Greenland
Bureau of Minerals and Petroleum
Drilling Guidelines

May 2011

Introduction

The Greenland Bureau of Minerals and Petroleum (BMP) are responsible for the administration of regulations pertaining to exploration and production of petroleum in the Greenland offshore area. The BMP approves and supervises all drilling and related operations in Greenland especially with respect to safety and environmental issues in compliance with the Greenland Mineral Resources Act and the Danish Marine Environment Act. BMP shall further overlook and ensure that sufficient well data and information are collected in interesting potential hydrocarbon reservoir layers by the license holder in order to make future evaluation and interpretation of potential estimates of reserves and producing capabilities.

These Exploration Drilling Guidelines have been developed to assist operators planning to conduct drilling operations within Greenland by providing information and explanation of the requirements contained in the *Greenland Mineral Resources Act*, the Danish Marine Environment Act and subordinate legislation. BMP, in the capacity of being the authorising body, will approve or disapprove an application to drill in line with the Guidelines herein. BMP may at its own discretion approve a drilling operation for one well or for several wells in one permit. BMP has further the right to request additional conditions from the license holder outside of these Guidelines when granting approval to drill. The Exploration Drilling Guidelines have been developed to form a framework covering drilling activities offshore Greenland to ensure flexibility and clarity with the BMP. The Guidelines provide specific direction where the BMP have been given the authority to prescribe, provide guidance and approve drilling and related activities. The Exploration Drilling Guidelines align and follow how the BMP interprets the legislative requirements governing the offshore area as described in the Minerals Resources Act, the Danish Marine Environment Act subordinate legislation and the Guidelines for Submitting Applications for Approval of Offshore Installations for Hydrocarbon Exploration in Greenland together with other accepted guidelines such as the Arctic Council Guidelines and other national and international legislations and regulations, etc. which are in effect and binding by the Greenland Government. The Drilling Guidelines are intended to regulate the total operations for a drilling application and the subsequent operations. This implies the inclusion of the total scope of operation being;

- logistical services
- support, supply and storage bases

- all marine vessels, both drilling and support vessels
- airplanes and helicopters including their bases
- all subcontractors

Much of the content material has been sourced from other agencies such as the Danish Energy Agency and Norwegian regulations and standards, particularly NORSOK Standards, to help formulate guidelines specific to requirements for Greenland exploration activities.

These Guidelines are a 'live' document and may be reviewed from time to time and updated as and when necessary.

Contact should be made with the BMP to confirm the status of any particular Guideline and any legislative requirements. However it is the licence holder's obligation with the best endeavours to keep themselves updated on changes to these Guidelines and any other legislations and standards, etc. referred to herein.

All requested hard copy submissions are to be accompanied with an electronic version. Submissions should be in English unless sections are required for public hearings, in which case the material is required to be translated into Greenlandic and Danish.

Glossary of Common Acronyms and Abbreviations

BOP – Blowout Preventer
COF – Certificate of Fitness
DOF – Declaration of Fitness
DPA – Drilling Program Authorization
DM – Drilling Manager
DST – Drill Stem Test
EL – Exploration License
HSE – Health, Safety and Environment
HUET – Helicopter Underwater Escape Training
IADC – International Association of Drilling Contractors
IWCF – International Well Control Forum
ID – Inside Diameter
LOC – Letter of Compliance
LTI – Lost Time Injury
MD – Measured Depth
MODU – Mobile Offshore Drilling Units
MSL – Mean sea Level
OD – Outer Diameter
OHS/OSH – Occupational Health and Safety
OIM – Offshore Installation Manager
POB – Personnel on Board
QHSE – Quality, Health, Safety and Environment
RT/KB - Rotary Table/Kelly Bushing
RTE – Rotary Table Elevation
RW – Restricted Work
SB – Seabed
SS – Sub sea
TVD – True Vertical Depth

Contents

1.0 Drilling Approval Procedures:

Operators are required to obtain **Approval to Drill** a well from the **BMP** before commencing any drilling or well related activities. The BMP are the primary regulatory body to provide approvals necessary to conduct drilling operations in Greenland.

The BMP authorizes the operator to conduct an exploration drilling programme on a single well basis, to include all operations and activities ancillary to the program.

The Drilling Approval allows the operator to drill a particular well using the drilling and evaluation procedures described in the application and accompanying well programme.

Prior to authorizing and issuing Approval to Drill, the BMP has a duty to ensure that:

- The operator is a registered holder of the necessary licenses for exploration and exploitation of hydrocarbons in the particular offshore area applied for.
- Satisfactory evidence of financial responsibility has been furnished in the form of Guarantee issued by the parent company and/or the ultimate owners of major shareholdings of the holder of the License
- The operator shall present the application to drill with a dual drilling rig vessel presence policy which allows for fast contingency response in case of severe well control issues. If more than one operator applies for drilling, a co-operation between the operators may be granted by BMP in sharing the responsibility for the dual rig policy by entering into rig sharing agreements. If such agreement is proposed, BMP shall review such an agreement prior to a potential approval
- The operator shall present contingency plans for; major personnel accident, oil pollution, ice management and relief well drilling
- A valid Certificate of Fitness has been obtained for the drilling installation
- Suitable standby vessel(s) will be provided complete with certification of fitness
- Ice breakers and other support vessels to be nominated have certification of fitness
- The Operator must have a recognized and documented HSE Management System
- An appropriate safety assessment of the operator's facilities, vessels, equipment, operating procedures, contingency plans and personnel has been conducted, including an assessment of the suitability and any limiting factors for operating in Arctic conditions
- The requisite detailed drilling programme and rig documentation regarding the drilling programme and well evaluation has been submitted and approved

- An Environmental Impact Assessment (EIA) of the proposed programme has been conducted and approved by the BMP or delegated agency
- A Social Impact Assessment (SIA) has been conducted and presented to the BMP
- Signed Declaration of Insurance form
- BMP may impose seasonal restrictions to the operations based on environmental sensitivity and/or weather/climate conditions

1.1 Compliance – Fitness Certification

An operator is required to obtain and provide to the BMP a certificate of fitness for the drilling installation issued by one of the recognized Certifying Authorities, i.e., American Bureau of Shipping, Bureau Veritas, Det Norske Veritas or Lloyd's Register of Shipping. It is a requirement and a condition of the Drilling Permit that the certificate remain valid and in force throughout the drilling programme.

The MODU is further required to hold a valid Acknowledgement of Compliance (AOC), (in Norwegian: Samsvarsuttalelse), issued by the Petroleum Safety Authority of Norway, or equivalent a Safety Case issued by the Health and Safety Executives of the United Kingdom.

The MODU shall be of a Dynamic Positioned DP Class III type drilling unit where applicable and suitable for the water depth at the drilling location.

In respect to certification of the Drilling Equipment installed on the MODU, the BMP expects the equipment to conform to NORSOK Standard D-001 Drilling Facilities and/or other international accepted and recognized industry standards as a minimum. The Certifying Authority for the vessel may also assess the drilling equipment on the installation.

The Drilling Facilities shall comprise of a Remotely Operated Pipe Handling and Transportation System on the Drillfloor and on the Pipedeck, as well as for transportation of equipment between/to/from Pipedeck and Drillfloor, or any other pipe storage facilities.

The BOP System shall comprise of minimum 2 Pipe Shear Rams, comprising of 1 Blind Shear and 1 Casing Shear Rams.

The BOP Control System shall in addition to the regular control system comprise of a Remotely Operated Acoustic Control System for emergency situations.

Dependant on the age, state of condition, historical and maintenance records among others, BMP may request a full third party review and reassessment of the complete Well Control System onboard the MODU prior to commencement of the drilling operations. This reassessment may also include shear testing of the BOP Shear Rams, test of the dead man system and documentation of the maintenance of the whole BOP system including the dead man system.

