC
7	Recertify a Pressure Safety Valve (PSV)	3	<b>Remove the PSV</b>					
7	Recertify a Pressure Safety Valve (PSV)	3.1	Ensure correct tags are attached at the joints to be broken	Check omitted - GOC tags are not attached	May break the wrong joints. May break into a live system leading to LOC.	Y	J1 – Valve ID J6 – Preparation (isolation) P5 – Competence (joint management)	TBC
7	Recertify a Pressure Safety Valve (PSV)	3.2	Attach lifting equipment / support the PSV (if required)	Action omitted - lifting equipment not attached	May drop the PSV when removing. May cause harm to people or equipment.	N		
7	Recertify a Pressure Safety Valve (PSV)	3.3	Loosen bolts on joint(s)	Action omitted - joints not loosened	Cannot carry out a final check for pressure, which is also a final check of isolation integrity.	Y	P5 – Competence (breaking joints)	TBC
7	Recertify a Pressure Safety Valve (PSV)	3.4	Confirm no pressure	Check omitted - pressure is present but not noticed.	Pressure indicates a failed isolation. Continuing with the task will lead to LOC	Y	P5 – Competence (breaking joints)	TBC
7	Recertify a Pressure Safety Valve (PSV)	3.5	Remove bolts	Action incomplete - one or more bolts left in place	Cannot remove the PSV. May cause damage when lifting.	N		
7	Recertify a Pressure Safety Valve (PSV)	3.6	Lift PSV and laydown	Action without required control - impacts between PSV and plant/people	Harm to people or equipment	N		
7	Recertify a Pressure Safety Valve (PSV)	3.7	Install a fully rated blank(s) using new gasket(s)	Action omitted - blanks not fitted	If isolations pass whilst the PSV is removed there would be a LOC	Y	J8 – Tools (spanners) P5 – Competence (making joints)	TBC
7	Recertify a Pressure Safety Valve (PSV)			Action omitted - blanks not fitted	Potential for debris to enter pipework that could compromise the PSV.	Y	P5 – Competence (avoid debris)	TBC
7	Recertify a Pressure Safety Valve (PSV)	3.8	Torque bolts	Action incomplete - bolts not torqued correctly	If isolations pass whilst the PSV is removed there would be a LOC	Y	J8 – Tools (spanners and torque wrench) P5 – Competence (making joints)	TBC
7	Recertify a Pressure Safety Valve (PSV)	4	<b>Complete re-certification of PSV</b>					

7	Recertify a Pressure Safety Valve (PSV)	4.1	Install PSV on the test rig	Action omitted - not put on rig	Cannot carry out the tests	N		
7	Recertify a Pressure Safety Valve (PSV)			Action incorrect - PSV not installed correctly or with wrong gasket	Nitrogen release when pressurising the PSV	N		
7	Recertify a Pressure Safety Valve (PSV)	4.2	Carry out initial 'as found' lift pressure test	Action omitted - test not carried out	No record of 'as found' condition. Faults with PSV would not be detected. Investigations would not be carried out to find the causes, which may mean the PSV fails on demand in the future due to design or process issues.	Y	J8 - Tools (test rig) P5 - Competence (test and calibration)	TBC
7	Recertify a Pressure Safety Valve (PSV)	4.3	Strip the PSV down	Action omitted - PSV not stripped down	Cannot carry out inspection of components.	N		
7	Recertify a Pressure Safety Valve (PSV)			Action without required control - spring tension not removed	Sudden release of the spring can cause harm to the technician or damage components	N		
7	Recertify a Pressure Safety Valve (PSV)			Action without required control - components damaged whilst stripping down	Damage to components may prevent the PSV operating on demand or not seating properly.	Y	J8 - Tools (for PSV strip down and assembly) P5 - Competence (PSV strip down and assembly)	TBC
7	Recertify a Pressure Safety Valve (PSV)	4.4	Inspect and clean components, and replace where required	Action incomplete - components are not in the required condition.	Damage to components may prevent the PSV operating on demand or not seating properly.	Y	P5 - Competence (component condition)	TBC
7	Recertify a Pressure Safety Valve (PSV)	4.5	Reassemble the PSV	Action misaligned - PSV reassembled incorrectly, without gaskets etc.	May prevent the PSV operating on demand or not seating properly.	Y	J8 - Tools (for PSV strip down and assembly) P5 - Competence (PSV strip down and assembly)	TBC
7	Recertify a Pressure Safety Valve (PSV)			Action misaligned - PSV reassembled incorrectly, without gaskets etc.	PSV body may leak gas when returned to service.	Y	J8 - Tools (for PSV strip down and assembly) P5 - Competence (PSV strip down and assembly)	TBC
7	Recertify a Pressure Safety Valve (PSV)	4.6	Carry out Pressure test and adjust spring tension if required	Action omitted - pressure test not carried out	PSV may not operate at correct pressure when required. May contribute to LOC due to process high pressure.	Y	J8 - Tools (test rig) P5 - Competence (pressure tests)	TBC
7	Recertify a Pressure Safety Valve (PSV)	4.7	Carry out Seat test	Action omitted - seat test not carried out	PSV may allow process gases to pass when in service. PSV would have to be removed and the task repeated.	N		

7	Recertify a Pressure Safety Valve (PSV)	4.8	Ensure the PSV ID plate / tags are attached, legible etc.	Action omitted - correct tags not attached	Could cause confusion in the future. May result in the PSV being fitted in the wrong location, which may be at a different pressure.	Y		TBC
7	Recertify a Pressure Safety Valve (PSV)	4.9	Issue the certificate	Action omitted - certificate not issued	Cannot prove the testing was carried out.	N		
7	Recertify a Pressure Safety Valve (PSV)	4.10.	Put the PSV upright in the transport cage	Action misaligned - PSV not transported correctly	PSV internals may be damaged in transport. May mean the PSV does not operate when required. May damage flange faces causing leaks when returned to service.	Y	J8 - Tools (transport cage) P5 - Competence (transport)	TBC
7	Recertify a Pressure Safety Valve (PSV)	5	<b>Refit the PSV</b>					
7	Recertify a Pressure Safety Valve (PSV)	5.1	Walk through the isolation with operations	Action omitted - do not walk through with operations	Blank may not be isolated leading to LOC	Y	J1 – Valve ID J6 – Preparation (isolation) P5 – Competence (isolations)	TBC
7	Recertify a Pressure Safety Valve (PSV)	5.2	Confirm the isolation points identified on the ICC are in the correct status	Check omitted - isolation points are not in correct status	Blank may not be isolated leading to LOC	Y	J1 – Valve ID J6 – Preparation (isolation) P5 – Competence (isolations)	TBC
7	Recertify a Pressure Safety Valve (PSV)	5.3	Use vents/drains to confirm the system is depressurised	Check omitted - system is still under pressure	Blank may not be isolated leading to LOC	Y	J1 – Valve ID J6 – Preparation (isolation) P5 – Competence (isolations)	TBC
7	Recertify a Pressure Safety Valve (PSV)	5.4	Remove the blank(s)	Action omitted - blank left in place	Cannot fit the PSV	N		
7	Recertify a Pressure Safety Valve (PSV)	5.5	Visually check pipework internals for blockages and corrosion	Check omitted - pipework is blocked	PSV may not lift when required	Y	P5 – Competence (avoid debris)	TBC
7	Recertify a Pressure Safety Valve (PSV)	5.6	Visually inspect the PSV internals for debris etc.	Check omitted - Debris has entered the PSV	PSV may not lift when required	Y	P5 – Competence (avoid debris)	TBC
7	Recertify a Pressure Safety Valve (PSV)	5.7	Lift PSV into place	Action without required control - impacts between PSV and plant/people	Harm to people or equipment	N		
7	Recertify a Pressure Safety Valve (PSV)	5.8	Insert new gasket(s)	Action omitted - gaskets not fitted	Leak when PSV is returned to service	Y	J8 – Tools (spanners) P5 – Competence (making joints)	TBC
7	Recertify a Pressure Safety Valve (PSV)	5.9	Insert and torque bolts	Action incomplete - bolts not torqued correctly	Leak when PSV is returned to service	Y	J8 – Tools (spanners) P5 – Competence (making joints)	TBC

