

HSE DIRECTIVE 5 **ENERGY ISOLATION**

ENERGY
ISOLATION

Directive owner per 01.01.2015 **Egil Songe-Møller**

*Please consult the asset's HSE instructions for potential
installation specific requirements*

1 GENERAL

Purpose

The purpose of this directive is to ensure that isolation and re-setting of electrical systems and operations systems is

- carried out safely and in accordance with the regulations
- is managed and documented

Domain

- This directive applies to all BP-operated installations and contracted installations on the Norwegian continental shelf.
- Owners of contracted installations who have a system that satisfies the requirements in this directive, may use their own system provided this has been clarified upon implementation.
- Onshore facilities, subsea or projects where BP Norge have a particular responsibility and which are assessed being part of the petroleum activities

References

- The Activities Regulations, section 82 Work on and operation of electrical installations NPD Regulation
- Regulations relating to safety in work on and operation of high voltage installations The Directorate for Civil Protection and Emergency Planning's regulations
- Regulations relating to safety in work on and operation of low voltage installations. The Directorate for Civil Protection and Emergency Planning's regulations
- 088 Common Model for Work Permits The Norwegian Oil Industry Association's regulations
- Norsok standard O-DP-001 Operations principles
- Guidance on Practice for Safe Isolation and Reinstatement of Plant NSSPU-GP-44-40-1
- HSE Directive no. 1 Work permits
- HSE Directive no. 2 Entry
- HSE Directive no. 8 Electrical installations
- HSE Directive no. 11 Safe Job Analysis
- Breaking Containment NSSPU-GP 10-36

Definitions and abbreviations

- **Work Permit** is a written permission to carry out a defined job at a given place on an installation in a safe manner and under certain conditions.
- **Authorised person electrical** is a BP employee appointed by the responsible person electrical installation to ensure that electrical installations and equipment are carried out in accordance with current regulations within one field.
- **Barriers** mean measures that prevent hazardous conditions such as
 - o physical intervention that shuts down or removes energy supply
 - o administrative routines and procedures

- **Double block and bleed** is a method of process isolation where there are two physical barriers (valves, blinds, etc.) with **bleed-off** in between, where each of the barriers can be operated, secured and tested independently.
- **Single valve** is a method of operational isolation consisting of a shut-off valve that is leak-tested and secured in the closed position.
- **High voltage installations** are electrical installations with nominal voltage of more than 1000 V alternating voltage or 1500 V direct voltage.
- **Isolation** is a method that blocks liquid, gas, electric current or other stored energy so as to ensure safe access for inspection or maintenance.
- **Isolation valve** is a valve that can be tightly closed for example a ball or gate valve. Regulation valves and PSV could not be used for isolation purpose.
- **Competent person, electrical** is a professionally qualified person approved by the responsible person electrical systems to work independently on electrical installations according to the current regulations.
- **Low voltage** installations are electrical installations with nominal voltage up to and including 1000 V alternating voltage or 1500 V direct voltage.
- **Leak test** must always be performed to 110% of the maximum allowed operating pressure of 90% of the PSV set pressure. Leakage rate is considered by the operational responsible person.
- **Maximum operating pressure** is the maximum pressure possible in the system given the prevailing operating conditions, typically given by PSHH.
- **Mechanical blinding** is a method of operations isolation using physical blinding (spade, spectacle flange, blind flange, spacer). Blinding should be equipped with a bleed if it lacks bleed options.
- **Area authority** leads all activities within a specific area
- **Area technician** has the operational responsibility for a specific installation or area.
- **Personal isolation** is short-term isolation used for minor work.
- **Safe Job Analysis (SJA)** is a systematic and step-by-step review of all elements of risk carried out prior to a specific task or operation so that measures can be taken to remove or control any elements of risk identified during the preparation for or performance of the said task or operation.
- **CCR technician** is a person in the central control room (CCR) who controls and coordinates all production and other activities onboard
- **Performing technician** is the person who specifically/physically executes the work covered by the work permit.
- **Safe area** is a place suitable to transfer liquid or gas to without creating a dangerous situation. For a vent this could be an area without ignition sources, HVAC or other suction. Primarily gas shall be depressurised to a flare/vent system and liquid to a drain system.

2 RESPONSIBILITY

Offshore Installation Manager (OIM)

is the highest authority on the platform and is responsible for:

- ensuring that all isolation of energy and safety systems is carried out safely and in accordance with HSE directives/instructions

HSE function (safety officer)

is responsible for:

- providing professional advice when planning isolations on safety systems.

Area authority

is responsible for:

- ensuring that all isolations in his/her area of responsibility are carried out safely and in accordance with HSE directives/instructions

CCR technician

is responsible for:

- coordinating all work activities underway in the operations department's area of responsibility
- maintaining an overview and status of safetycritical isolations

Area technician

is responsible for:

- ensuring that necessary isolations are performed in connection with work in his/her area of responsibility
- preparing process equipment and systems for operational isolation
- isolating safety systems in accordance with work permit/isolation confirmation certificate
- ensuring that the correct equipment/systems are isolated and prepared for work in accordance with work permit/ isolation confirmation certificate
- making sure all isolations are back in position after the work has ended
- to keep overview and status of all isolations within the area of responsibility

Competent person electrical (operations electrician)

is responsible for :

- carrying out electrical isolation of equipment and systems safely and in accordance with regulations and HSE directives

3 USE OF ISOLATION CONFIRMATION CERTIFICATES

Introduction

All isolation and/or disconnection of:

- process equipment/ systems
- electrical equipment/ systems
- safety equipment/ systems

requires an approved isolation confirmation certificate, with the exception of personal isolation

- In addition, an approved work permit is required for execution of work that requires isolation
- The isolation confirmation certificate is not time-limited, with the exception of disconnection of safety systems.