Other drilling units than MODU's, such as Light Drilling & Intervention Vessels (LDIV) may be used in the drilling operations for Pilot hole and Top hole Drilling, and for Plug & Abandonment operations. However the requirements for Authority Certification and Compliances are equivalent as for the MODU's.

For rescue and contingency, a standby vessel shall be provided and equipped in accordance with recognized international standards with respect to Stand-by Vessels and certified accordingly.

1.2 HSE Assessment

The safety of the proposed drilling programme is assessed by the BMP prior to the authorization of any drilling programme and 'Approval to Drill'. This assessment is made prior to issuing Drilling Approval, to consider the safety of the programme by reviewing the system as a whole, including vessels, facilities, equipment, operating procedures and personnel.

Personnel shall follow specific rotation schedules for time on the various installations and time off. As a general principle 2 weeks on/2 weeks off schedule shall apply for personnel living in Greenland, while 4 weeks on/4 weeks off schedule shall apply as a maximum for personnel living outside Greenland.

Operators are expected to demonstrate they have a Safety Management System and to describe how safety management, including the co-ordination of the safety management programs of the major contractors, fits within the overall management of the program. The BMP expects operators to identify all hazards associated with a drilling programme and to ensure that appropriate measures are in place to manage and control the hazards. To identify hazards and manage them operators shall use systematic methodology and log systems such as HAZID, HAZOP and Risk Assessments, ref. NORSOK Standard Z-013 Risk and Emergency Preparedness Assessment.

The hazards which need to be examined include, but are not limited to, are:

- Blowouts
- Uncontrolled releases to sea/air
- Shallow subsurface drilling hazards
- Major accident
- Fires
- Explosions
- Heavy Weather
- Icebergs and Pack Ice
- Loss of Ballast Control
- Loss of Stability
- Helicopter Transportation
- Ship Collisions
- Structural Failure
- Dropped Objects
- H2S
- Man overboard

The following contingency plans must be submitted and presented as a minimum to BMP for approval:

- Emergency preparedness plan for major accident
- Oil spill and pollution plan
- Relief well drilling plan and programme
- Ice management plan

In the case where more than one operator applies for drilling, co-operations between the operators may be granted by BMP in sharing the responsibility for the different contingency plans by entering

into sharing agreements and responsibilities. If such agreement is proposed, BMP shall review such agreements prior to a potential approval of the sharing agreements.

In addition, in line with the Safety Management System the following programmes need to be in place and demonstrable:

- Safety Programmes, such as STOP cards etc
- Permit to Work (PTW) programme
- Evacuation Systems and Programmes
- Maintenance Programmes
- Qualification, Competence and Certification of personnel
- H2S Awareness and Emergency Response Planning

During the BMP's safety assessment, the BMP will pay particular attention to the various safety issues identified, in particular the BMP expects operators to demonstrate that the best practicable evacuation technology available is used on drilling installations.

As a general principle the SI system of units, ref. ISO 1000 Standard, shall be used in all operations, particularly in drilling operations. This is however not applicable for Inside and Outside Diameters on pipes, tubular, etc.

The information which is typically requested to be submitted, or made available to the BMP, in connection with this review is listed in the Exploration Drilling Guidelines, Appendix A – Drilling Process Flowchart and Checklist.

2.0 Approval to Drill Application

An application for a Drilling Approval may be made by completing and forwarding three (3) duly executed copies of the BMP Exploration Drilling Application submissions plus 1 electronic format copy together with a detailed drilling programme at least eight to twelve weeks prior to spudding the well, although a longer period is preferred. The application must be signed by the operator's senior representative responsible for the programme.

The Drilling Application shall be accompanied by an Executive Summary of the total project detailing and presenting the following as a minimum:

- organization charts including interfaces
- logistical services
- support, supply and storage bases
- all marine vessels, both drilling and support vessels
- airplanes and helicopters including their bases
- all subcontractors
- planned HAZID/HAZOP's
- audit and verification plans, internal and external
- operational plans and schedules
- preliminary drilling programmes
- well designs

The BMP will provide a well number when the Approval to Drill is authorized.

An example of the required format is provided in Appendix B

2.1 Seabed Site Survey

As part of the EIA and site survey requirements, the Drilling Application submission is preceded or accompanied by documentation showing that the operator has investigated the nature of the seafloor and underlying sediments to identify any potential surface or subsurface hazards such as

shallow gas. These surveys are usually conducted using geophysical methods. An application to undertake such surveys should be made to the BMP at least 6 weeks in advance of any Well Site Survey.

As a general principle, due to limited offset data from other wells and limited exploration wells having been drilled in Greenlandic territory, a small diameter Pilot hole shall be drilled in accordance with section 5.7.2.3 in NORSOK Standard D-010 and on each new well location prior to commencing the actual Drilling Programme. The depth of the Pilot hole may vary from location to location, but shall determine non presence/hazards of shallow gas, and establish safe foundation and setting depths for the surface casings.

The seismic/geophysical survey data shall as a general principle cover a radius of minimum 500 meters from the proposed well location centre.

Plans for relief well shall be in accordance with section 4.8.2 in NORSOK Standard D-010. The relief well locations must be surveyed and evaluated to same extend as the primary well location.

The site surveys shall include collection of specific Environmental Data as determined by BMP. The requirements for Environmental Site Survey Data may vary for different license blocks and well locations.

The site survey with respect to drilling operations safety shall as a minimum determine:

- Foundation stability and anchor suitability
- Any limitations on well positioning with respect to avoid or reduce unnecessary impact to the environment
- Any limitations on positioning and anchoring of drilling MODUs and auxiliary crafts to avoid damage to pipelines, cables, etc. as well as unnecessary drilling risks.
- The possible presence of objects which might affect the drilling operation (boulders, wrecks, other wells, etc.).
- Possibility of penetrating gas bearing zones.
- Possibility of penetrating particularly weak zones.
- Possibility of penetrating zones with abnormal pressures.

2.2 Drilling Programme

A copy of the detailed drilling programme and site survey plan of the proposed well location must be provided with the Approval to Drill Application, as per Section 3.0.

The detailed drilling programme will state how the operations are to be conducted with specific emphasis on safety and environmental related issues. The Drilling Programme shall be prepared and documented in accordance with the NORSOK Standard D-010 Well Integrity in Drilling and Well Operations.

Due to the Dual Rig Vessel policy, the drilling programme shall establish acceptance criteria for concurrent operations between the 2 rigs and reasonable safe conditions for drilling into potential hydrocarbon bearing zones/reservoirs more or less simultaneously.

The drilling programme shall establish criteria and action procedures for disconnecting from the well and leaving location in the case of external threat to the MODU (T-time). As a general principle and guidance, a shallow set mechanical plug shall be set in the well prior to disconnect and leaving location in any sequence of operations.

Management of Change: Changes concerning safety and other substantial changes such as a major variance in casing setting depth or well TD (greater than +/- 50m), adding or deleting a casing string etc. would need consent from the BMP, relative to the existing drilling programme, must not take place without prior consent from the BMP. Alterations to the Drilling Programme shall as a general principle be subject to a risk assessment. In the case of emergencies the drilling programme may be altered without prior consent. In such cases, the BMP must be notified immediately of the changes and the reason for them.

3.0 Drilling Records and Reports

A 24 hour activity report summarizing as a minimum the drilling and related operations, lithology and weather & sea conditions must be provided daily to the BMP covering activities up to 06.00 Greenlandic time of the reporting day. This report is required from the time of the MODU's arrival into the licence block for the planned drilling until operations are terminated at the wellsite.

The format used by operators for their internal daily morning reporting purposes is normally acceptable for the BMP's monitoring requirements. A copy of the daily reporting format is to be presented to the BMP for confirmation of acceptance. BMP reserves the right to request alterations to the format and the content of the daily reports at any time during the reporting period.