7	<b>Recertify a Pressure Safety Valve (PSV)</b>	5.10.	Sign-off permit	Action omitted - permit not signed-off	Will not progress to the next stage which means the plant will remain isolated.	N		
7	<b>Recertify a Pressure Safety Valve (PSV)</b>	6	<b>De-isolate the PSV (by operations)</b>	Action omitted - PSV is left isolated	PSV will not lift when required	Y	P5 - Competence (PSV status)	TBC
7	<b>Recertify a Pressure Safety Valve (PSV)</b>	7	<b>Sign-off Work Order and attach the test certificate</b>	Action incomplete - work order is not completed correctly	History of PSV test results will not be complete. May mean future issues cannot be investigated properly	Y	P5 - Competence (records)	TBC
8	<b>Test diesel engine fire water pump</b>	1	<b>Ensure the diesel engine is ready to start</b>					
8	<b>Test diesel engine fire water pump</b>	1.1	Record the engine running hours from the meter	Action omitted - running hours not recorded	Requirements for a routine engine service may be overlooked. However, this is checked independently so at this time there is no significant consequence.	N		
8	<b>Test diesel engine fire water pump</b>	1.2	Ensure the engine oil level is in operating range	Check omitted - oil level is outside range	If oil level is too low the engine may be damaged when running. It may not be available when required in a fire.	Y	J2 - Interfaces (panels and gauges) P5 - Competence (pre-start checks)	TBC
8	<b>Test diesel engine fire water pump</b>	1.3	Ensure the batteries are charged	Check omitted - batteries are not charged	Engine may not start. Cannot perform the test. If batteries are not charged the pump will not be available when required in a fire.	Y	J2 - Interfaces (panels and gauges) P5 - Competence (pre-start checks)	TBC
8	<b>Test diesel engine fire water pump</b>	1.4	Ensure engine water temperature is between 60 C and 80 C	Check omitted - water is too hot or too cold	Too cold indicates that the water heating system is not working as required. May mean the engine is more difficult to start when required in a fire.  High temperature when the engine is not running is not credible.	Y	J2 - Interfaces (panels and gauges) P5 - Competence (pre-start checks)	TBC
8	<b>Test diesel engine fire water pump</b>	1.5	Ensure coolant level is visible	Check omitted - level is too low	Engine may overheat when running and may be damaged. It may not be available in a fire.	Y	J2 - Interfaces (panels and gauges) P5 - Competence (pre-start checks)	TBC
8	<b>Test diesel engine fire water pump</b>	1.6	Ensure the diesel level is within operating range	Check omitted - tank level is outside range	May not be able to start the engine or it may stop during the test.	N		
8	<b>Test diesel engine fire water pump</b>	1.7	Use test button on the diesel pump panel and confirm all lamps are functioning OK	Check omitted - one or more lamps are not functioning	Warnings may not be visible when the pump is running. May contribute to damage to the engine.	Y	J2 - Interfaces (panels and gauges) P5 - Competence (pre-start checks)	TBC

8	Test diesel engine fire water pump	2	Prepare the diesel driven pump to start					
8	Test diesel engine fire water pump	2.1	Line-up flow to drain system	Action omitted - valve left closed	If both drain systems are closed the water flowing during the test will remain in the catchment in the building. It may flood the area and require a pump to remove from trenches etc.	N		
8	Test diesel engine fire water pump	2.2	Open a hydrant to allow a small flow (not enough to start the jockey pump)	Action omitted - no hydrants are opened	The water will circulate in the system instead of flowing to the hydrant. Opening a hydrant is good practice not essential (manufacturers advice).	N		
8	Test diesel engine fire water pump	2.2		Action too much - jockey pump starts	No significant consequence.	N		
8	Test diesel engine fire water pump	3	Run the pump/engine					
8	Test diesel engine fire water pump	3.1	Start the diesel engine manually	Action omitted - pump not started	Cannot carry out test	N		
8	Test diesel engine fire water pump	3.2	Allow to run for 15 minutes	Action too short - run for less than 15 minutes	Test requirements will not be satisfied. Faults will not be detected.	Y	J7 - Time available (run for 15 minutes) P5 - Competence (running checks)	TBC
8	Test diesel engine fire water pump	3.3	Ensure engine oil pressure is within its operating range	Check omitted - pressure is low	Engine may be damaged during the test or a fault with the oil system may not be detected.	Y	J2 - Interfaces (panels and gauges) P5 - Competence (running checks)	TBC
8	Test diesel engine fire water pump	3.4	Ensure engine temperature is below 80 C	Check omitted - temperature is too high	Engine may be damaged during the test or a fault with the coolant system may not be detected.	Y	J2 - Interfaces (panels and gauges) P5 - Competence (running checks)	TBC
8	Test diesel engine fire water pump	3.5	Stop the engine manually using the local button	Action omitted - engine left running	Cannot return system to normal operation	N		
8	Test diesel engine fire water pump	3.6	Reset the engine	Action omitted - engine left running	Cannot return system to normal operation	N		
8	Test diesel engine fire water pump	4	Return engine / pump to normal					
8	Test diesel engine fire water pump	4.1	Return the engine switch to Auto	Action omitted - switch left in wrong position	Engine in manual will not start automatically or remotely when required in a fire.	Y	J2 - Interfaces (panels and gauges) P5 - Competence (standby status)	TBC
8	Test diesel engine fire water pump	4.2	Close the hydrant used for the test	Action omitted - hydrant left open	Waste of water and energy if pumps start automatically to maintain the pressure	N		
8	Test diesel engine fire water pump	4.3	Return drains line-up to normal	Action omitted - valve left open	No significant consequence is the valve to system 44 is opened	N		



8	Test diesel engine fire water pump	4.4	Record the engine running hours	Action omitted - running hours not recorded	Requirements for a routine engine service may be overlooked. However, this is checked independently so at this time there is no significant consequence.	N		
8	Test diesel engine fire water pump	4.5	Replace the protective flange	Action omitted - protective flange is not refitted	Potential for personal harm if the engine starts when someone is nearby.	N		
8	Test diesel engine fire water pump	4.6	Ensure the diesel day tank level has been topped up automatically	Check omitted - level in tank is low	Fault with auto top up of the day tank may not be detected. May mean there is insufficient diesel to provide water in a fire.	Y	J2 - Interfaces (panels and gauges) P5 - Competence (standby status)	TBC
9	Black start (after total power outage)	1	Obtain permission from operations for a start-up	Communication omitted - start before permission obtained	No significant consequence. Communication with operations is more important when production is being started.	N		
9	Black start (after total power outage)	2	Prepare systems for emergency generator start-up					
9	Black start (after total power outage)	2.1	Put the switch to island mode	Action omitted - switch remains in normal status	Cannot start emergency generator	N		
9	Black start (after total power outage)	2.2	Start the emergency generator by hand	Action incorrect - not started correctly	Not a credible error. The emergency generator start is a single button press.	N		
9	Black start (after total power outage)	2.3	Switch off non-essential users	Action incomplete - some non-essential users are left on	Emergency generator may be overloaded when started and trip. Delay re-establishing power.	N		
9	Black start (after total power outage)	3	When emergency generator is running, establish power to essentials switchboard					
9	Black start (after total power outage)	3.1	Switch the essentials switchboard to emergency generator supply	Action omitted - switch remains open	Unable to power any users.	N		
9	Black start (after total power outage)	3.2	Confirm there is power on the essential panel	Check omitted - there is no power to the panel	Unable to power any users.	N		
9	Black start (after total power outage)	3.3	Confirm interior lights come on	Check omitted - the lights are off	This is another indication that essential power is available from the emergency generator	N		
9	Black start (after total power outage)	4	Establish power to essential users					