Isolation confirmation certificate requirements

- The isolation confirmation certificate must be used for all isolation, with the exception of isolation of high voltage installations
- For isolation of high voltage installations ref. item 4 Electrical isolation.
- The isolation confirmation certificate must show which equipment/systems will be worked on. A sketch/drawing showing in detail which equipment/systems are involved should also be included. The performing department and contact person must also be included on the certificate.
- The marked up P&ID shall show the situation before the performing technician starts the work.
- In connection with isolation of heater cables, the isometric drawings, where this exists and P&ID showing the extent of the heater cables must be enclosed with the work permit.
- Documentation for larger isolations shall consist of (refer to attachments):
 - o Procedure for isolation and reinstatement
 - o ICC
 - o Valve list and/or Blind list
 - o Marked up P&ID's
 - o Other relevant documentation

Process for isolation confirmation certificates

- The department that requires the isolation will fill in and pass the isolation confirmation certificate with the relevant P&ID's to the Area Authority as described in Completing isolation confirmation certificates. For work that can be planned, the isolation statement should be delivered to the area responsible department 2-3 days before the work is to be performed.
- The department manager, area authority or area technician shall complete the isolation confirmation certificate and determine /add the necessary compensating measures

In connection with isolation of safety systems, the offshore installation manager and the HSE function (safety advisor) must approve the isolation confirmation certificate

Executing the isolation

- The area technician shall ensure that the isolation confirmation certificate is correctly filled in and covers the work to be performed
- A separate procedure shall be used for larger isolations.
- The procedure shall be made by use of the forms given in the attachments.
- Isolations and reinstatement shall be verified in the field when isolating:
 - HC systems
 - Larger isolations (To be decided by the OTLD)
- The performing area technician shall be checked out for the area of the isolation.
- The verifying technician shall have a thorough knowledge of Directive 5.
- For operations isolations, the area technician shall
 - o prepare the equipment/system for isolation in accordance with operations isolation
 - o ensure that equipment/systems are isolated, locked and labelled in accordance with the isolation confirmation certificate and work permit
 - o At start of every work period make sure that there is no pressure buildup in the double block and bleed isolations in all ongoing work
 - o sign the isolation confirmation certificate
- In connection with electrical isolation, a competent person electrical (operations electrician) shall:
 - o perform electrical isolation, and lock and label the isolation in accordance with Electrical isolation
 - o note the padlock number on the isolation confirmation certificate
 - o sign the isolation confirmation certificate
 - o The performing technician shall personally lock the isolation

Overview of isolations

The CCR technician shall ensure that an overview is always available of active isolations at any given time of

- process equipment/ systems
- electrical equipment/ systems
- safety equipment/ systems

Temporary removal of isolation for testing

- For testing of isolated equipment such as leak testing and starting/running motors, equipment can be temporarily de-isolated

- In the event of temporary de-isolation of equipment for testing
 - o the area technician shall ensure that the test can be conducted safely
 - o the area authority shall approve temporary removal of isolation by signing the isolation confirmation certificate

The isolation confirmation certificate is still active even when the equipment is in test.

Re-setting isolation

- Before re-setting, all the involved executing disciplines must remove their padlocks from trays/equipment, and sign the isolation confirmation certificate.
- The area authority or his/her deputy must approve that isolated equipment/systems are ready for re-setting.
- In connection with re-setting of operational isolation the area technician shall
 - o ensure that any mechanical blinding is dismantled
 - o re-set equipment in accordance with Operational isolation and sign the isolation confirmation certificate.
- In connection with re-setting of electrical isolation, a competent person electrical (operations electrician) shall
 - o remove padlocks and marking
 - o conduct electrical connection
 - o sign isolation confirmation certificate
- When re-setting heater cables, the isolator and competent person electrical (operations electrician) shall physically check all parts of the heater cables before megging and electrification

Storage of original and copy of isolation confirmation certificate

Work in progress

- The original isolation confirmation certificate shall be stored at the work site or with the area technician. Appendices must be kept with the original.
- For isolation of safety systems a copy shall be held:
 - o In the vicinity of the CCR
 - o By the Area Technician
- For electrical isolation, the competent person electrical (operations electrician) shall retain a copy of the isolation confirmation certificate.

Follow-up work and re-setting.

- The area technician shall sign performed isolation confirmation certificates.
- The Electrical copy of the IE could be unsigned by the area technician.
- The performing technician shall gather the original and all copies of the isolation confirmation certificate and bring them to the performing department

4 ELECTRICAL ISOLATION

Introduction

For work on electrical equipment and installations, or on equipment that is connected to same, all power supply to the equipment/installation shall be isolated/disconnected electrically.

Activation of emergency trip is not regarded as being electrical isolation, as the emergency trip only cuts off the control power.

Approval

- Electrical isolation requires an approved isolation confirmation certificate.
- An approved work permit can be used instead of an isolation confirmation certificate for low voltage installations when:
 - o the work is conducted by a competent person electrical
 - o the equipment will not be isolated for longer than the duration of the work permit
- For isolation in high voltage systems the form entitled Isolation certificate for high voltage installations shall be used. Alternativly "Leder for sikkerhet" a and "Leder for kobling" can be written in the work permit if this is traceable.

Execution

- Electrical isolation of distribution and battery systems shall only be performed by a competent person, electrical.
- Automation technicians can isolate in automation systems. Performing technician shall be present when the isolation is set and when removed.
- The isolation shall ensure:
 - o that all power supply to installations/equipment is isolated, including power supply for control and indication.
 - o that stored energy, including any capacitor potential, is discharged
 - o that equipment cannot be rendered live by means of an accident or error.
 - o that circuits are without voltage by using a voltage indicator, which must be checked before and after use
 - o that equipment is labelled and locked in the isolated position
- For electrical isolation of low voltage systems of 440V/480V or higher, all-pole switches in the main power circuit must be secured and locked in open position. For electrical isolation of low voltage systems below 440V/480V, the system shall be secured against accidental connection.
- If sufficient security cannot be established, other security measures such as earthing/short-circuiting shall be implemented. For electrical isolation of high voltage systems, the provisions of Work to secure high voltage systems in HSE Directive 8 Electrical installations, shall be followed.
- If integrated earthing equipment is installed, this must be used to connect all main conductors of an isolated unit to earth.