3.1 Weather Forecasts and Ice Reports

The BMP requests that a copy of the site-specific meteorological forecast and a report of ice conditions are to be provided daily to ensure the BMP is fully informed of the status of conditions in the event of an alert or an emergency situation.

3. 2 Tour Sheets

One copy of the IADC Drilling Report Tour Sheets should be submitted weekly to the BMP.

3.3 MODU Movement

Before a MODU or any support vessel can either enter into or move between locations within Greenland territorial waters the BMP has to be notified and the MODU operator must report directly to the Greenland Command at the naval base in Kangilinnguit (under the Danish Ministry of Defence) when entering Greenland waters.

3.4 Significant Events and Hazardous Occurrences

Any serious injury, loss of life, significant event or hazardous occurrence must be reported to the BMP immediately. The reporting procedures for such events should be in accordance with the procedures established in the BMP contingency committee.

3.5 Well Evaluation and Data Acquisition

The requirements pertaining to well evaluation and data acquisition, including the submission of cuttings, cores and fluid samples are covered in more detail in Sections 7, 10 and 11, but in essence refer to:

- Drill Cuttings
- Cores
- Gas Content of Drilling Fluid
- Logs and Surveys
- Testing and Formation Samples

3.6 Formation Flow Tests

If the well is to be tested according to the approved tentative well test programme all relevant logs shall be submitted together with the test programme to the BMP for approval to test. Final well test programme shall, when applicable be submitted and be written approved separately by BMP prior to conducting any formation flow test.

Well Testing planning and preparations shall be in accordance with NORSOK Standards D-010 Well Integrity in Drilling and Well Operations and D-SR-007 System Requirements, Well Testing Systems.

BMP shall have the right to request test production to be carried out based on sound and reasonable arguments for obtaining additional well data and information for future evaluation and interpretation of hydrocarbon properties and volumes.

Preliminary test results, including data such as flow rates, fluid type, gravity and other readily available information, should be reported to the BMP by telephone/email as soon as possible followed up by a complete written report of the test results.

3.7 Well Termination – Suspension or Abandonment

1 Copy of the proposed well termination program either suspension or abandonment must be forwarded at least 24 hours before termination operations are scheduled to commence in accordance with Section 9 of the Greenland BMP Exploration Drilling regulations and Section 8 of the

BMP Licensing Process Flowchart. The well termination program must be consistent with the drilling regulations. The BMP's approval of the program is required prior to terminating any well. Approval for suspension of a well may only be given for 1 year, thereafter the well has to be permanently abandoned.

Any wells suspended for future potential additional operations shall be adequately covered and protected in order to avoid disturbances and hazards to other activities in the area.

Three (3) copies of the Well Termination Record form, each signed by the senior operator's representative responsible for the program, is required to be forwarded to the BMP within 21 days of the well termination date as specified by Section 8 of the BMP Licensing Flowchart.

A sample of the Well Termination Record is provided in Appendix C

3.8 Final End of Well Reports

The BMP requires three (3) copies of the Final End of Well Report plus 1 electronic format copy for exploratory and appraisal wells, the report is to be submitted within 90 days of the rig release date.

4.0 Drilling Programme Requirements

The drilling programme shall (together with manuals) state unambiguously how the operations connected to the well are expected to be carried out. Parts of the information required concerning the drilling programme may be forwarded as separate appendices and, where relevant, reference may be made to other documentation material such as the operator's general operation manual, general safety regulations, general regulations for test production, etc. . The Drilling Programme shall be prepared and documented in accordance with the NORSOK Standard D-010 Well Integrity in Drilling and Well Operations.

The drilling programme must state whether hydrogen sulphide preparedness will be needed and if this is the case the programme must state how and when it will be established.

The programme shall contain the following:

4.1 The well number as per the BMP numbering system.

4.2 The name of the well. Wells will be named by the BMP

4.3 Name of operator and information on the operator's organisation in connection with the drilling operations.

4.4 Well surface location and maximum tolerance on this position. The location shall be given in geographical and Universal Transverse Mercator (UTM) co-ordinates.

4.5 Ownership and name of drilling rig.

4.6 Water depth, mean sea level (msl).

4.7 Expected rotary table elevation (RTE) above mean sea level (msl).

4.8 Estimated total well depth, positions for targets and planned well trajectory.

4.9 Depth and description of the anticipated geological horizons.

a) Stratigraphic column showing and describing anticipated lithology as well as the planned casing points.

b) Representative, interpreted seismic sections near the planned well (normally 2 intersecting lines).

c) Depth and time structure maps showing primary and secondary prospects as well as time and possibly depth structure maps for other key horizons in a digital format which can be read by BMP.

d) The velocity functions used in the area.

e) A prospect description of primary and secondary objectives, including a description of the geological model covering information on the expected source, reservoir, seal, trap formation and timing of formation and migration of hydrocarbons, and volumetric calculations.

4.10 Casing Programme

The programme shall contain:

a) Diameter of drilled hole.

b) Casing size.

c) Weight and grade of casing plus type of connection.

d) Planned casing setting depths.

e) Casing Centralization Programme

f) Casing Cementation Programme, including type of cement, weight, estimated height of cement behind the casing, and calculations of cement volumes and planned % excess

g) Demonstration of the sufficiency of the casing string design with regard to burst, collapse, and tension. Reference may be made to Company Procedure for casing design calculation. In this case the parameters used in the design (pressure, cementing height, mud density etc.) must be stated.

h) Procedure and minimum requirements for testing the formation strength after drilling out the individual casings, including calculations demonstrating that the required formation strength is sufficient for drilling to the next casing setting depth.

i) Precautions to be taken if the required formation strength is not obtained.

j) Casing integrity test procedures and plug bump pressures

4.11 Mud Programme

The programme shall contain the following:

a) A detailed description of the types of drilling fluid to be used specifying density, rheological properties etc.

b) A detailed description of the components of the drilling fluids. Reference may be made to relevant chemical data sheets.

c) A detailed description of check equipment and procedures for the drilling fluid or reference to relevant standard which will be followed (e.g. API RP 13B).

d) Procedure for monitoring the drilling fluid volume.

e) A list of the quantities of safety related material (e.g. barite and cement) to be stored on the drilling rig during normal operations and an argumentation for these quantities.

f) A plot of the mud programme and casing plan in relation to the expected porepresseure and fracture gradient with depth (including most likely scenario, high and low side).

g) Documentation for the calculations of the expected pressures and gradients.

4.12 Logging programme, containing information on types of logs to be run and intended intervals.

4.13 Programme for taking geological samples, including a coring programme, the sample and coring programme shall include:

a) Expected number and total volume of samples

b) Description and handling and storage of samples

c) Analytical programme to be performed on site and to be performed later.

d) Coring criteria

4.14 Tentative well test programme. Final well test programme shall, when applicable be submitted and be approved separately.

4.15 Well survey programme measuring the well depth, inclination and direction.

4.16 Well Control Measures, etc.

a) A list of the blow-out prevention equipment available onboard the drilling MODU, specifying manufacturer, size, working pressure, and arrangement. Information regarding the BOP control system and redundancies.

b) Procedure for kick control, stating i.e., the data and calculations which by routine are updated to ensure the necessary background for handling emergency situations. Information on how blow-out preventers, measuring equipment, drilling fluid circulation and mixing equipment are expected to be used under such conditions.

c) Programme for drills in connection with equipment as mentioned in sections 4.16.a and 4.16.b above.

d) Programme for pressure testing of blow-out preventers and casing at different stages in the drilling operations.

e) Programme for hanging off drilling string and emergency quick disconnect procedures

4.17 Abnormal pressures.

a) An evaluation of the possibilities of encountering overpressured zones with the well in question. This should be based on seismic data and/or experience from neighbouring wells.
b) A description of methods and procedures to be used for detecting any overpressure in the well.