9	Black start (after total power outage)	4.1	Reset UPS battery chargers	Action incomplete - one or both bypasses are not activated	Will not be able to recharge batteries whilst there is an ESD1 signal, which will still be active.	Y	J1 - Control ID J5 - Procedures (black start checklist) P5 - Competence (battery systems)	TBC
9	Black start (after total power outage)	4.2	Confirm BPCS is powered up	Check omitted - DCS is not ready	Will not be able to start main power generator. Without BPCS the operators cannot open fuel valves etc.	N		
9	Black start (after total power outage)	4.3	Inhibit the main power generator trip.	Action omitted - inhibit is not applied	Will not be able to start main power generator.	N		
9	Black start (after total power outage)	4.4	Confirm fire and gas systems are online	Check incomplete - one or more systems not working	Higher risk from fire and gas events	Y	J1 - Control ID J5 - Procedures (black start checklist) P5 - Competence (fire and gas systems)	TBC
9	Black start (after total power outage)	5	When the cause from power outage has been fixed, establish power generation					
9	Black start (after total power outage)	5.1	Switch emergency generator controller from island to normal duty	Action omitted - emergency generator mode not changed	Emergency generator may not stop in a future ESD event. It may act as an ignition source	Y	J1 - Control ID J5 - Procedures (black start checklist) P5 - Competence (ESD overrides)	TBC
9	Black start (after total power outage)	6.2	Reset alarms	Action incomplete - one or more alarms remain active	Batteries will not be charging. Depletion would mean UPS is not available when required for safety critical devices.	Y	J2 - Interfaces (alarms) P5 - Competence (system status)	TBC
9	Black start (after total power outage)	6.3	When ready, start the main power generator	Action delayed - generator is not started	Will not be able to start production	N		
9	Black start (after total power outage)	6.4	Synchronise with emergency generator	Action incorrect - synchronisation is not carried out correctly	Unable to use the power from the generators.	N		
9	Black start (after total power outage)	6.5	Stop emergency generator	Action omitted - emergency generator is still running	Waste of diesel and engine hours.	N		
10	Replace pipework	1	Confirm correct isolations are in place - "show me" step					
10	Replace pipework	1.1	Confirm exactly which flanges are going to be split	Action on wrong object - wrong flange identified	Pipework may not have been isolated, drained or purged. LOC when flange is split.	Y	J1 - Flange ID J6 - Preparation (permit)	TBC
10	Replace pipework	1.2	Identify the isolations that have been carried out	Right action on wrong object - wrong isolations carried out	Pipework may not have been isolated, drained or purged. LOC when flange is split.	Y	J1 - Valve ID J6 - Preparation (permit) P5 - Competence (isolations)	TBC
10	Replace pipework	1.3	Confirm isolations are in place and secure	Check omitted - isolation can still be operated	Isolation may be compromised during the work. May result in LOC.	Y	J1 - Valve ID J6 - Preparation (permit) P5 - Competence (isolations)	TBC

10	Replace pipework	1.4	Confirm the correct isolations are recorded on the Permit	Check omitted - wrong isolations shown on permit (isolations applied correctly in the plant)	May cause confusion about which isolations are required for the job. May allow an isolation to be removed part way during the job resulting in LOC.	Y	J1 - Valve ID J6 - Preparation (permit) P5 - Competence (isolations)	TBC
10	Replace pipework	2	Replace bolts to allow easy joint break (if required) and/or 'half bolt'	Action omitted - bolts not replaced when required	If there was a problem when splitting joints it may be more difficult to re-make the flange in a timely fashion to stop the LOC.	Y	J7 - Time available (to change bolts) J8 - Equipment (bolts) P5 - Competence (joint bolting)	TBC
10	Replace pipework	2.1	Confirm correct new bolts are available	Check omitted - wrong bolts are fitted	Bolts may fail resulting flange failure and LOC	Y	J8 - Equipment (bolts)	TBC
10	Replace pipework	2.2	Attach clamp	Action omitted - clamp not used	Joint may leak when bolt is removed.	N		
10	Replace pipework	2.2	Remove one bolt	Action too much - More than one bolt removed at the same time	Joint will leak if under pressure.	Y	J7 - Time available (to change bolts) J8 - Tools (spanners) J11 - Access (to bolts) P5 - Competence (joint bolting)	TBC
10	Replace pipework	2.3	Fit new bolt	Action on wrong object - old bolt fitted	May not be able to tighten. Bolts may fail resulting flange failure and LOC	Y	J7 - Time available (to change bolts) J8 - Tools (torque wrench) J11 - Access (to bolts) P5 - Competence (joint bolting)	TBC
10	Replace pipework	2.4	Torque new bolt	Action too little/much - New bolt not torqued correctly	Joint may leak.	N		
10	Replace pipework	2.5	Remove clamp	Action omitted - clamp left on	No significant consequence	N		
10	Replace pipework	2.6	Repeat for remaining bolts	Action incomplete - Do not replace all bolts	Bolts may fail resulting flange failure and LOC	Y	J7 - Time available (to change bolts) O1 - Work pressures	TBC
10	Replace pipework	3	Carry out first line break	Action omitted - First line break not conducted as defined in procedure	If there was a spill when the flange was the split, people may be harmed.	Y	J5 - Procedures (first line break) J7 - Time available (for first line break checks) P5 - Competence (first line break) O4 - Staffing (people to complete checks)	TBC
10	Replace pipework	4	Remove section of pipework					
10	Replace pipework	4.1	Support pipework (as required)	Action omitted - Pipework not supported	Pipework may fall when flange is split causing harm to people or damage to equipment.	N		
10	Replace pipework	4.2	Remove bolts from flanges furthest away first	Action incomplete - One or more bolts left in place.	Cannot remove pipework	N		

10	Replace pipework			Action in wrong order - Bolts nearest person removed first	If there was a release the person may be harmed.	N		
10	Replace pipework	4.3	Lift pipework to make flanges accessible	Action omitted - Do not lift away	May not be able to cover pipework ends adequately. Residue in pipework may be released when pipework is being transported.	N		
10	Replace pipework	4.4	Seal pipework ends to prevent any escape of residue during transport	Action omitted - Pipework ends not sealed	Residue in pipework may be released when pipework is being transported. May cause harm to people.	N		
10	Replace pipework	4.5	If new pipework is not being refitted immediately, fit blanks to the plant open flanges	Action omitted - Blanks not fitted	If the isolation fails (e.g. valve passes) there would be a LOC.	Y	J8 - Equipment (blanks) P5 - Competence (open ends)	TBC
10	Replace pipework	5	<b>Prepare and inspect flange faces</b>					
10	Replace pipework	5.1	Confirm there is no Asbestos present in the joint	Check omitted - Asbestos not recognised	Trade person may be exposed to asbestos with long term potential health issues	N		
10	Replace pipework	5.2	Remove remains of old gasket and clean the flange face	Action incomplete - Some of the old gasket remains	Release from flange when plant is returned to service.	Y	J8 - Tools (to remove gasket) J11 - Access (to flange face) P5 - Competence (joint making)	TBC
10	Replace pipework	5.3	Visually check for cracks, pitting or corrosion	Check omitted - Defects not noticed	Release from flange when plant is returned to service.	Y	J8 - Tools (to remove gasket) J11 - Access (to flange face) P5 - Competence (joint making)	TBC
10	Replace pipework	5.4	If any defects are found, request Engineer to inspect	Action omitted - Engineer does not inspect	Release from flange when plant is returned to service.	Y	P5 - Competence (know when to refer) O4 - Staffing (Engineer availability)	TBC
10	Replace pipework	6	<b>Install new section and make up flanges</b>					
10	Replace pipework	6.1	Confirm correct gaskets are ready to be inserted	Check omitted - Wrong gaskets fitted	Premature failure when in service leading to LOC.	Y	J8 - Equipment (gaskets) P5 - Competence (joint making)	TBC
10	Replace pipework	6.2	Support new pipework in position	Action omitted - Do not support pipework	May not be able to insert bolts to make up the flange.	N		
10	Replace pipework	6.3	Install bolts (loose) at bottom of flanges to hold flanges in position	Action in wrong order - Bolts at top installed first or bolts are tightened	May not be able to insert the gasket or may not be able to align it in the flange (see below).	N		