Marking and labelling

- In the event of isolation, isolated equipment and switches must be labelled with a red tag showing:
 - o name of equipment
 - o number of isolation confirmation certificate
 - o name of executing discipline
- In the event of isolation, isolated equipment shall be locked off to prevent improper operation of equipment. Each discipline shall use padlocks/keys with colours conforming to the colour codes for Ula, Valhall and Skarv.
- For isolation of electrical installations and equipment of 440V/480V or higher, the isolation shall be secured with at least two padlocks, one from the electrical department and one from an executing department
- For isolation of electrical installations and equipment of lower than 440V/480V, the isolation shall be secured with at least one padlock from the electrical department. If a padlock cannot be fastened, some other appropriate securing device shall be used.
- If an isolated starter tray is to be used temporarily in another location, or be removed for testing, the padlock and isolation must be transferred to the tray's garage.
- If one discipline completes the work before another, the first discipline can remove its padlock and sign the isolation confirmation certificate.

5 OPERATIONAL ISOLATION

Introduction

- For work on process, auxiliary and drilling systems, equipment and associated components in connection with pressurised equipment/installations, such items must be isolated, depressurised and any hydrocarbons/chemicals removed before work can commence on the equipment/the system.
- Opening of process, auxiliary and drilling systems/equipment shall be carried out in accordance with Instructions for opening operations systems.

This directive does not apply for isolation vis-à-vis reservoirs, if and only if Drilling and Wells have their own approved procedures and NSSPU-GP 10-36 Breaking Containment is followed

Maritime systems are isolated according to specific and approved procedures.

Approval

Operational isolation requires:

- An approved isolation confirmation certificate
- An approved working environment permit level 1 in the event there is a danger of the release of
 - o hydrocarbons

- o chemicals classified as toxic, hazardous to health, corrosive, allergenic or carcinogenic

Safety measures

- In connection with the opening of operating equipment/ systems that entail a danger of releasing hydrocarbons, Safety measures for work on hydrocarbon-bearing systems must be followed
- In connection with the opening of operating equipment/ systems that entail a danger of releasing chemicals, Safety measures for work with hazardous chemicals must be followed
- Develop a contingency plan against leakage before breaking hydrocarbon and hazardous chemical systems.
- All cut points shall be marked on relevant documentation and in the field and shall be approved by the Area Responsible operator.

Application

- *Mechanical blinding* shall be used as operational isolation in connection with
 - o hot work Class A on hydrocarbon-bearing systems connected to pressurised facilities in operation
 - o entry of tanks and enclosed spaces
 - o opening of process equipment and systems for work that involves leaving the work site
- *Double block and bleed* or mechanical blinding shall be used as operational isolation in connection with
 - o opening of hydrocarbon or chemical-bearing systems connected to facilities with a maximum pressure support of more than 10 barg (145 psig). When using Double Block and Bleed the worksite shall not be left by the end of a shift or for more than 1,5 hours without being blinded.
 - o The maximum pressure support shall be determined by the area technician based on all energy sources upstream, downstream, internally and externally. In addition, an uncertainty margin must be allowed for. If there is any uncertainty, PSHH should be used.
 - o opening of systems containing extremely toxic gas (H₂S, etc.)
- *Single valve* can be used as operational isolation instead of mechanical blinding
 - o by opening of the hydrocarbon or chemical-bearing system, including diesel, in connection with facilities with operating maximum pressure of less than 10 barg when using a Single Valve the worksite shall not be left by the end of a shift or for more than 1,5 hours without being blinded.
 - o by opening of systems for less-hazardous auxiliary mediums (air, water without hydrocarbons, pure (dry) glycol, lube oil, hydraulic oil, etc.). Pressure limit is 55 barg.
 - o when barrier is equal or less than ¾" in diameter (and max operation pressure has a limit of 55 barg on hydrocarbon and chemical system)

Shut Down

- During shut down when the system is depressurized and inert and external barriers are established against all energy and inert single block could be used for isolation in the depressurized system also on systems usually having higher operating pressure.
- Use of barriers should be planned before the shutdown. If possible, the barriers should be tested before the system is depressurized. External barriers should always be tested and logged to be approved as a barrier (import, export, wells, etc).
- During the shutdown when the external barriers are secured safely, it is permitted to use plastic strips to secure insulation within its boundary.

Requirements for execution

- An isolation shall be performed as close as possible to the tank or work site.
- Where it is possible, a bleed shall always be located in the working area, to make it easy to verify that no pressure has built up before the work is started.
- The minimum recommended frequency of monitoring is once per crew-change and immediately prior to breaking containment. The isolations shall be checked once per shift while work is performed within the isolations. The isolation integrity shall always be a part of the shift handover.
- All connections must be mechanically blinded when isolating tanks, containers, etc. for entry.
- Exceptions are standpipes if they are not connected to other operating systems under pressure (flare, closed drainage, etc) which may contain hydrocarbons, hazardous chemicals, nitrogen or other things that may lead to undesirable situations. Note that the standpipe may contain condensate or hazardous chemicals that can represent a risk. In such cases they must be isolated from the container through blinding.
- Blinds, pressure indicators, etc. that are installed as part of the isolation shall have the same pressure class as the pipes/ equipment to which they are connected.
- In connection with removal of spoolwork, equipment, etc.
 - o open flanges must be mechanically blinded
 - o free-standing pipes must be properly secured

Mechanical blinding

- When opening systems to install mechanical blinding on less-hazardous auxiliary mediums (air, water without hydrocarbons, glycol, lube oil, hydraulic oil, etc.) *single valves* can be used as shut-off (requirements for isolation of single valve is given below).
- When opening systems to install mechanical blinding on hydrocarbon or chemical-bearing systems, including diesel, in connection with facilities with a maximum operating pressure of less than 55 barg, a single valve can be used as shut-off.

(Requirements for single valve isolation are given below). The maximum pressure support shall be determined by the area technician and is typical PSHH, based on all energy sources upstream, downstream, internally and externally. In addition, an uncertainty margin must be allowed for.