4.18 An evaluation of the possibilities of encountering zones with poisonous gases with the well, including description of methods for detecting and handling of same.

4.19 An evaluation of the possibilities of encountering gas pockets in the well in question based on seismic data and experience from neighboring wells, including the possibility of encountering shallow as well as deep gas pockets.

4.20 A list of any other possible significant deviations from the geological/drilling prognosis which may be encountered during the drilling of the well, (e.g. saltzones, swelling clay, high pressured zones, faults) and information on precautions planned in this connection.

4.21 A summary sequence of all operations including an estimate of the time required for the different main operations (typical as a time versus depth curve i.e. drilling curve). The summary shall give a general description of the operations, including information on any special safety related requirements (caused by e.g. possible gas pocket or abnormal pressure).

4.22 Information regarding function, name, address and nationality of the contractor companies to be employed for the well in question. Information about companies carrying out less critical functions may be forwarded just before the start of the drilling operation.

4.23 Tentative programme for plugging the well and for re-establishing the well site. This programme may be submitted at a later stage. Final programme must be submitted for separate approval.

4.24 Description of preparedness for handling hydrogen sulphide and other dangerous gases including information on equipment, supplies, training and drills

4.25 Contingency plan for use in the event of major accidents or emergency situations regarding safety as well as environment.

5.0 Drilling Operations

5.1 Drilling operations shall be conducted in accordance with the NORSOK Standard D-010 Well Integrity in Drilling and Well Operations. During drilling operations, all necessary steps shall be taken to prevent explosion, blowouts, pollution, or other damage. Safety related equipment shall be installed as drilling operations progress and shall comply with the following requirements. Apart from possible drilling when setting the conductor pipe and surface casing, drilling must not be carried out before blowout preventers/diverter system and related equipment have been installed and tested.

5.2 The well must be cased. The casing shoes shall - with due consideration of geological conditions - be set at depths sufficient to ensure complete control of the well at all times.

a) Conductor pipe (casing) shall be set at such a depth below seabed that unconsolidated formations are supported and a stable hole ensured for initial drilling operations. Cement must be to seabed and a means of top filling annulus must be provided.

b) Surface casing shall be installed in such a manner to provide a good anchorage for the subsea wellhead and support of the blow-out preventers. Surface casing shall be cemented to seabed. After running and installation of the BOPs and riser, all rams and connections shall be function and pressure tested to pressures approved by the BMP and following internationally accepted procedures.

c) Intermediate casing shall be installed and cemented in such a way that full control of the well is maintained at all times. The cementing and centralization programmes shall endeavour to secure that all zones containing hydrocarbons as well as all intervals with abnormal pressures are isolated. Prior to drilling out from intermediate and subsequent casings, a complete blow-out preventer function and pressure test will be conducted to pressures approved by the BMP and following internationally accepted procedures.

d) Production casing must be cemented as stipulated as above for the intermediate casing.

e) A liner must be cemented over its full length. When placing and cementing the liner, consideration shall be given to the best possible isolation of hydrocarbon bearing and/or abnormally pressured zones.

5.3 The use of cement bond log or temperature survey must be run when critical tops of cement (TOCs) are required for intermediate and production casing isolation. The cementation of

production casing and liners must be checked with cement bond logging in situations where the cement job is suspect.

5.4 Casing strings shall be of such a diameter, weight and grade, as well as designed and installed in such a way that they can withstand any mechanical and chemical influence which may be expected in the well during drilling, testing, and stimulation.

5.5 After the casing strings have been installed and cemented, they shall be pressure tested in accordance with the approved drilling programme. For each casing the pressure test shall be adapted to the internal pressure to which the casing may be exposed.

5.6 The installation of used casings is not permitted unless these have been adequately tested and inspected in advance by an independent inspection company and satisfactory strength of pipes and connections can be documented.

5.7 Pressure testing of the formation strength below the casing shoe shall be performed in accordance with the approved drilling programme.

5.8 It must be possible to handle drilling fluid loss or to increase the fluid density without delay. During routine operations sufficient spare amounts of mud mixing materials must therefore be stocked on the platform/well site. Furthermore a sufficient stock of chemicals for handling possible hydrogen sulphide must be available (if hydrogen sulphide is expected).

5.9 Before the drill string is pulled out of the hole the well shall be observed and found to be stable. During tripping the well shall be monitored carefully for fluid loss/gain.

5.10 During drilling, the drilling fluid reconditioning equipment shall be used to the necessary extent to separate gas and cuttings from the fluid.

5.11 The density of the drilling fluid shall be tested regularly and at least every hour.

5.12 Oil based mud or mud containing chemicals which can be particularly detrimental to the health or environment, can only be utilised when approval is given by the BMP, (approval by other authorities may also be necessary).

5.13 The disassembly or other maintenance of blow-out preventers may take place only when the well is secured against blow-out by a minimum of 2 independent and tested barriers, accepted by the BMP in general or specifically.

5.14 Every 14 day pressure or operational testing of the blow-out preventers and connected pressure control equipment shall be carried out and after disassembly, as well as when drilling operations or other conditions make it reasonable. Providing the equipment

configuration is such designed, the BOP Control System (or parts of it) shall be tested every 7 days.

5.15 The hydrostatic pressure in the well may only in connection with testing be reduced to such a level that the formation fluid can flow to the borehole.

5.16 During drilling operations the Licensee is required at all times and with necessary accuracy to keep track of the well trajectory. Measurements which determine inclination and azimuth shall be taken at intervals securing the necessary knowledge of the well course. For deviated wells the measurements shall be taken at intervals not exceeding 100 m, while bigger intervals and possibly omission of azimuth determination can be accepted in the case of almost vertical wells. Such measurements shall be carried out while drilling below the surface casing or from another specified depth approved or required by the BMP.

6.0 Safety Precautions and Drills

6.1 During the operations there must be preparedness for handling escape of poisonous gases (e.g. in case of a kick). This preparedness can be omitted in cases where it prior to the operation and be demonstrated that no hydrogen sulphide or other poisonous gases can be met in the well. If hydrogen sulphide or other poisonous gases are encountered all necessary safety precautions shall be taken to prevent accidents and the BMP shall be notified.

6.2 At the end of each shift, the off going crew shall -each within his area of responsibility - inform the oncoming crew of any defects that have been detected but not repaired. The off going crew shall furthermore inform the incoming crew about the working conditions and changes that have taken place. The incoming crew shall make certain that the equipment is in satisfactory condition. The crew shift handovers shall be conducted in a systematic pattern which shall be uniform for all crews. The crew shift handovers shall further be documented.

6.3 For each drilling crew, pit level drills shall be carried out at least once a week.

6.4 For each drilling crew, weekly drills shall be carried out covering precautions to be taken in the event of kick.

6.5 For each drilling crew training and drills concerning handling of hydrogen sulphide shall be conducted to the degree relevant.

6.6 Safety meetings and drills shall be recorded.

6.7 During inspection, inspectors from the BMP may in consultation with the operator require drills as mentioned in items 6.3, 6.4 and 6.5 to be conducted.

7.0 Abnormal Formation Pressure and Hydrocarbon Detection

7.1 Monitoring and registration of data for evaluation of formation and pore pressures and for determination of hydrocarbon content in relation to the drilling fluid density, drilling rate, etc. shall be carried out from the drive/conductor pipe shoe from a jackup drilling unit and from the surface casing from a floating drilling unit and shall be continued until the well has been plugged.

7.2 Recognized measuring methods, parameters, and calculation methods shall be used at all times in evaluation of the possibility of encountering abnormal pressures.