10	Replace pipework	6.4	Insert gasket in each flange	Action omitted - Gasket not inserted	Flange will leak when returned to service	Y	J8 - Equipment (gaskets) J11 - Access (to inset gasket) P5 - Competence (joint making)	TBC
10	Replace pipework	6.5	Install remainder of bolts (loose)	Action omitted - Bolts not fitted at this time	May not be able to get the bolts in to complete making up the flange	N		
10	Replace pipework	6.6	Align the flanges	Action misaligned - Flange not aligned properly	Flange will leak when returned to service. May over stress pipework leading to premature failure and LOC	Y	J11 - Access (to align) P1 - Physical capability (to align) P5 - Competence (joint making)	TBC
10	Replace pipework	6.7	Torque flange bolts	Action too little/much - Bolts not torqued sufficiently	Flange may leak when returned to service or may result in premature failure	Y	J8 - Tools (torque wrench) J11 - Access (to align) P5 - Competence (joint making)	TBC
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	<b>1</b>	<b>Identify system components</b>					
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	1.1	Identify initiators	Selection incorrect - Wrong initiator used for the test	May activate the wrong SIF. If the SIF is associated with running plant it will shut down the plant.	N		
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	1.2	Identify final elements	Selection incorrect - wrong final element is monitored during the test	May not collect the evidence required to satisfy the proof test. In some cases the first activation is critical. In these cases failure to collect evidence will invalidate part of the test.	Y	J1 - Component ID P5 - Competence (avoid mis-fire)	TBC
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	1.3	Identify tidy-up functions	Information not obtained - Tidy-up functions not considered	May not confirm that tidy-up functions are operating correctly, which may lead to operational problems when in service.	N		
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	<b>2</b>	<b>Visually inspect the SIF components</b>					
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	2.1	Confirm labelling is intact, legible and correct	Check omitted - Labelling issues not detected	May contribute to identification errors (see sub-task 1)	N		
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	2.2	Visually confirm integrity of physical supports	Check omitted - Physical supports are degraded or unsuitable	Component may be compromised. May mean that a SIF does not function on demand, which may contribute to loss of containment.	Y	J11 - Access (to view supports) P5 - Competence (visual checks)	TBC

11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	2.3	Visually confirm integrity of power supplies	Check omitted - Power supplies are degraded or unsuitable	Component may be compromised. May result in it changing to its 'safe' state leading to plant trip or other operational issues. May mean that a SIF does not function on demand, which may contribute to loss of containment.	Y	J11 - Access (to view power supplied) P5 - Competence (visual checks)	TBC
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	2.4	Confirm electrical components satisfy Ex	Check omitted - Electrical components are degraded or unsuitable	Component may become a source of ignition	Y	J11 - Access (to view components) P5 - Competence (visual checks) P5 - Competence (COMEX includes visual 'close' and 'detailed' checks).	TBC
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	2.5	Visually confirm integrity of the connection to the process	Check omitted - Process connections are degraded or unsuitable	Physical failure of block/tubing may result in loss of containment. In some cases it is not possible to view connections to process (e.g. insulation)	Y	J3 - Difficulty (Connections not visible) J11 - Access (to view connections) P5 - Competence (visual checks) P5 - Competence (small bore tubing)	TBC
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	2.6	Confirm insulation is in place and in good condition (if required)	Check omitted - Insulation is missing or in poor condition	May contribute to blockages of instrument tubing or final element mechanism resulting in failure of the SIF to function on demand.	Y	J11 - Access P5 - Competence (visual checks)	TBC
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	2.7	Confirm heat tracing is in place and operating correctly (if required)	Check omitted - Heat tracing is not operating	May contribute to blockages of instrument tubing or final element mechanism resulting in failure of the SIF to function on demand.	Y	J3 - Difficulty of task (not visible) J8 - Equipment (heat tracing status indicators) P5 - Competence (heat tracing status)	TBC
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	3	<b>Prepare to activate the SIF by electronic simulation)</b>					
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	3.1	Apply the inhibits / overrides	Right action on wrong object - Wrong functions overridden or inhibited	May cause running plant to trip causing operational problems.. SIF may not operate on demand on running plant.	Y	J5 - Procedures (inhibits/overrides identified) J6 - Preparation (inhibits/overrides) P5 - Competence (manage inhibits/overrides)	TBC

11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	3.2	Record the inhibits / overrides	Information omitted - Overrides / inhibits are not recorded	Overrides / inhibits may not be re enabled after the test is complete. Plant will not be protected from hazardous situations.	Y	J5 - Procedures (inhibits/overrides identified) J6 - Preparation (inhibits/overrides) P5 - Competence (manage inhibits/overrides)	TBC
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	3.3	Set-up the process to allow operation of the final element	Action omitted - Final element cannot be put in its non-trip status	May not be able to confirm the final element operates when the SIF is activated.	Y	J6 - Preparation (operational status for testing) P5 - Competence (Operational status for testing)	TBC
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	3.3	Prepare for initiation by electronic simulation					
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	3.4	Disconnect the cables from the initiator	Left connected	Cannot connect simulator	N		
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	3.5	Record the cable connections details	Cable connections not recorded correctly	May reconnect incorrectly after proof test. May mean the initiator does not read correctly. May mean SIF does not operate at correct point on demand.	Y	J1 - Cable ID P5 - Competence (cable connections)	TBC
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	3.6	Connect electronic simulator	Action in wrong order - SIF is activated when personnel are not ready to monitor	In some cases the first activation is critical. In these cases failure to collect evidence will invalidate part of the test.	Y	J6 - Preparation (identify critical test points) P5 - Competence (avoid mis-fire)	TBC
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	3.7	Simulate an input that is outside of the SIF activation range	Action too little/much - Simulated input it within the SIF activation range	May result in the SIF being activated too early. In some cases the first activation is critical. In these cases failure to collect evidence will invalidate part of the test.	Y	J6 - Preparation (activation settings) P5 - Competence (avoid mis-fire)	TBC
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	3.8	Confirm the simulated value is reaching the SIF correctly	Check omitted - Input and output are not the same	May mean the SIF activation set-point is not confirmed by the test. May incorrectly believe the SIF is faulty and waste time/effort on an unnecessary repair.	N		
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	3.7	Ensure final elements are in non-trip status	Check omitted - Final element is in its tripped status	Will not be able to confirm final element operation when the SIF is activated	Y	J2 - Interface (final element status) P5 - Competence (non-trip status)	TBC
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	4	<b>Activate the SIF</b>					