- The following additional requirements are made for work in these two categories:
 - Work in this category must have a short duration.
 - The work must be thoroughly planned.
 - A Safe Job Analysis (SJA) must have been carried out with a positive conclusion, and resulting measures implemented.
 - Any actions in case of a leak shall have been clarified in a SJA.
 - An extra guard must be posted in the area until a positive isolation has been established.
 - It must be considered whether the work of installing blinding involves a greater risk than the original scope of work, because of the extra time it takes, for example. The work method must be evaluated based on this.
 - The work shall have been reviewed and approved by Technical Authority Process/Operations
- When opening systems to install blinding on hydrocarbon or chemical-bearing system in connection with facilities with operating pressure of more than 55 barg, double block and bleed can be used as shut-off .
- When using mechanical blinding as operational installation
 - it must be possible to monitor and bleed of any pressure that builds up against the blinding
- Before mechanical blinding is removed, ensure that
 - any built-in pressure that has built up is released
 - any flammable or hazardous liquids have been drained to a safe area

Using a mechanical pipe plug

When a mechanical (mechanical or hydraulically expandable) plug is used for pressure testing or leak testing, the following requirements apply:

- Only plugs with double seals that allow for a pressure increase up to the maximum operations pressure between the seals, must be used. The plug must have been leak tested up to this pressure before the work is started. It must be possible to drain the chamber between the seals to the atmosphere and to monitor the pressure in it.
- Work on a pipe plug must only be carried out by personnel who have been trained in the use of this particular plug. There must be a user manual for the plug, and the manual must be followed. SJA should always be performed.
- The plug must be secured mechanically using a wire or chain.

The area must be secured during testing. In particular, there must be no access to the area where the plug would go in the event of an unintended blowout.

Double block and bleed

When *double block* and bleed is used as operational isolation

- the bleed-off shall be equipped with pressure indicator and shut-off valve to make it possible to verify the leakage rate
- A log must be kept to trace a possible pressure build up if a blind is not installed.
- bleed-off is routed to a safe area
- if the first valve is leaking the leakage rate shall be evaluated to make sure it is routed to the right place and also to make sure it is not plugged due to hydrates, solid etc. The OTL-D/OTL-S takes the decision if the leakage rate is acceptable and where the bleed hose shall be routed.
- Bleed to a permanent system shall be shown on the marked up P&ID.

Single valve

- Operational isolation using a single valve must be subject to thorough consideration. Alternative, more reliable solutions must be considered
- A single valve must be secured in the closed position and leak-tested to the existing operating pressure in order to be approved as operational isolation.
- For leak tests against the flare and closed drainage, leak tests of valves can be conducted from the upstream side
- Pressure safety valves (PSV) and check valves are not approved as a barrier for operational isolation
- Controlvalves shall only be used in non critical service when a minor leak is acceptable.
- Valves that are to be worked on may not be used for isolation if the work may have an impact on the valve's integrity or mechanical strength

Labelling and locking

- For operational isolation, valves/blinds must be marked with red labels showing :
 - o name of equipment
 - o number of isolation confirmation certificate
 - o name of executing discipline
- For operational isolation
 - o valves must be secured with chains, wire locks, etc. so that handwheels/handle cannot be operated. Plastic strips shall not be used. If this is not possible, handwheels/handle must be removed and the valve must be marked with LO/LC (locked open/locked closed) sign.
 - o for locking of valves, jobs that last less than a week plastic strips can be used if the valves are not considered as safety critical.
 - o electric valves must be electrically isolated in the correct position, and the handwheel/handle for manual operation must also be secured

- o pneumatic or hydraulic valves must be disconnected from air/hydraulics in closed position or be isolated from the air/hydraulic supply with double block and bleed. Valves that open when energy is lost (fail open) must be mechanically locked in the closed position. Preferably, a mechanical lock should be fitted on the valve and not on the drive medium (hydraulics/ pneumatics). If this is not possible, isolation, locking and disconnection of the impulse pipe must be considered .
- o valve position must be easily identifiable

Color Coding

To clarify the boundaries of the isolation the following marking shall be used on the P&IDs

- Valves isolated in closed position shall be marked with red color
- Valves in open position shall be marked with green color
- The area in-between the isolation where the job is performed shall be marked with yellow color
- The bleed volume shall be marked with orange color
- Blinds shall be marked with red color
- The work item shall be marked with blue color

Well intervention

- Before well intervention, the well intervention team (WIS) shall assume control of the Xmas tree and the subsurface safety valve (DHSV) for the well in question.
- Well control shall be assumed when the area authority production (OTL-D) signs the form for Take-over of well control to WIS or the toolpusher. All handover between operation and well intervention team must be followed by an isolation confirmation certificate.
- An Isolation confirmation certificate shall be used for rigging that may reduce the integrity level of the X-mas tree and removal of hydraulic connections for emergency shutdown.
- In connection with well intervention, operation of the Xmas tree valves and/or subsurface safety valves (DHSV) shall be conducted by WIS without requiring a separate isolation certificate

except for

- valve interface from well intervention to process facility (e.g. wing valve, valves to closed drain) and production header that require a separate isolation confirmation certificate
- When well intervention is complete, WIS shall deliver the Xmas tree and subsurface safety valve (DHSV) to the area authority production (OTL-D) by signing the form for Takeover of well control
- NSSPU-GP 10-36 «Breaking containment» is valid for all well work

6 PERSONAL ISOLATION

Introduction

Personal isolation is a simple operational isolation that can be used in connection with shut-off of minor process- and operation equipment. When using personal isolation, the plant must be closed in accordance with Section 5, Operational insulation.

For personal isolation / securing electric equipment, see section 4.

Approval

- Personal isolation does not require an approved isolation confirmation certificate.
- Personal isolation requires an approved work permit as described in HSE Directive 1 Work Permits. The Area technician is exempted from this requirement.

Use

Personal isolation can be used for minor work such as:

- replacing pressure gauges
- replacing filters
- replacing minor instrument valves
- calibration of level instrument (float) on manifold with diesel
- minor PM work
- Preparations for operational tasks performed by an area technician.