8.0 Drill Stem Test (DST)

Penetrated formations with potentially important hydrocarbon show, must if possible be tested. Test production shall be carried out in such a way that as much relevant information as feasible is obtained concerning fluids produced, production capacity of the formation and possibly the size of the reservoir. At the discretion of the Operator, when relevant for the evaluation of the hydrocarbon content and/or production mechanism, test production shall be carried out from water bearing zones, which may have connection to the hydrocarbon bearing formations.

Well Testing planning, preparations and operations shall be in accordance with NORSOK Standards D-010 Well Integrity in Drilling and Well Operations and D-SR-007 System Requirements, Well Testing Systems.

BMP shall have the right to request test production to be carried out based on sound and reasonable arguments for obtaining additional well data and information for future evaluation and interpretation of hydrocarbon properties and volumes.

8.1 Before a well test can be carried out all relevant logs shall be submitted together with the test programme to the BMP for approval to test. See item 3.3.6

8.2 The well test, perforating, hydraulic fracturing, acidizing or other chemical treatment of the well may only take place when special safety precautions, relevant for the operation, are observed. The well test is not to take place when safety is adversely affected by weather and wind conditions.

Test production in open hole will require special permission by BMP.

Test production shall be performed in such a way that the well is not damaged unnecessarily. Caution shall be exercised to prevent accidental escape of chemicals and hydrocarbons to the environment.

8.3 Before start-up of test production, the drilling rig shall be specially prepared for the operation. Upon completion of installation of the temporary Well Test Equipment, a third party certifying society shall approve the installation and issue a Certificate of Compliance for use of the Well Test package onboard the specific MODU unit where DST will take place.

All necessary fire precautions shall be taken. The fire fighting equipment shall be ready for immediate use.

Valves, lines, and vessels in the entire production test system and where relevant blow-out preventers shall be pressure and function tested.

Where relevant stand-by, nearby vessels and aviation authorities shall be alerted if the intended test and likelihood of flaring.

Before the operation commences, all persons who are to participate in the test operation shall take part in a safety meeting.

8.4 Well perforation may be carried out by experienced personnel only. Extreme caution shall be exercised to prevent accidental firing of perforating guns when either loading or retrieving 'fired' guns.

Perforation of an exploration well shall take place under safety conditions corresponding to appropriate weather conditions.

8.5 If radio transmitters or other equipment may constitute a hazard in connection with the use of explosives, this equipment must not be used while such operations are in progress. Non drilling related radio equipment, e.g. transmitters onboard vessels, helicopters and radio stations, which are not at a safe distance from the drilling site must be considered. The burners are to be ignited by remote control systems only.

9.0 Explosives and Radioactive Materials

9.1 Explosives Materials

9.1.1 Explosives work shall be carried out under supervision by approved explosives supervisors.

9.1.2. The explosives supervisors need to have a valid certificate and have sufficient experience in this field

9.1.3 Explosives work shall be carried out in accordance with the approved safety and health plan for work on the drilling rig.

9.1.4. Detonators, prima cord and perforation charges for the perforating guns shall be stored in suitable and approved metal containers constructed for explosives storage, and storage on the rig shall be in designated area.

9.1.5 Detonators, prima cord and perforation charges shall be stored separately. Detonators and explosives may *not* be stored together.

9.1.6 The explosives magazines shall be located such that the detonation wave does not move directly out towards critical areas on the drilling rig or drilling ship.

9.1.7 Shipment of explosives shall be in accordance with international recognised standards.

9.1.8 Storage of explosives onshore Greenland may only be allowed in designated storage areas which are protected by guards on a 24 hour basis.

9.1.9 Import of explosives to Greenland may require special permits.

9.2 Radioactive materials and equipment containing radioactive materials

9.2.1 Radioactive materials shall be stored in an approved designated area on the rig and handled by specially trained personnel only.

9.2.2 The license holder needs to register all movements /use of radioactive materials in a radioactive in/out pit control book. The license holder needs to send a copy of the movements once a week.

9.2.3 Persons who are working with radioactive materials need to have a valid certificate and have sufficient experience in this field.

9.2.4 Work with radioactive materials shall be carried out in accordance with the approved safety and health plan for work on the drilling rig.

9.2.5 The license holder needs to have work description regarding the handling of radioactive materials.

9.2.6 Shipment of radioactive materials shall be in accordance with international recognised standards.

9.2.7 Storage of radioactive materials onshore Greenland may only be allowed in designated storage areas which are protected by guards on a 24 hour basis.

9.1.9 Import of radioactive materials to Greenland may require special permits.

10.0 Termination of Wells (Suspension or Abandonment)

Prior to the abandonment of a well the hole must be plugged according to procedure approved by the BMP in the well termination submission.

10.1 Normally, an exploration well shall be abandoned permanently when drilling operations as well as relevant logging and test production have been carried out. Under special circumstances the BMP may permit a well to be abandoned temporarily without permanent plugging. To obtain such permission the Licensee must submit an application indicating how and when the well is to be abandoned permanently or operations will be resumed. Furthermore, the application must describe the responsibility and supervision situation during the temporary abandonment. Approval for suspension of a well may only be given for 1 year, thereafter the well has to be permanently abandoned.

10.2 Application for permission to stop operations and to plug (permanently or temporarily) and abandon a well, shall together with a copy of essential logs and other relevant documentation material, if any, be available to the BMP at least 24 hours before estimated commencement of the actual abandonment activities.

In the application, the Licensee shall give the reasons for the planned plugging and specify how the plugging will take place and how the plugs will be checked. The well site condition after the abandonment and procedures for verification of this must furthermore be stated.

10.3 In cases where the well is uncased opposite permeable zones, plugging shall be carried out so that there can be no flow of fluid through the hole (normally by cementing at least 50 m below and above the individual zones).

10.4 Where there is an open hole below the deepest casing, a cement plug shall be placed in such a manner that it extends at least 50 m above and below the casing shoe. The top of the cement plug shall be located by load testing. Where the condition of the formation makes cementing difficult, a mechanical plug may be positioned in the casing, within 50 m from the shoe as an alternative to the cement plug below the shoe. In addition, a cement plug, at least 50 m long shall be placed on top of this plug. The performed plugging of the open hole section shall be pressure tested for sufficient time and with enough differential pressure to detect a possible leak or mechanical failure of the plug.

10.5 Perforated zones must be plugged with cement so that no fluid flow to or from the well is possible. Where possible perforated intervals shall be isolated with cement plugs through the individual perforated zones and with 50 m long cement plugs below the lowermost perforation and above the uppermost perforation. Alternatively the perforated zones can be isolated by a combination of a mechanical plug squeeze cementing of the perforations and cement plugging above the mechanical plug.

10.6 If a liner has been used, a cement plug shall be placed in such a manner that the plug extends 50 m above and below the point of suspension. Alternatively a mechanical plug followed by a 50 m long cement plug can be set just above the liner hanger. The top of the plug shall be located by load testing and the plug shall be pressure tested as specified in item10.4.

10.7 In the innermost casing a cement plug must be placed from the shoe depth of the previous casing and 100 m up.

10.8 It must be ensured that no communication from down hole formation to the sea-bed/surface via any casing annulus is possible.

10.9 A cement plug, at least 100 m long, shall be placed near the surface.

10.10 The total weight of the cement plugs in the well and the weight of the fluid between the plugs shall ensure that as a minimum the system is in balance with any pressure which may develop in the borehole.

10.11 When a well is abandoned the original state of the well site shall be re-established. No obstacles that can cause damages to fishing equipment may be left on the seabed. Drill cuttings shall be handled according to OSPAR and the London Convention.
When abandoning a well, the condition of the well site shall be verified. Obtained documentation shall be submitted to the BMP. Where reasonable departure from this requirement may be approved by the BMP (approval by other authorities may also be necessary).

11. Sampling and Measurements

11.1 When drilling is in progress, the Licensee shall take cuttings of all lithologies from all geological formations penetrated. The sampling shall commence immediately after the return of the drilling fluid has been established. The interval between the samples shall not exceed 10 m. However, when drilling in formations which may contain hydrocarbons, the intervals shall not exceed 3 m.