11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	4.1	Set the simulated input to close but outside of the activation set point	Action too little/much - Level is within the SIF activation range	May result in the SIF being activated. In some cases the first activation is critical. In these cases failure to collect evidence will invalidate part of the test.	Y	J6 - Preparation (activation settings) P5 - Competence (avoid mis-fire)	TBC
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	4.2	Confirm the simulated input is reaching the SIF correctly	Check omitted - Input and output are not the same	May mean the SIF activation set-point is not confirmed by the test. May incorrectly believe the SIF is faulty and waste time/effort on an unnecessary repair.	N		
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	4.3	Adjust the input until the SIF activates	Action too fast/slow - Input value changed too quickly.	May not be able to confirm that the SIF activates within an acceptable tolerance. The SIF performance may not be sufficient to achieve the required risk reduction.	Y	J8 - Tools (simulator adjustments) J5/P5 - Competence (adjust to set point)	TBC
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	4.4	Confirm the final element operates	Check omitted - Operation of final element is not confirmed	Test will not confirm SIF is fit for purpose. It may not function on demand.	Y	J2 - Interface (final element status) P5 - Competence (trip status)	TBC
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	4.5	Confirm status indications for the final element and SIS status update correctly	Check omitted - Status indications are incorrect	May cause operational issues if SIF activation is not communicated clearly to operations.	N		
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	4.6	Confirm operation of tidy-up actions	Check omitted - Tidy-up actions fail	Possible operational issues if the SIF activates on demand.	N		
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	4.7	Collect the data required to confirm the performance criteria have been met	Information incorrectly interpreted - Test result considered to be a pass when it was actually a fail	Test will not confirm SIF is fit for purpose. It may not function on demand.	Y	J2 - Interfaces (data from test) P5 - Competence (data required from test)	TBC
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	5	<b>If test is successful, return SIF to operating status (electronic simulation)</b>					
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	5.1	Adjust the input until it is outside of the activation set-point	Action too fast/slow - Adjust too quickly	May not detect the re-set point. May not recognise the need to adjust the re-set. May result in process problems.	N		
11	<b>Safety Instrumented Function (SIF) proof testing (electronic simulation)</b>	5.2	Confirm that the SIF has reset	Check omitted - SIF has not reset	May not detect the re-set point. May not recognise the need to adjust the re-set. May result in process problems.	N		



11	Safety Instrumented Function (SIF) proof testing (electronic simulation)	5.3	Carry out full range calibration	Action omitted - Calibration checks not carried out at the same time as the proof test	Carrying out calibration checks separately creates another occasion when the SIF loop has to be broken into with the risk that it is then not return to service.	Y	J7 - Time available (for calibration checks) P5 - Competence (full range calibration)	TBC
11	Safety Instrumented Function (SIF) proof testing (electronic simulation)	5.4	Collect the data required to confirm the performance criteria (for reset) have been met	Information not recorded	Will not have a full history of the SIF. If there are problems in the future it may be difficult to determine the cause.	N		
11	Safety Instrumented Function (SIF) proof testing (electronic simulation)	5.5	Disconnect the simulator	Action omitted - Calibrator is left connected	Calibrator may prevent the initiator from measuring the process. SIF may not function on demand.	Y	P5 - Competence (initiator operational status)	TBC
11	Safety Instrumented Function (SIF) proof testing (electronic simulation)	5.6	Reconnect the cables to the initiator	Action omitted - Cables not connected or connected incorrectly	Initiator will not measure the process. SIF will not function on demand.	Y	J1 - Cable ID P5 - Competence (initiator operational status)	TBC
11	Safety Instrumented Function (SIF) proof testing (electronic simulation)	5.7	Cross check the initiator output with other process data to confirm it is accurately tracking plant conditions (where possible)	Check omitted - Do not cross check	A problem with reinstatement may not be detected. May mean the SIF is not available to function on demand. In some cases (e.g. vessels normally at atmospheric pressure) there may be no independent indication that initiator has been de-isolated.	Y	J2 - Interfaces (cross check) P5 - Competence (cross checking) P6 - Motivation (attention to process)	TBC
11	Safety Instrumented Function (SIF) proof testing (electronic simulation)	5.8	Return process to its normal status	Action omitted - Process not returned to required status	Operational problems	N		
11	Safety Instrumented Function (SIF) proof testing (electronic simulation)	5.9	Remove override / inhibits	Action incomplete - One or more overrides / inhibits left on	Actions from the SIF may not be active meaning the plant is not fully protected.	Y	P5 - Competence (manage inhibits/overrides)	TBC
11	Safety Instrumented Function (SIF) proof testing (electronic simulation)	6	<b>If test is unsuccessful, develop an appropriate plan</b>					
11	Safety Instrumented Function (SIF) proof testing (electronic simulation)	6.1	Develop an operational plan to manage risks until SIF is repaired	Action misaligned - Operational plan does not achieve tolerable risk	Plant may not be properly protected against a MAH scenario.	Y	J5 - Procedure (test failure response) P5 - Competence (operate with degraded SIF)	TBC
11	Safety Instrumented Function (SIF) proof testing (electronic simulation)	6.2	Arrange for repair	Action omitted - Repair not arranged	Delay returning to normal operation. May increase time at risk.	N		
11	Safety Instrumented Function (SIF) proof testing (electronic simulation)	7	<b>Update and review SIF data file</b>	Information not recorded	Will not have full history for the SIF. If there is a problem in the future, it may not be possible to determine the cause.	N		
12	Leak test plant when re-instating after maintenance	1	<b>Confirm system status</b>					

12	Leak test plant when re-instating after maintenance	1.1	Visually check the status of all disturbed joints	Check incomplete - one or more joints are not checked	May result in nitrogen leaks during the test	N		
12	Leak test plant when re-instating after maintenance	1.2	Carry out line-walk of the whole system	Check incomplete - whole system is not checked	Discrepancies between the test design and plant status may not be detected. May mean hazards are created during leak testing.	N		
12	Leak test plant when re-instating after maintenance	1.3	Confirm integrity of outboard isolations	Check incomplete - integrity of one or more isolations is not checked	If inboard isolation valves have to be open for the leak test a passing outboard isolation would allow gas to flow into the system before the leak test is complete. If a joint leaked there would be a LOC.	Y	J1 - Valve ID. J6 - Preparation (isolation). J11 - Access (to valves) P5 - Competence (isolation integrity)	TBC
12	Leak test plant when re-instating after maintenance	2	<b>Set-up test equipment</b>					
12	Leak test plant when re-instating after maintenance	2.1	Visually check the test manifold, hoses etc.	Check incomplete - problems with test equipment are not detected	Possible failure during testing.	N		
12	Leak test plant when re-instating after maintenance	2.2	Ensure a correctly rated regulator is connected to the nitrogen supply	Check omitted - regulator is not rated correctly	May contribute to plant being over pressurised during leak testing. Potential to damage adjacent live plant.	Y	J8 - Tools (regulator). P5 - Competence (potential to over pressurise).	TBC
12	Leak test plant when re-instating after maintenance	2.3	Confirm the PSV on the test manifold is set correctly	Check omitted - PSV is not rated correctly	If there is no online PSV on the plant, setting the PSV incorrectly on the test manifold could contribute to plant being over pressurised during leak testing - as above. Additionally, potential for personal harm due to test equipment being over pressurised.	Y	J8 - Tools (PSV). P5 - Competence (potential to over pressurise).	TBC
12	Leak test plant when re-instating after maintenance	2.4	Confirm pressure gauge on test manifold is the correct range	Check omitted - pressure gauge is not rated correctly	Leak test may not be carried out at the required pressure due to inappropriate scale on the gauge. May mean leaks are not detected, leading to LOC on return to service. May contribute to over pressurisation of plant during leak testing.	Y	J8 - Tools (PSV / test manifold).	TBC
12	Leak test plant when re-instating after maintenance	2.5	Fit a pressure recorder of correct range to the test manifold	Check omitted - gauge is not rated correctly	A second indication of pressure would not be available.	N		