Requirements for use of personal isolation

The following requirements must be met in order to use personal isolation:

- The standard for personal isolation must be the same as for use of the isolation certificate
- Isolation, work and de-isolation are carried out by the same person during the same shift period
- Personnel who carry out personal isolation have the necessary competence, and are approved by the team lead.
- If the work site must be left, the isolation must be secured by plugging or blinding open ends and by labelling and locking isolation points

If one or more points cannot be fulfilled, an approved isolation confirmation certificate shall be used

HSE DIRECTIVE 5

ENERGY ISOLATION

ATTACHMENTS

Attachment 1:

High Voltage Installation ICC Form

Attachment 2:

Compilation of ICC Form

Attachment 3:

Instructions For Opening Working Systems

Attachment 4:

Instructions For Leakage Testing

Attachment 5:

Procedure for preparations and isolations

Attachment 6:

ICC Form

Attachment 7:

Valvelist


Attachment 8:

Blindlist

Attachment 9:

Form For Transfer Of Well Control

ATTACHMENT 1: HIGH VOLTAGE INSTALLATION ICC FORM

 Høyspenningsanlegg IE/ICC nr.:	Arbeidsordre (er) dekket av IE:
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1	Arbeid som skal utføres:					
	1 Original	3 Områdeansvarlig/CCR	Sikkerhetsutstyr isolert:			JA
	2 Områdetekniker	4 _____ Andre/Elektro				NEI
	Plattform/Dekk/Modul:	Utstyr som skal isoleres				Fra KI : Dato:
	Utstyrsnr.:	1	2	3	4	Til KI: Dato:
Isolering Forespurt av: _____			Isolering Godkjent: _____			
Underskrift			Områdeansvarlig			

2	Kompenserende tiltak:
	Isolering av sikkerhetssystem godkjent av: Verneleder sign: _____ Feltsetj sign: _____

3	Fylles ut av områdeansvarlig (Delegering av myndighet for Test og Tilbakestilling/Avisolering)			
	Nødvendig signatur for test:	CCR	Områdetekniker	Sign OA: _____
	Nødvendig signatur for tilbakestilling:	CCR	Områdetekniker	Sign OA: _____

4	Driftsleder/Autorisert person/stedfortreder utpeker i henhold til DH FSH94					
	med dette: som leder for sikkerhet					
	og: som leder for kobling					
	Driftsleder/Autorisert person/stedfortreder				Dato	Sign.
	Navn:					
	Tiltak:				JA	Nei
	L Er utstyr frakoblet?					
	K Er utstyr sikret mot innkobling/avlåst?					
	L Er spenningsprøving foretatt?					
	S Er spenningsprøving og jording på arbeidsstedet foretatt?					
Spesielle tiltak:						
Undertegnede erklærer at alle tiltak er fjernet og at utstyr kan innkobles						
Leder for kobling		Dato	Sign.	Leder for sikkerhet		
Navn: _____				Navn: _____		

5	GODKJENT FOR TILBAKESTILLING Jeg bekrefter hermed at all arbeid på isolert utstyr er avsluttet, og anmoder om at utstyr blir tilbakekoblet til normal drift. OACCR/OT Sign: _____				
	Arbeidet er ferdig og utstyret er testet og satt tilbake i normal drift (Sign. ut av utførende avdeling).				
	Produksjon (OT/UT)	Mekanisk (UT)	Instrument (UT)	Elektro (UT)	Boring (OT/UT)

CCR= Kontrollrom / OA= Områdeansvarlig / OT= Områdetekniker / UT= Utførende teknikker

VEDLEGG 2: BESKRIVELSE FOR BRUK AV ISOLASJONSERKLÆRING

Heading

Isolasjonserklæring nr.

Isolasjonserklæring genereres gjennom Workmate. Etter at isolasjonserklæringen er generert knyttes den opp til arbeids tillatelse i Work mate.

Modul 1 beskriver arbeidet.

Linje 1 *Arbeid som skal utføres*; her fylles inn tekst fra arbeidsordre.

Linje 2 forteller hvordan orginal/kopi fordeles. Samt avkryssing om sikkerhetsutstyr skal isoleres. Med sikkerhetsutstyr i denne sammenheng, menes utstyr hvor beredskapsledelse og skadestedsleder må orienteres før utkobling.

Linje 3 & 4 Brukes for identifisering av arbeidssted og utstyr; plattform, dekk eller modul og navn på utstyr samt utstyrnummer.

Hvis arbeidet omfatter flere utstyrnummer, skrives de inn fortløpende. Er det mer utstyr, kan dette legges som vedlegg. Neste rubrikk brukes for å tidfeste isolasjonen. Husk at sikkerhetsutstyr må ha et tidspunkt for tilbakekobling.

Linje 5. *Isolering forespurt av*: Underskrives av områdeansvarlig, avdelings leder eller tekniker dvs. **den som ønsker isolering utført.**

Neste rubrikk. *Isolering godkjent*: Underskrift av områdeansvarlig.

Modul 2 beskriver kompenserende tiltak.

Denne modulen skal kun fylles ut dersom det er isolasjon av sikkerhetsutstyr.

Områdeansvarlig legger inn kompenserende tiltak.

Verneleder og feltsjef signerer for godkjenning av kompenserende tiltak.

Modul 3 beskriver ansvar og myndighet for test og tilbakestilling/ avisolering.

Denne modulen skal fylles ut av områdeansvarlig.

Områdeansvarlig kan her delegere myndighet til kontrollrom eller områdetekniker for utføring av test eller tilbakestilling/ avisolering.

Modul 4 beskriver driftisolering.

Det fylles ut navn på utstyr, hvilken disiplin som har bedt om isolering.

Om isolering er skjedd i åpen eller stengt posisjon.
Om utstyret er merket, og om utstyret er fysisk frakoblet/
blindspade montert. Neste rubrikk er for testing. Før inn
innkobling og frakobling. Godkjent for test skal signeres i hht.
Modul 3. før test iverksettes.

Det er mulighet for å foreta separate tester for de forskjellige
utstyr ved at det krysses for om utstyr 1-8 er testet.
Siste rubrikk er for tilbake stilling. Her skal områdeoperatør
signere.

For større driftsisoleringer må det lages blindingsinstruks dvs
prosesstegninger som viser ventiler og isoleringsposisjon for
den enkelte ventil. Man refererer da til vedlegg. Tilbakestilling
skal ikke skje før første linje i modul 6 er utfylt.

Modul 5 beskriver elektrisk isolering.

Først beskrives utstyr som ønskes isolert, med mulighet for
spesifisering av delutstyr.

I første rubrikk (utstyr merket) krysses det av om utstyret er
merket ute i anlegget.

Kompetent person (elektriker som er godkjent for å utføre
isolering/ avisolering). isolerer og setter på blank systemlås.
Utførende disiplin setter på sin lås og fører lås nr inn på skjema
og signerer.

Ingen elektrisk isolering skal utføres før kompetent person har
signert.

Neste rubrikk går på Test. Før inn tidspunkt for innkobling og
utkobling. Det kan spesifiseres hvilket utstyr som ønskes testet
ved å krysse i rubrikkene 1-5.