11.2 When preparing the drilling programme and during drilling operations, the Licensee should aim at obtaining sidewall cores from intervals where it is relevant, e.g. for dating of geological horizons, determination of lithology or evaluation of the potential reservoir or source rock. The Licensee shall carry out relevant analyses e.g. petrographic, clay mineralogy, micro palaeontologic and palynologic, based on the sidewall cores taken.

11.3 The operator is obligated to obtain sidewall cores if hydrocarbons are identified. The sampled zones shall include the seal above the reservoir, the reservoir and the zone just below the hydrocarbons. Furthermore, samples of formations fluids (MDT samples) must be obtained from the interval containing hydrocarbons.

11.4 The Licensee - with due consideration of safety aspects - shall aim at obtaining core information from all potentially significant hydrocarbon bearing reservoirs. Sufficient coring shall be done to ensure satisfactory information for the evaluation of the reservoir and the necessary analyses shall be performed.

11.5 When preparing the drilling programme and during drilling operations the Licensee shall see that sufficient logs are run in the well to obtain satisfactory geologic, geophysical, hydrocarbon and stratigraphic information from the layers penetrated. The logging programme must, as far as possible, always include types of data acquisition which allows for all sections of the well to be correlated with seismic data.

11.6 When essential for the evaluation of the hydrocarbon potential or whenever measurement of the formation pressure in another way might give valuable information the Licensee shall attempt to carry out pressure measurements and take fluid samples from relevant penetrated horizons.

11.7 Penetrated formations with potentially important hydrocarbon shows must - if possible - be test produced. (see 8.0)

11.8 The BMP can at any time require further sampling, coring or data acquisition to be carried out, based on the data obtained during the drilling operation.

12. Reporting, Submission and Storing of Samples

The BMP must receive certain samples as well as reports on results from surface and downhole measurements and all analysis carried out on samples from the borehole. BMP may at any time request additional data as available and produced by the operator. All fluid samples as well as wet samples which are to be delivered to BMP shall at all times be kept frostfree, this also applies during transport. Furthermore the BMP can require data to be submitted in other formats than stated in this document. Further requirements may also be set out in the approval.

12.1 The reporting shall among others include the following:

a) A daily "Mud, Pressure and Temperature Log", shall be sent to the BMP together with the open hole logs from the given hole section. The BMP will forward the logs as required to the appropriate body for review. Final logs have to be forwarded to the BMP when the well has reached final depth.

b) A daily well site geological report (DGR) shall be forwarded to the BMP. The DGR shall include general well information, an operation summary, geological summary with a description of the lithology and depths of formations drilled, gas measurements, information on hydrocarbon shows, pore pressure information, LWD tools, survey results, a mud summary and information on LOT/FIT and casing shoe depth.

c) Core descriptions, if any are also to be forwarded continuously to the BMP.

d) A "Drilling Mud Report", shall be forwarded to the BMP no later than 3 months after termination of the well.

e) Ordinary wireline logging, Logging While Drilling (LWD) and Measurements While Drilling (MWD): 1 paper copy for each printed scale (normally at least 1:200 and 1:500) of all log runs shall be forwarded to the BMP. Logs where the raw data are recorded on magnetic tape must be sent to the BMP in a standard format which can be read by the BMP without difficulties (LAS/LBS format for well log data, and LIS/TIF and/or TAP/NTI for raster images). The data shall be forwarded as a copy of the original digital media on CD, DVD or another digital media readable by the BMP. A table of contents must be included in the shipment. Edited data must be sent to the BMP in the same way together with a verification list and a paper log of the tape/CD contents. The material must be forwarded immediately after preparation.

f) Composite, processed and interpreted logs, including parameter listing, shall together with a processing report and a justification for choice of parameters be submitted to the

BMP

g) Directional surveys: The results from surveys shall be forwarded to the BMP when they are available.

h) Vertical seismic profile (VSP): Raw and processed data must be forwarded to BMP in SEG-Y format on a CD-rom/DVD or another media readable by the BMP together with associated reports and a description of the contents of the digital media. Time and depth data must also be submitted in ASCII format.

12.2 Samples (cuttings, cores, fluids).

12.2.1 The following geological types and quantities of samples are to be forwarded to the BMP:

a) Cuttings. A set of washed and dried samples, taken at the same intervals as samples for the Licensee's own use, shall be forwarded to the BMP Core Storage Facility upon termination of drilling operations and no later than one year after the drilling operation has ended.

b) Cuttings. Wet samples, taken at the same intervals as samples for the Licensee's own use, shall be forwarded to the BMP Core Storage Facilities not later than 2 weeks after they have been taken. From each sample interval the sample size shall be at least 1000 g.

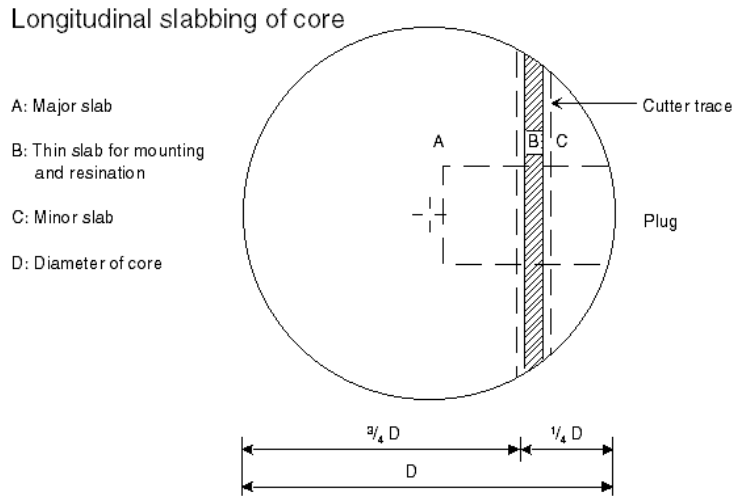
c) Sample (1 litre) of the drilling fluid from the inlet side taken after each qualitative change of additives and before test production, shall be taken. Furthermore, samples must be taken to ensure intervals of no more than 300 metres (drilled depth) between consecutive samples. All samples must be forwarded to the BMP Core Storage Facility.

d) Sidewall cores. Remaining material shall be stored at the BMP Core Storage Facilities not later than one year after the well is completed. If samples are prepared for paleo-analysis, one set of paleontologic or palynologic slides (original or extra set) shall be forwarded to BMP after the analysis is completed.

e) Cores. The material shall be stored at the BMP Core Storage Facilities not later than one year after completion of the well. This time period may upon request be prolonged by the BMP. When the cores are stored the Licensee may freely inspect the material and may - after consulting the BMP - take samples for further analysis. The core material shall from when it is taken till it is stored at the BMP be stored in such a way that representatives from the supervising authority at the Licensee's expense have unimpeded access to inspect the material in so far as it is reasonable and to take samples for additional analysis. Cores shall be used to obtain information concerning the specific layers penetrated and in the long-term

establishment of general information on the Greenland subsoil. It is therefore important that core material is kept as intact as possible. Samples should be sawed or drilled out. The BMP can at any time require special procedures to be followed in connection with handling and sampling of cores. Unless another procedure is agreed with the BMP the following shall be used:

Core chips: To avoid unnecessary damage of the core material only essential chips should be taken. Chips, which are not immediately needed, shall be taken by sawing or drilling (e.g. reference samples). If it is necessary to take chips at the well site (e.g. for quick paleontological dating) this shall be done with care and the chips shall whenever possible be taken where the core already is broken. Drilling of plugs: A 1 inch diameter horizontal plug shall be taken for each, 0.3 m of core. At the same depth a supplementary plug (normally 1½") may be taken for special core analysis. Furthermore a 1 inch diameter vertical plug may be taken for each 1.5 m core. The BMP may when justified require additional plugging to be done by the Licensee. Slabbing of cores: For each 1 m core a 15 cm long, undisturbed section shall be wax-sealed and stored. For the remaining core material eccentric slabbing - as shown below - shall be performed.