12	Leak test plant when re-instating after maintenance	2.6	Connect a hose between test manifold and identified test point	Action misaligned - connect to wrong point on plant	If wrong side of NRV or isolation valve the leak test would not be effective, which may contribute to LOC on return to service.	Y	J1 - valve ID. J6 - Preparation (test design) J11 - Access (to connection) P5 - Competence (potential for incomplete test).	TBC
12	Leak test plant when re-instating after maintenance	2.7	Ensure whip checks are fitted to the hose ends	Action omitted - whip checks not fitted	Harm to personnel if hose joints fail	N		
12	Leak test plant when re-instating after maintenance	3	<b>Leak test the test equipment and hoses</b>	Check omitted - leaks from test equipment not detected	Nitrogen leaks from test equipment	N		
12	Leak test plant when re-instating after maintenance	3.1	Open nitrogen supply and pressurise to the determined test pressure	Action omitted - do not pressurise	Nitrogen leaks from test equipment not detected	N		
12	Leak test plant when re-instating after maintenance	3.2	Shut the nitrogen supply	Action omitted - valve left open	Nitrogen leaks from test equipment detected by decay test because nitrogen supply compensates	N		
12	Leak test plant when re-instating after maintenance	3.3	Check joints for leaks	Check incomplete - one or more sections not checked	Nitrogen leaks from test equipment	N		
12	Leak test plant when re-instating after maintenance	3.4	Monitor pressure gauge on test manifold for decay	Monitoring omitted - decay not detected	Nitrogen leaks from test equipment	N		
12	Leak test plant when re-instating after maintenance	4	<b>Line-up the system for the leak test (some steps may require authorisation if plant isolation status is affected for the test)</b>					
12	Leak test plant when re-instating after maintenance	4.1	Open PSV isolation valve(s)	Action omitted - PSV isolation valve is closed	May contribute to plant being over pressurised during leak testing. Potential to damage adjacent live plant.	Y	J6 - Preparation (isolation modification). P5 - Competence (PSV online)	TBC
12	Leak test plant when re-instating after maintenance	4.2	Ensure an open path from injection point to vent valve	Check incomplete - system is not fully lined up	If the plant was over pressurised in error, there may not be a safe way to recover. May lead to plant over pressurisation during the leak test - as above.	Y	J1 - valve ID. J6 - Preparation (test design) J11 - Access (to connection) P5 - Competence (potential for incomplete test).	TBC
12	Leak test plant when re-instating after maintenance	4.3	Ensure the route will pressurise every disturbed joint	Check incomplete - system is not fully lined up	One or more disturbed flanges may not be pressurised during the leak test. May result in LOC on return to service.	Y	J1 - valve ID. J6 - Preparation (test design) J11 - Access (to connection) P5 - Competence (potential for incomplete test).	TBC

12	Leak test plant when re-instating after maintenance	4.4	Ensure downstream High Pressure Low Pressure (HP-LP) interfaces cannot be over pressurised by a passing isolation valve (may require downstream valves to be opened to create a vent route)	Check incomplete - downstream HP-LP interfaces are not protected	Downstream systems are over pressurised due an isolation valve passing during the leak test.	Y	J1 - HP/LP interfaces. J6 - Preparation (test design) P5 - Competence (HP/LP interface).	TBC
12	Leak test plant when re-instating after maintenance	4.5	Ensure pressure will not be trapped behind NRV or can be vented if required.	Check incomplete - NRV downstream of vent point not identified	Pressure may be trapped causing a hazard to personnel if corrective action is required due to leaks being detected.	N		
12	Leak test plant when re-instating after maintenance	5	<b>Carry out the leak test in defined stages</b>					
12	Leak test plant when re-instating after maintenance	5.1	Pressurise the system to the 1st stage pressure	Action too much - pressurise to greater than correct 1st stage pressure	If there was a leak there would be a greater volume of nitrogen that may leak causing a hazard.	N		
12	Leak test plant when re-instating after maintenance	5.2	Shut the nitrogen supply	Action omitted - nitrogen supply is left open	Either the pressure would continue to increase or the leak would continue.	N		
12	Leak test plant when re-instating after maintenance	5.3	Check upstream / downstream for any pressure rise	Check omitted - pressure rise not detected	Passing boundary isolation (i.e. test gas flowing beyond the isolation) could result in downstream plant being over pressurised.	Y	J6 - Preparation (test design) P5 - Competence (isolation integrity).	TBC
12	Leak test plant when re-instating after maintenance	5.4	Check all disturbed joints for leaks (use snoop)	Check incomplete - one or more joints are leaking	Leaks from joints on return to service.	Y	J1 - Joint ID P5 - Competence (check joints)	TBC
12	Leak test plant when re-instating after maintenance	5.5	Monitor for pressure decay	Check incomplete - one or more joints are leaking	Leaks from joints on return to service.	Y	J7 - Time available P5 - Competence (decay test)	TBC
12	Leak test plant when re-instating after maintenance	5.6	Repeat for the remaining pressurisation stages (50%, 75%, 100%)	Action incomplete - leak test not carried out at all pressures	Leaks from joints on return to service.	Y	J7 - Time available P5 - Competence (pressurisation stages)	TBC
12	Leak test plant when re-instating after maintenance	5.7	Monitor at full test pressure for 30 minutes	Action too short - do not monitor for 30 minutes	Leaks from joints on return to service.	Y	J7 - Time available P5 - Competence (decay test)	TBC
12	Leak test plant when re-instating after maintenance	6	<b>De-pressurise system and de-rig test equipment</b>					
12	Leak test plant when re-instating after maintenance	6.1	Depressurise the test equipment and process system to safe location	Action incomplete - pressure remains	Harm of people when de-rigging	N		
12	Leak test plant when re-instating after maintenance	6.2	If the leak test has failed, return the system to its isolated state as shown on the ICC	Action omitted - isolation is not re-established	Leaks identified in leak test may be fed with gas if the isolation integrity has been reduced.	Y	P5 - Competence (disturbed isolation).	TBC

12	Leak test plant when re-instating after maintenance	6.3	Ensure the nitrogen hose is depressurised and disconnect from plant	Action omitted - hose is not disconnected	No immediate consequence. However, the plant will not be in its design state.	N		
13	Take high pressure gas sample	1	Prepare sample skid					
13	Take high pressure gas sample	1.1	Confirm correct sample point has been identified	Check omitted - wrong sample point	Personnel can be exposed to high temperature if sample when bed is on hot regeneration	N		
13	Take high pressure gas sample	1.2	Confirm no other work is taking place in the vicinity of the sample skid	Check omitted - work taking place in area	May lead to escalation if a gas release occurred during sampling	Y	J6 - Preparation (timing sample collection) J7 - Time available (gas tech availability at scheduled time) P5 - Competence (sampling precautions)	TBC
13	Take high pressure gas sample	1.3	Confirm no personnel in the vicinity of the sample skid vent	Check omitted - people in the area	Gas will be released at vent. Possible ignition if work is taking place near vent. Personnel may be startled by high noise created when venting.	Y	J6 - Preparation (timing sample collection) J7 - Time available (gas tech availability at scheduled time) P5 - Competence (sampling precautions)	TBC
13	Take high pressure gas sample	1.4	Ensure all skid valves downstream of process pressure instrument are closed	Check omitted - one or more valves open	Gas may be released to vent earlier than intended.	N		
13	Take high pressure gas sample	1.5	Ensure skid valves upstream of process pressure instrument are open	Check omitted - one or more valves closed	Pressure instrument will not be reading pressure. Process upset.	N		
13	Take high pressure gas sample	1.6	Ensure skid bleed valve is shut	Check omitted - valve is open	Gas will be released to vent earlier than intended when inlet valve is opened.	N		
13	Take high pressure gas sample	1.7	Locate sample cylinder in clamp but do not connect	Action too much - connect at this time	Sample skid may not be purged before sample is taken. Sample may not be representative of process.	N		
13	Take high pressure gas sample	3	Purge skid (air to gas)					
13	Take high pressure gas sample	3.1	Open skid inlet isolation valves	Action omitted - valve left closed	No gas flows to skid. Cannot purge or take sample	N		
13	Take high pressure gas sample	3.2	Open skid outlet isolation valves	Action omitted - valve left closed	No gas flows through skid to vent. Skid not purged. Sample will not be representative of process.	N		
13	Take high pressure gas sample	3.3	Slowly open skid sample inlet valve	Action omitted - valve left closed	No gas flows to skid. Cannot purge or take sample	N		