Ved større omfattende EL isoleringer kan det vises til egen liste
der avganger som er/skal isoleres spesifiseres.
Godkjent for test skal signeres i hht. Modul 3. før test
iverksettes.

Det signeres for avisolering etter at dette er utført. Avisolering
skal skje av kompetent person.

Avisolering skal ikke skje før første linje i modul 6 er signert.
Denne signering skal være samsvarende med delegering av
myndighet i modul 3.

Modul 6 beskriver godkjenning av tilbakestilling.

Første linje er signatur for godkjenning av tilbakestilling både
for driftsisolering og elektrisk isolering. Signatur skal være i hht.
delegering av myndighet i modul 3.

Nederste linje skal signeres av utførende teknikker i den avdeling
som utfører arbeidet.

ATTACHMENT 3: INSTRUCTIONS FOR OPENING WORKING SYSTEMS

General requirements

Before opening working equipment/systems:

- the equipment/system shall be shut off/isolated
- the pressure shall be relieved
- any fluids shall be drained
- any remnants of flammable or hazardous materials shall be removed

Depressurisation

- Working equipment/systems that are to be opened shall be shut off/isolated.
- Internal pressure shall be released to a safe area.
- Before the equipment/system is flushed/drained it must be verified that the shut-off valves do not leak

Removal of fluids

- For working equipment/systems where there is a risk of a discharge of hydrocarbons or chemicals that are classified as toxic, hazardous, corrosive, allergenic or carcinogenic, they must be flushed with water or another suitable medium before they are opened.
 - o Chemicals shall be flushed/pumped to an operative system or to a suitable container.
 - o Fluids containing hydrocarbons shall be flushed to a closed drainage system or an operative system.

For flushing to an operative system, measures must be taken to protect against backflow from the working system.

- After flushing, the fluid shall be drained to a safe storage site.
- o Fluids containing hydrocarbons shall be drained to a closed drainage system.
 - o Diesel oil can be drained to a hazardous drain.
 - o Chemicals, lubricating oils, glycol, etc. shall be collected in suitable containers and treated in accordance with Hazardous Waste in the HSE Directive no. 6, Hazardous Materials and Waste

Removal of hazardous atmosphere

- For working equipment/systems where there is a risk of emissions of hydrocarbons or hazardous gas, or if there is a risk of explosivemixtures, they must be purged with nitrogen to a safe area before they are opened.
- Before working equipment/systems can be opened, the content of hydrocarbons in the nitrogen atmosphere must be below 5% volume

Resetting

- When resetting the working equipment/systems for hydrocarbons or other flammable materials that have been opened, the system shall be purged with nitrogen until the oxygen content is below 5% volume.
- Instead of purging with nitrogen, equipment/systems can be filled with water or another non-explosive fluid

ATTACHMENT 4: INSTRUCTIONS FOR LEAKAGE TESTING

Modifications and projects shall leak-test according to BPN-Z-007. Operations may leaktest by non-critical media when a leak does not pose a risk. In a service test the system shall be pressurised to the maximum available operating pressure. Service test may be performed on Seawater, Firewater, Instrument air, Working air, Domestic drain, Potable water, Industrial water, Fresh water, Glykol, Nitrogen and Hydraulics.

Before work begins

Check

- that pressure gauge is available
- that PSV's installed in the test segment is in operation or that the pressure source is equipped with a PSV if overpressurisation is possible
- that the connected and installed equipment will withstand the pressure that is to be tested

When using water as a test medium

- that the foundation and supports for the equipment to be tested will withstand the combined weight of the equipment and water used during the test

Leak test

- All parts of the operating system/equipment that have been opened
 - flanges, nozzles, lids, instrumentation, etc. shall be tested for leakage before taken into operations.
- Water should primarily be used as test medium. In case it is not practical to use water as test medium, nitrogen is used instead. Ref BPN-Z-007 chapter 7.1.
- Well valves can be tested with diesel
- Leak test is performed by:
 - 110% of the maximum operating pressure
 - 90% of opening pressure set on the safety valve.

Performance of leakage testing

When using water, the equipment shall be filled to 100% first - ensure that the gas is vented at the highest point.

1. Increase the pressure to approx. 10% of the test pressure – maximum 10 bar.
2. Check for possible leaks (flanges, plugs, etc.).
3. Increase the pressure gradually to 50% of the test pressure.
4. Check for possible leaks (flanges, plugs, etc.).
5. Increase the pressure gradually to the test pressure.
6. Maintain the pressure for an adequate period of time in order to perform a thorough check for leaks

- o Avoid shock loads
- o Avoid passing in front of possible leakage points
- o Monitor any possible temperature variations that can influence the pressure

After leakage testing

1. Reduce the pressure gradually to atmospheric pressure
 2. In the event of drainage:
 - o refill nitrogen at the highest point – avoid creating a vacuum
 - o check that the drainage system is not overloaded
 3. Check that all parts of the tested system have been depressurised/drained – low points, check valves, etc
- Typical safety measures for leakagetesting is sealed off affected area. A safety evaluation shall be conducted before the work starts (ref. Safety measure for pressure testing).

ATTACHMENT 5: PROCEDURE FOR PREPARATIONS AND ISOLATIONS

Navn:	
Arbeidsordre nr.	
Isolasjons erklæring nr.	
Utført av: (dato/sign)	Evt. endringer utført av: (dato/sign)
Verifisert av: (dato/sign)	Godkjent av: (dato/sign)
Behov for sjekklister før /etter vedlikehold:	JA NEI (sign/dato)

Hensikten med prosedyren:	
Identifiserte farer:	
Tiltak	
Forutsetninger, Verktøy/ Utstyr:	
Referanser:	
• Styrende dokumenter	
• Tegninger	
• HMS-datablad	
• Annet	

FULL KLARGJØRING - Sjekklister for vedlikeholdsarbeid	Rev.nr 1. 27.05.14	
Utstyrsenhet / beskrivelse av arbeidsoperasjon :		
	Dato	Signatur
Områdeansvarlig leder har godkjent isoleringsplan for iverksettelse :		