Further work can be carried out after the programme for the work has been discussed with the BMP. All core material (i.e. the wax-sealed sections, part A, B and C together with plugs) shall be stored at the BMP as soon as practicable and at the latest 1 year after completion of the well. Part B shall be glued in a tray or a section of plywood by the Licensee. Permission

must be obtained from the BMP if cores are to be stored outside the BMP Core Storage Facilities.

f) Gases and hydrocarbon seepages: Gases and or liquid hydrocarbons escaping from cores must be sampled and kept in appropriate, tight containers. Sampling should be carried out *in duplo*, and one duplicate sample must be forwarded to BMP Core Storage Facilities as soon as possible.

g) Logging of the core shall be undertaken in a non destructive manner (i.e. spectral gamma ray, susceptibility, density, velocity etc.) either onboard the drilling vessel/the support vessel or later when the core is taken onshore.

h) If possible, 2 litre samples of formation fluid from each test produced interval of all produced liquids shall be forwarded to the BMP Core Storage Facility. When samples of separator gas are taken for PVT-analyses, a corresponding sample shall be taken and forwarded to the BMP Core Storage Facility. Whenever possible, the fluid samples shall be sent in containers which can be retained by the BMP. If the containers shall be returned the Licensee, an agreement shall be established on the time from which rental may be charged to the BMP. The Licensee must cover all transport costs.

i) A duplicate of all samples of formation fluids must be submitted to the BMP Core Storage Facility. In addition a report concerning all analyses carried out must be sent to the BMP. The report must contain a description of the completed work, results of analyses, as well as a review of these.

j) Unless agreed otherwise with the BMP, a duplicate of all samples shall be forwarded to the BMP Core Storage Facility.

12.2.2 Marking. All samples collected by the Licensee shall bear a label stating name of the well and depth (depth interval) from which the sample is taken. The label must be made in a way that ensures permanent sample identification.

12.2.3 Packing. The samples must be packed so that the possibility of long-term identification and storage is ensured. Fluid samples from formation and production tests and samples of drilling mud shall be packed so that quality and quantity are not affected during transportation. All shipments must be accompanied by a cover letter describing the content, sender, samples, types of samples, well and drilling depth.

12.3 Reports on analyses of samples from the borehole.

Copies of all sample and core descriptions and reports shall be forwarded to the BMP, including the following information:

a) Reports on stratigraphic, sedimentologic and paleontologic and geochemical analyses.

b) Core descriptions.

c) High resolution colour photos of all cores. The photos are to be taken immediately after cutting. Each photo shall show well name, core number, depth, and scale as well as top and bottom data. Furthermore, a copy of all other photos from the handling of core material (e.g. taking of plugs) must be forwarded.

d) Conventional core analyses.

e) Special core analyses.

f) Petrophysical measurements of core material.

g) Qualitative and quantitative water analysis if formation water is produced.

h) PVT report indicating qualitative and quantitative composition of fluid samples from any test productions.

i) Reports on source rock analyses.

12.4 Reports on Production Test.

12.4.1 Reports containing pressure and temperature profiles in the well and at the surface as well as separator conditions, choke size, operational sequence, production rates and cumulative production.

12.4.2 For all test productions a summarising and concluding report shall be prepared. The report must be forwarded to the BMP not later than 4 months after the termination of the well. The report shall as a minimum comprise the following information:

a) Information on the individual test productions, including perforating pattern and interval, description of any stimulations, or other operations performed to stabilise or increase production.

b) A listing of measured data used for analysing the production test.

c) A listing of non-measured parameters used in the analysis of the test production and a documented explanation for the choice of parameters.

d) A listing of calculated values from the test production, including among others permeability, extrapolated pressure, radius of investigation, and flow efficiency.

e) All type curves and plots used for analysing the test productions indicating match point.

f) A detailed discussion of the achieved results and interpretations hereof.

12.5 Final reporting:

At the latest 6 months after the completion of a well the following reports shall be forwarded:

12.5.1 Summarizing technical/geological report at least containing:

a) Listing of the well's principal data, name, position in geographical and Universal Transverse Mercator (UTM) co-ordinates, drilling rig, water depth/ground level, reference level, operator, contractor, dates of the included operations, total time spent, and total depth of the well indicating geological age at TD.

b) Summary of the progress of drilling operation, stating technical problems, if any, and discussion hereof.

c) Summary of all geological information obtained during the drilling operation.

d) Listing of installed casings and results of cementing.

e) Detailed description including layout drawing of the well status when completing the operation.

f) Composite log with main information from the well stating at least core- and test intervals, position of casings, cement and plugs together with lithology and selected logs.

12.5.2 One set of summary accounts for economy and for time split into main operations shall be forwarded to the BMP.

12.5.3 A discussion of the results obtained, time spent, and economy related to expectations to be forwarded in one copy to the BMP.

12.5.5 All data and reports must be submitted digitally in two separate copies, which allows for onward forwarding of one copy without media copying. All reports must be submitted digitally and as printed copies.

12.5.6 All material submitted to the BMP Core Storage Facility must be stored at a price of DKK 60 per pallet per month. This price is subject to change with the price in storage rates. The operator must pay the above expense for the entire period in which the operator is the holder, the relevant licence under which the sampling/coring has been carried out. The BMP must be contacted prior to forwarding material of any kind to the Core Storage Facility.

12.5.7 Submission of samples to the BMP Core Storage Facility shall be done to the following address:

Greenland Service Partners A/S

3910 Kangerlussuaq

Greenland

Appendix A - Exploration Drilling Process Flowchart

Phase	Description	Activity	Reference Legal & Guidelines	Remarks
0	Pre-Licensing	SEIA - Strategic Environmental Impact Assessment		BMP undertakes large regional and baseline studies before any specific licensing rounds. The SEIA are supplemented with further studies funded by subsequent licensees. Information from SEIAs is available to all interested parties.
1	Pre-Qualification Licensing	Operator Approval for Licensing	Letter of Invitation	• Operators need to meet BMP requirements
1	Licensing	License Submission & Approval	• As defined in Letter of Invitation • Mineral Resources Act; Part 5, sub-section 16 • Mineral Resources Act; Part 6, sub-section 24	• Financial Capability • Technical Capability • HSE Management is to recognised international standards
2	Pre-Investigations	Site specific EIA - Environmental Impact Assessment	• Mineral Resources Act, Part 15, sub-section 73-75 • BMP Guidelines for preparing EIA January 2011 / NERI report 785: Guidelines to environmental impact assessment of seismic activities in Greenland Waters 2nd edition, 2010	BMP to approve before seismic operations can commence
2	Pre-Investigations	Site specific EIA report - consultation process	• Mineral Resources Act, Part 15, sub-section 75	Consultation process may include public hearing/s in addition to publication of site specific EIA
2	Pre-Investigations	Seismic Operations	• Mineral Resources Act, subsection 84 • BMP's guidelines for application, execution and reporting of offshore hydrocarbon activities (excluding drilling) in Greenland, April 2011	Offshore hydrocarbon exploration activities in Greenland are subject to approval by the Bureau of Minerals and Petroleum, Greenland, cf. the Mineral Resources Act § 86. Activities may not commence before an approval is obtained