13	Take high pressure gas sample	3.4	Confirm skid local gauge reads full plant pressure	Check omitted - gauge does not read	Purge has not been achieved. Sample will not be representative of process.	N		
13	Take high pressure gas sample	3.5	Slowly open valve on skid outlet to vent	Action omitted - valve left closed	No gas flows through skid to vent. Skid not purged. Sample will not be representative of process.	N		
13	Take high pressure gas sample	3.6	Purge for several minutes then close needle valve on skid outlet to vent	Action too short - do not purge for long enough	Sample will not be representative of process	N		
13	Take high pressure gas sample	3.8	Close skid sample inlet valve	Action omitted - valve left open	Gas may be released from skid outlet to sample cylinder	N		
13	Take high pressure gas sample	4	<b>Fill cylinder</b>					
13	Take high pressure gas sample	4.1	Connect hose from sample cylinder to skid	Action omitted or incomplete - do not connect cylinder correctly	Cannot take sample	N		
13	Take high pressure gas sample	4.2	Slowly open skid sample inlet valve	Action omitted - valve left closed	Cannot take sample	N		
13	Take high pressure gas sample	4.3	Open valves to sample cylinder	Action omitted - valve left closed	Cannot take sample	N		
13	Take high pressure gas sample	4.4	Allow cylinder to fill	Action omitted - valve left closed	Insufficient gas in cylinder. Sample may not be representative	N		
13	Take high pressure gas sample	4.5	When cylinder is full, close valves to sample cylinder	Action omitted - valve left open	Gas released from cylinder when disconnected. Will be at high pressure so possible physical harm to personnel. Released gas may form create risk of fire.	N		
13	Take high pressure gas sample	5	<b>Depressurise skid</b>					
13	Take high pressure gas sample	5.1	Close skid inlet valves	Action omitted or incomplete - valve left open	Gas supply to skid remains live. May contribute to gas release.	N		
13	Take high pressure gas sample	5.2	Slowly open needle valve in skid outlet to vent	Action omitted - valve left closed	Will not depressurise skid. May contribute to gas releases or hazard to personnel	N		
13	Take high pressure gas sample	5.3	Confirm skid local gauge shows zero	Check omitted - gauge showing pressure	Indicates skid has not been depressurised. May contribute to gas releases or hazard to personnel	N		
13	Take high pressure gas sample	6	<b>Remove sample cylinder</b>					
13	Take high pressure gas sample	6.1	Disconnect hose between cylinder and skid	Action omitted - do not disconnect	Cannot remove sample cylinder	N		
13	Take high pressure gas sample	6.2	Remove cylinder from clamp	Action omitted - cylinder left in place	Cannot analyse sample	N		

14	Start-up an oil/gas production well	1	<b>If plant side pressure is greater than well side pressure, vent to equalise</b>					
14	<b>Start-up an oil/gas production well</b>	1.1	Confirm safe to vent	Check omitted - other activities (e.g. helicopter movements) whilst venting	Potential ignition of vented gas that may lead to loss of helicopter	Y	J6 - Preparation (coordinating activities) P5 - Competence (hazards of venting) P6 - Motivation (priority of well start)	TBC
14	<b>Start-up an oil/gas production well</b>	1.2	Open vent to de-pressurise topsides	Action omitted - do not de-pressurise	Opening Emergency Shut Valve (ESDV) with large differential pressure will damage it meaning it cannot isolate gas flow in an emergency.	Y	J1 - Valve ID P5 - Competence (equalising pressures before opening valves)	TBC
14	<b>Start-up an oil/gas production well</b>	1.3	When pressures are equalised, close vent	Action omitted - vent left open	Will create a differential pressure across the ESDV, which can cause damage when opened. When well is opened, gas will flow from the vent.	Y	J1 - Valve ID J2 - Interfaces (pressure data) P5 - Competence (equalising pressures before opening valves)	TBC
14	<b>Start-up an oil/gas production well</b>	1.4	Open ESDV	Action omitted - valve left closed	Cannot flow gas	N		
14	<b>Start-up an oil/gas production well</b>	2	<b>Dose wells to be used with methanol / corrosion inhibitor</b>					
14	<b>Start-up an oil/gas production well</b>	2.1	Start-up dosing pumps	Action omitted - pumps not started	No methanol injection can lead to hydrate formation affecting flow. May contribute to loss of containment.	Y	J2 - Interfaces (dosing data) J8 - Equipment (dosing system) P5 - Competence (dosing requirements)	TBC
14	<b>Start-up an oil/gas production well</b>	2.2	Pressurise dosing system to above well pressure	Action too little or much - wrong pressure in methanol sealine	Low pressures means methanol / inhibitor cannot be dosed. No methanol injection can lead to hydrate formation affecting flow. Low dosing may contribute to LOC.	Y	J2 - Interfaces (dosing data) J8 - Equipment (dosing system) P5 - Competence (dosing requirements)	TBC
14	<b>Start-up an oil/gas production well</b>	2.3	Pressurise between upper master and wing valve until pressure is the same as the well.	Action omitted - do not equalise pressures	Upper master valve may be damaged if opened with high differential pressure. May affect its function as an ESDV.	Y	J1 - Valve ID J2 - Interfaces (pressure data) P5 - Competence (equalising pressures before opening valves)	TBC
14	<b>Start-up an oil/gas production well</b>	2.4	When equalised, open upper master valve	Action omitted - upper master left closed	Cannot flow gas			

14	Start-up an oil/gas production well	2.5	Establish methanol / corrosion inhibitor as per plan	Action too little / much - inject at wrong rates	Insufficient methanol injection can lead to hydrate formation affecting flow. Low dosing may contribute to LOC. Over dosing can cause process problems.	Y	J6 - Preparation (dosing requirements) P5 - Competence (dosing requirements)	TBC
14	Start-up an oil/gas production well	3	<b>Start well flowing</b>					
14	Start-up an oil/gas production well	3.1	Open wing valve	Action omitted - valve left closed	Cannot flow gas	N		
14	Start-up an oil/gas production well	3.2	Slowly open choke valve to start flow whilst keeping within temperature limits	Action too fast - increase flow too quickly	Low temperatures can cause pipework failure.	Y	J2 - Interfaces (temperature data) J8 - Equipment (choke flow control) P5 - Competence (low temperature risks)	TBC
15	Set-up for wire lining on an oil/gas well	1	<b>Test integrity of Swab valve</b>					
15	Set-up for wire lining on an oil/gas well	1.1	Ensure the Swab valve is closed.	Check omitted - valve is open	Cannot test valve integrity	N		
15	Set-up for wire lining on an oil/gas well	1.2	Install pressure gauges	Action omitted - gauges not installed	Cannot test valve integrity	N		
15	Set-up for wire lining on an oil/gas well	1.3	Pressurise below Swab valve to well pressure	Action too little - do not pressurise sufficiently	Integrity of barriers not confirmed to required standard. Increased likelihood of LOC when well cap is removed.	Y	J2 - Interfaces (pressure indication) P5 - Competence (valve integrity checking)	TBC
15	Set-up for wire lining on an oil/gas well	1.4	Use well cap bleed to vent any residual pressure above the Swab Valve	Action omitted - pressure not vented	Cannot test valve integrity	N		
15	Set-up for wire lining on an oil/gas well	1.5	Monitor pressure for defined period	Action too short - do not monitor for long enough	Integrity of barriers not confirmed to required standard. Increased likelihood of LOC when well cap is removed.	Y	J2 - Interfaces (pressure indication) J7 - Time available (for test) P5 - Competence (valve integrity checking)	TBC
15	Set-up for wire lining on an oil/gas well	1.6	Confirm pressure rise above Swab valve is zero / within allowable limits	Check omitted - pressure rise is greater	Integrity of barriers not confirmed to required standard. Increased likelihood of LOC when well cap is removed.	Y	P5 - Competence (valve integrity checking) P6 - Motivation (test integrity vs work programme)	TBC
15	Set-up for wire lining on an oil/gas well	1.7	Isolate Swab valve closed	Action omitted - valve is not isolated	Swab valve could be operated. LOC when cap is removed.	Y	J8 - Equipment (method of isolation) P5 - Competence (isolation standard)	TBC
15	Set-up for wire lining on an oil/gas well	2	<b>Test integrity of Upper Master valve</b>					