Sjekklister for områdetekniker				
Arbeidsordrenummer / -pakke :		Aktuelt: A / Ikke aktuelt: IA		
		A / IA	Dato	Signatur
1	Isoleringsventiler:			
1.1	Manuelle ventiler er låst i stengt posisjon			
1.2	Hydrauliske ventiler er i stengt posisjon.			
	Hydraulikk forsyning er stengt/akkumulator avblødd (hvis mulig)			
	Aktuator er demontert, eller låseplate montert, på hydraulisk eller luftstyrt ventil som er "fail open"			
1.3	Vurdert behov for å kjøre ventiler for å trykkavlaste innestengt volum i / ved ventil. Trykkavlastet ved behov.			
2	Sjekk med den som har satt inn blindinger, at disse er sertifisert og iht. Rorspesifikasjon /rett trykk klasse			
3	Systemet er trykkavlastet og drenert			
4	Systemet er inertisert i henhold til spyleplan. (under 5 Vol% HC i N2 atmosfære) Nitrogenslanger er frakoplet.			
5	Isoleringsplan er oppdatert og signert.			
6	Blindingsplan er oppdatert og signert.			
7	Utstyr er låst ut elektrisk (pumper, motor, ol.).			
8	P&ID er kontrollert mot master arkiv (Skal signeres/sjekkes ut ifm utarbeidelse av isoleringsplan)			
9	Før entring er tanker og beholdere spylt med luft. O2-innhold = 20,9 vol %. Det er også sjekket for giftgass og hydrokarboner.			
10	Isoleringsventil(er) mot trykkilder er lekkasjetestet, f.eks. equalizing / blow down systemet.			


FULL KLARGJØRING - Sjekkliste etter vedlikeholdsarbeid

Utstyrsenhet / beskrivelse av arbeidsoperasjon :

Sjekkliste for områdetekniker

Arbeidsordrenummer / -pakke :		Aktuelt: A / Ikke aktuelt: IA		
		A / IA :	Dato	Signatur
1	Systemet er inertisert og fritt for oksygen (O ₂ < 4 vol %)			
2	Blindingsplan er oppdatert og signert (inkl. plugg og blindlokk)			
3	Slang er brukt til spyling, drenering, vent ol. er frakoblet, og tilkoblingspunktene er plagget/blindet.			
4	Ventiler står i riktig posisjon.			
5	ESD skapene er tilbakestilt (nøkkel/supply/avbløding/instrument rør frakoblet)			
6	Blokkventiler for PSV'er står i riktig posisjon			
7	Hvis Master Key-lock har vært brukt, skal berørt system tilbakestilles og testes uten master for å verifisere tilbake stilling.			
8	Funksjonstest utstyr som det har vært utført arbeid på. (f. eks. PV, LV, XXV)			
9	Isoleringsplan er tilbakestilt, oppdatert og signert.			
10	Sett brann og gass-systemet operativt.			
11	Sjekk/fjern blokkeringer i samarbeid med CCR			
12	Lekkasjetest er utført.			
13	Sett varmekabler i drift der det er mulig. NB! Kapsling må være på plass før spenning setting.			
14	Lufte kjølere som har vært drenert.			
15	Elektrisk utstyr er innkoplet (pumper, motor, ol.). Lokal nødstopbryter er ikke aktivert			
16	Master P&ID er oppdatert ved midlertidige opplegg som skal være i drift etter at vedlikeholdsjobber er ferdig.			
17	LO/LC/CSO/CSC er reinstallerert			

ATTACHMENT 6: ICC FORM

 Isolasjonserklæring nr.:		Arbeidsordre (er) dekket av IE:	
Arbeid som skal utføres:			
1 Original		3 Områdeansvarlig/CCR	
2 Områdetekniker		4 Andre/Elektro	
Sikkerhetsutstyr isolert:		JA	
		NEI	
Plattform/Dekk/Modul:		Utstyr som skal isoleres	
Fra Kl :		Dato:	
Utstyrsnr.:		Til Kl: Dato:	
1		2	
3		4	
Isolering Forespurt av:		Isolering Godkjent:	
Utdersatt		Områdeansvarlig	
2 Kompenserende tiltak:			
Isolering av sikkerhetssystem godkjent av:			
Verneleder sign: _____		Feltsjef sign: _____	
3 Fyller ut av områdeansvarlig (Delegering av myndighet for Test og Tilbakestilling/Avisolering)			
Nødvendig signatur før test:		CCR	Områdetekniker
Nødvendig signatur før tilbakestilling:		CCR	Områdetekniker
Sign OA: _____		Sign OA: _____	
4 DRIFTSISOLERING			
Utstyrsnr./navn:		Disiplin	Åpen
		Stengt	Utstyr merket
		Frakoblet	Blindet
		Test	Tilbakekobling
		Innkoblet Kl:	Utkoblet Kl:
		Dato/ Sign: (OT)	
1			
2			
3			
4			
5			
6			
7			
8			
Områdeteknikers navn: _____, Sign: _____		Godkjent for Test: 1 2 3 4 5 6 7 8	
Referanse/Vedlegg: _____		Sign: _____	
5 ELEKTRISK ISOLERING			
Utstyrsnr.:		Utstyr merket	Lås nr
		Disiplin	Disiplin
		Sign. Disiplin	Lås nr
		Disiplin	Sign. Disiplin
		Test	Tilbakekobling
		Innkoblet Kl:	Utkoblet Kl:
		Dato/ Sign: (EL)	
1			
2			
3			
4			
5			
Kompetent person: _____ Sign: _____		Godkjent for Test: 1 2 3 4 5	
Referanse/Vedlegg: _____		Sign: _____	
6 GODKJENT FOR TILBAKESTILLING			
Jeg bekrefter hermed at all arbeid på isolert utstyr er avsluttet og anmoder om at utstyr blir tilbakekoblet til normal drift. OA/CCR/OT Sign: _____			
Produksjon (OT/UT)	Mekanisk (UT)	Instrument (UT)	Elektro (UT)
			Boring (OT/UT)

CCR= Kontrollrom / OA= Områdeansvarlig / OT= Områdetekniker / UT= Utførende tekniker

ATTACHMENT 7: VALVELIST

VENTILLISTE FOR:									
IE NUMMER:					TEGNINGNUMMER:				
Utførendes navn: _____									
Verifiserendes navn : _____									
Ventil liste godkjent av område ansvarlig: _____									
NR	BESKRIVELSE	NORMAL POSISJON FOR ISOLERING A/S	POSISJON ETTER ISOLERING A/S	Utførende Dato/Sign Verifiserende Dato/Sign	TILBAKE I NORMAL STILLING	Utførende Dato/Sign Verifiserende Dato/Sign	GODKJENT FOR TEST DATO/SIGN	INN KL	UT KL
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									

OPPTELLING AV IE LAPPER ETTER TILBAKESTILLING: DATO/SIGN:

LEKKASJETEST PÅ SPLITTET UTSTYR UTFØRT DATO/SIGN:

Dersom ventiler som er låst åpen/stengt skal isoleres, markeres dette med LOLC (CSO/CSC) i rubrikken for normal posisjon før og etter isolering.