15	Set-up for wire lining on an oil/gas well	2.1	Use vent to depressurise between Upper Master and Swab valves	Action omitted - pressure not vented	Cannot test valve integrity	N		
15	Set-up for wire lining on an oil/gas well	2.2	Monitor pressure between Upper Master and Swab valve for defined period	Action too short - do not monitor for long enough	Integrity of barriers not confirmed to required standard. Increased likelihood of LOC when well cap is removed.	Y	J2 - Interfaces (pressure indication) J7 - Time available (for test) P5 - Competence (valve integrity checking)	TBC
15	Set-up for wire lining on an oil/gas well	2.3	Confirm pressure rise above is zero / within allowable limits	Check omitted - pressure rise is greater	Integrity of barriers not confirmed to required standard. Increased likelihood of LOC when well cap is removed.	Y	P5 - Competence (valve integrity checking) P6 - Motivation (test integrity vs work programme)	TBC
15	Set-up for wire lining on an oil/gas well	2.4	Isolate Upper Master valve closed	Action omitted - valve is not isolated	Swab valve could be operated. LOC when cap is removed.	Y	J8 - Equipment (method of isolation) P5 - Competence (isolation standard)	TBC
15	Set-up for wire lining on an oil/gas well	3	<b>Rig-up wireline assembly onto well</b>					
15	Set-up for wire lining on an oil/gas well	3.1	Confirm the wireline assembly is as design	Check incomplete - one or more components omitted or installed incorrectly	May reduce the ability to close in the well in the event of an incident	Y	J6 - Preparation (assembly design) P5 - Competence (wireline equipment knowledge)	TBC
15	Set-up for wire lining on an oil/gas well	3.2	Confirm no trapped pressure under well cap	Check omitted - pressure is trapped	Release of trapped pressure on removing the well cap	N		
15	Set-up for wire lining on an oil/gas well	3.3	Remove cap	Action omitted - cap left on	Cannot install wireline assembly	N		
15	Set-up for wire lining on an oil/gas well	3.3	Lift wireline assembly into place	Action misaligned - impacts between wireline assembly and plant whilst lifting.	LOC from plant. Wireline equipment may not operate correctly, including when closing-in in the event of an incident.	Y	J6 - Preparation (lifting plan) J8 - Equipment (lifting) J10 - Working environment (lighting) P5 - Competence (lifting management)	TBC
15	Set-up for wire lining on an oil/gas well	3.4	Secure wireline equipment onto the well	Action incomplete - joint not made properly	LOC when wellhead valves are opened.	Y	J8 - Tools (making joints) P5 - Competence (making joints)	TBC
15	Set-up for wire lining on an oil/gas well	3.5	Ensure wireline assembly is lined-up for pressure testing	Check incomplete - one or more valves/components in wrong status	Sections of assembly may not be pressurised during leak test. Leaks may not be discovered leading to LOC when wireline activities take place.	Y	J2 - Interfaces (valve status) P5 - Competence (leak testing)	TBC
15	Set-up for wire lining on an oil/gas well	3.6	Pressurise wireline assembly	Action too little - do not pressurise sufficiently	Leaks may not be discovered leading to LOC when wireline activities take place.	Y	J2 - Interfaces (pressure indication) P5 - Competence (leak testing)	TBC

15	Set-up for wire lining on an oil/gas well	3.7	Monitor pressure in wireline assembly for defined period	Action too short - do not monitor for long enough	Leaks may not be discovered leading to LOC when wireline activities take place.	Y	J2 - Interfaces (pressure indication) J7 - Time available (for test) P5 - Competence (leak testing)	TBC
15	Set-up for wire lining on an oil/gas well	3.8	Confirm pressure loss is zero / within allowable limits	Check omitted - pressure loss is greater	Leaks may not be discovered leading to LOC when wireline activities take place.	Y	J2 - Interfaces (pressure indication) J7 - Time available (for test) P5 - Competence (leak testing)	TBC
15	Set-up for wire lining on an oil/gas well	4	<b>Test wireline assembly operation</b>					
15	Set-up for wire lining on an oil/gas well	4.1	Rig up hydraulic power supply to wireline assembly	Action incomplete - hydraulic joints not made properly	Release of hydraulic fluid at high pressure leading to personal injury	N		
15	Set-up for wire lining on an oil/gas well	4.2	Confirm critical components (particularly Blow Out Preventer) components operate correctly	Action incomplete - one or more functions not checked	May be unable to respond to a well control event. May result in LOC (blowout)	Y	J2 - Interfaces (status of component after operation) J5 - Procedures (component operation vs scenario) P5 - Competence (testing operation of components)	TBC
15	Set-up for wire lining on an oil/gas well	4.3	Confirm critical components revert to their fail-safe status on loss of hydraulic power	Action omitted - loss of power checks not carried out	May be unable to respond to a well control event under power loss scenarios. May result in LOC (blowout)	Y	J2 - Interfaces (status of component after operation) J5 - Procedures (component operation vs scenario) P5 - Competence (testing operation of components)	TBC
15	Set-up for wire lining on an oil/gas well	5	<b>Carry out wireline scope of work</b>					
15	Set-up for wire lining on an oil/gas well	5.1	Ensure correct wireline tools are in place, ready for use	Check incomplete - one or more tools are omitted	Cannot complete wireline work. May need to de-rig and repeat, with associated increased hazard.	N		
15	Set-up for wire lining on an oil/gas well	5.2	Carry out a "well-control drill" with the team, covering indications of an incident and how to respond	Action omitted - drill not carried out	Signs of well-control incidents may be missed or action may be ineffective. Increased potential for LOC (blowout)	Y	J5 - Procedures (well-control response) J7 - Time available (to perform drill) P5 - Competence (carry out drills) P6 - Motivation (drill vs work programme)	TBC

15	Set-up for wire lining on an oil/gas well	5.3	Ensure valves below the Upper Master valve are open	Check incomplete - one or more valves is closed	Cannot complete wireline work.	N		
15	Set-up for wire lining on an oil/gas well	5.4	De-isolate and fully open the Upper Master valve	Action incomplete - valve left closed or only partially open	Potential damage to valve or wireline tool	N		
15	Set-up for wire lining on an oil/gas well	5.5	De-isolate and fully open the Swab valve	Action incomplete - valve left closed or only partially open	Potential damage to valve or wireline tool	N		
15	Set-up for wire lining on an oil/gas well	5.6	Follow the wire-line programme	N/A	N/A	N		