Dersom det må benyttes Master key for å operere en ventil i isoleringen, skal dette markeres med en M først i beskrivelse feltet.

ATTACHMENT 8: BLINDLIST

SPADE/BLINDINGS LISTE FOR:											
IE NUMMER:					TEGNINGNUMMER:						
Spade/blindings liste godkjent av område ansvarlig (sign/dato): _____											
								Utleiende		Sjølvet	
NR	FLENS	SPADE	BESKRIVELSE	LINJE NR	NORMAL POSISJON FØR SPADING	POSISJON ETTER SPADING	DATO/ SIGN Mek	SPADING VERIFISERT AV OT	TILBAKE I NORMAL STILLING	DATO/ SIGN	DESPADING VERIFISERT AV OT
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
OPPTELLING AV IE LAPPER ETTER TILBAKESTILLING					DATO/SIGN:						
LEKKASJETEST PÅ SPLITTET UTSTYR UTFØRT					DATO/SIGN:						

ATTACHMENT 9: FORM FOR TRANSFER OF WELL CONTROL

Plattform:	Dato:	Brønn no. /Well no.	Slot no.
Fra Drilling & Well Operations til Production			
Fra Production til Drilling & Well Operations			
Reason for handover			

Detaljer vedrørende komplettering/Details of completion:

Well Type	
Tubing initial test pressure	
Production casing initial test pressure	
X-mas tree initial test pressure	
Tubing plugs installed (type, depth)	
Liner bridge plugs installed (type, depth)	
Junk in hole	
Any other pertinent details.	

Trykk i Tubing og Annuli/Pressure in Tubing and Annuli:

	Trykk/Pressure	Medium
Tubing (wellhead)		
A – annulus (indre ringrom)		
B – annulus		
C – annulus		
D – annulus		

Trykk og lekkasjetester/Pressure and Leak tests:

	Akseptert / Ikke akseptert Accepted/Not Accepted	Dato
Inflow test of DHSV		
Inflow test of ASV		
Inflow/leak test of x-mas tree to 5000 PSI / 345BAR.		
Inflow/leak test of x-mas tree to 3000 psig / 207 BAR		
Inflow/leak test of x-mas tree to 10000 psig /690 BAR		
Leak test of Tree Cap (Over Swob) (if broken)		
Leak test of Service Wing Cap (Kill Wing) (if broken)		
Leak test of Caps on Annulus Valves. (if broken)		

Trykkstatus X-mas Tree/Pressure status of X-mas Tree:

	Blødd av / Ikke blødd av Depressurised/Not Depressurised
Pressure inside X-mas tree	
Pressure between Service Wing Valve and Blind Cap	
Pressure between Swab Valve and Blind Cap	
Pressure downstream Production Wing Valve	
Pressure in kill/service line (if installed)	

Ventilstatus/Valve Status:

X-mas Tree og Wellhead Valves	Åpen / Lukket / NA Open/Closed/NA	Koblet til ESD. Hooked up to ESD
Swab valve		
Production Wing Valve (hydraulic) (ESD)		
Upper Master Valve (hydraulic) (ESD)		
Lower Master Valve (manuell)		
Service Wing Valve (Kill Wing Valve)		
Pressure gauge isolation valve on X-mas tree		
Needle Valve on Tree Cap		
A - annulus valve(s) (inner annulus valves)		
B - annulus valve(s)		
C - annulus valve(s)		
D – annulus valve(s)		
A - annulus Pressure Gauge Isolation Valve		
B - annulus Pressure Gauge Isolation Valve		
C - annulus Pressure Gauge Isolation Valve		
D – annulus Pressure Gauge Isolation Valve		
Needle valves on all annulus if installed		
If M-SAS/H-SAS installed on Annulus A, Status		
If M-SAS/H-SAS installed on Annulus B, Status		
If M-SAS/H-SAS installed on Annulus C, Status		
If M-SAS/H-SAS installed on Annulus D, Status		
DHSV Control Line Isolation Valve		
ASV Control Line Isolation Valve		
ASV Setting Line Isolation Valve		
GLV		
Chemical Injection Line Isolation Valve		
Lubricator Valve Control Line Isolation Valve		
(ORBIT VALVE Open / Closed)		
Deep Set Injection Valve (DSIV)		
Downhole Safety Valves		
DHSV (Down hole safety valve) (ESD)		
ASV (Annulus Safety Valve) (ESD)		
Andre/Other Downhole Valves & Circulating Devices	Dummy / GLV / Shear Orifice Valve / CIV	
Lower Side Pocket Mandrel		
Middel Side Pocket Mandrel		
Upper Side Pocket Mandrel		
Chemical Injection Side Pocket Mandrel		
Sliding Sleeve no. 1		
Lubricator Valve (e.g. SFIV)		
(*) Separat oppstartsprosedyre for brønnen må følges for brønner med ASV, uten gassløft ventiler installert (dette for å sikre at ASV er åpen før man starter produksjonen) GLV = Gas Lift Valve, CIV = Chemical Injection Line		

Kommentarer og observasjoner:

Identifiserte farer og forhåndsregler ivaretatt:

Unntak fra BP policy og/eller PTIL regelverk::

Vedlegg:

	Ja / Nei
Wellhead / Tree Diagram	
Completion Diagram	
Wellbore Barrier Diagram	
Well Status Form	
Test Certificate for X-mas Tree and Downhole Valves	

Godkjenning og aksept av handover:

Wellhead Operator:	Completion Engineer:
OTLD/ODK:	Drilling Supervisor / WIS:

Completion Engineer skal signere etter initiell ferdigstilling.