2	Pre-Investigations	Geophysical analysis and reporting	• Mineral Resources Act, Part 15, sub-section 75 • As per Licence agreement	
3	Operator Approval	Operator Approval to Conduct Operations	• Defined in License agreement • Mineral Resources Act, Part 6, sub-section 24 • Mineral Resources Act, Part 18, sub-section 86	• Confirmation or reconfirmation of prequalified operators technical competence • Operator must be able to demonstrate to BMP their capability and competence to operate in harsh remote offshore Arctic locations
4		Consultation Period		• Clarification of requirements and submission formats etc eg. EIA and SIA - Social Impact Assessment
5	Exploration Drilling Phase: Pre -Planning	EIA - Environmental Impact Assessment	• Defined in License Award Document. • Mineral Resources Act, Part 15, sub-section 73-75 • BMP Guidelines for preparing EIA January 2011 • BMP - Guidelines for submitting applications for approval of offshore installations for hydrocarbon exploration in Greenland with particular emphasis on HSE • Arctic Oil & Gas Guidelines • OSPAR Guidelines	• NERI to review EIA on behalf of BMP, inclusive of drilling fluid selection and cuttings discharge plans • Estimated approval timing - min. 8 weeks • Guidelines found on BMP website
5	Exploration Drilling Phase: Pre -Planning	SIA - Social Impact Assessment	• BMP Guidelines for SIA • Mineral Resources Act; Part 16, sub-section 76-78	• SIA to be undertaken in parallel with EIA, but not as a combined submission • SIA Guidelines on BMP website with reference to petroleum activities in guidelines
5	Exploration Drilling Phase: Pre -Planning	Ice Studies	• License documentation	• Included in EIA
5	Exploration Drilling Phase: Pre -Planning	Site Survey pre drilling activities	• License documentation	• Included in EIA • Submission to BMP at least 6 weeks ahead of planned activity

5	Exploration Drilling Phase: Pre -Planning	Approval of MODUs	• BMP - Guidelines for submitting applications for approval of offshore installations for hydrocarbon exploration in Greenland with particalar emphasis on HSE• Act on Working Environment in Greenland• Mineral Resources Act; Part 17, sub section 79	• Focussed on HSE and technical safety of the installation for working offshore Greenland• BMP are the authority once on location• Danish Maritime are the authority during navigation
6	Exploration Drilling Phase: Operations	Drilling Approval Application to Conduct Operations	• Mineral Resources Act; Part 15, sub-section 73 1 and Part 16, sub-section 76 1 and Executive Orders Chapter 7 26 and Chapter 6, 23 to 25 must be completed before submission can be made • Mineral Resources Act; Part 17 subsection 79 • BMP Exploration Drilling Guidelines	• **EIA and SIA Approvals required before Drilling Application Approvals can be considered** • Complete Drilling Approval Application submitted at least 3 months ahead of planned activity • To review, approve/decline application. • Presentation to BMP • Detailed Drilling Programme • BMP to initiate an independent technical review using contracted third party services on a 'call out' contract.
7	Exploration Drilling Phase: Well Testing	Well Test Application and Approval to Test	• Mineral Resources Act: Part 17 subsections 79 and 86 • BMP Exploration Drilling & Well Test Guidelines	• Well Test Programme submission to BMP for approval • Submission at least 7 days ahead of planned activity • Flaring consent
8	Exploration Drilling Phase: Well Termination	Well Suspension or Abandonment Application and Approval	• Exploration Drilling Guidelines Mineral Resources Act: Part 86 • Mineral Resources Act: Parts 42, 43 and 44	• BMP to approve termination programme • Submission at least 24 hours before termination • Final Termination Record form to be submitted to the BMP within 21 days of termination
9	Exploration Drilling Phase: Well Data Analysis	Review and Analysis of Exploration data	• As per License Agreement, Article 18 • Mineral Resources Act: Part 86 (4)	• Operator to deliver evaluation report within 90 days from release of rig

Appendix B - Process Check List for Guidance Only

Phase Description		Activity	Submit to BMP	Make available to BMP	Obtain from BMP
1	Licensing and Pre-Qualification	Open Letter of Invitation from BMP			X
1		Qualification as Operator Submission	X		
1		*Required company name, details and structure*	X		
1		*Ability to conduct proposed activities*	X		
1		*HSE Organization and Management System*	X		
1		*Financial Capability to meet minimum requirements*	X		
1		*Insurance - Proof of Cover*	X		
1		License Approval			X
2	Pre-Investigation	Site specific EIA	X		
2		Submission to conduct seismic activities	X		
2		Approval to conduct seismic activities			X
3	Operator Approval	Technical Qualification as Operator to undertake drilling activities offshore Greenland in harsh remote Arctic locations			X
4		Consultation with BMP on forward plans	X		
5	Exploration Drilling pre-planning	**EIA Submission and Approval**			X
5		Environment and Eco System Review			
		Seabed Site Survey	X		
		Drilling Fluid Selection and Cuttings Discharge Plans	X		
		Ice Management Plan	X		
		Oil Spill Contingency Plan	X		
		Relief Well Contingency Plan	X		
5		*Risk Assessment*	X		
5		*Contingency Planning including relief well*	X		
5		*Emergency Response Planning*	X		
5		Ice Studies	X		
5		**SIA (Social Impact Assessment) Submission and Approval**	X		X

Phase Description		Activity	Submit to BMP	Make available to BMP	Obtain from BMP
5		Operator to demonstrate Safety Management System	X		
5		Personnel Competence - Qualifications of Key Personnel		X	
		Personnel Organization Chart		X	
5		Helicopter Operations Approval	X		
5		*Helicopter Operations Plans*	X		
5		*Helicopter Operator Certification of Fitness*	X		
5		*Search and Rescue Plans*	X		
5		Approval of MODUs and support vessels helideck certs			X
5		Approval of Offshore MODU Installation			X
5		Permit for MODU to operate in Greenland waters			X
5		*HSE Compliance and Management System*	X		
5		*Technical safety of unit*	X		
5		Compliance - MODU Certification of Fitness	X		
		MODU Operability Envelope	X		
		MODU & Vessels - Liability 'P&I' Insurance Certificate	X		
5		Drilling Equipment - Certification of Fitness	X		
5		Standby Vessel - Certification of Fitness	X		
5		Ice Breakers and PSVs - Certification of Fitness	X		
5		MODU Emergency Plans		X	
5		*Ballast Control*		X	
5		*Emergency Riser Dis-connect*		X	
5		*Vessel Drive Off*		X	
5		MODU Management Systems		X	
5		*Vessel QHSE System*	X		
5		*Planned Preventive Maintenance*		X	
5		*Permit To Work*		X	
5		*Lifting Equipment and Appliances*		X	
5		*Vessel Operating Manual*		X	
5		Logistics Management Plan		X	
6	Drilling Operations	Drilling Programme Approval			X
		Detailed Drilling Programme	X		
		Drilling Fluid Selection and Cuttings Discharge Plans	X		
6		Seabed Site Survey for rig safety & location	X		
6		Ice Management Plan	X		
6		Oil Spill Contingency Plan	X		
6		Relief Well Contingency Plan	X		
6		Reporting Plan	X		
6		Emergency Evacuation Plan	X		
6		Emergency Contact List	X		
6		H2S Contingency Plan	X		

Phase Description		Activity	Submit to BMP	Make available to BMP	Obtain from BMP
7	Well Testing	Well Test Approval			X
7		Well Test Programme	X		
7		Flaring Consent	X		X
8	Well Termination	Approval to Suspend or Abandon Well			X
8		Termination Programme	X		
8		End of Well Report	X		
	Miscellaneous				
	Community Relations		Met	Notified	Hearing
		Contact with local Stakeholders			
		Municipality			
		Employers Organization - SIK			
		Employees Organization - GA			
		Fisherman and Hunters Association - KNAPK			
		Labour Office/Office for Unemployed			
		Emergency Services - Police/Fire/Medical			
		Greenland Coast Guard			
		Customs and Excise			
		Greenland Airport Authority/ Traffic Control			
		Danish Air Authorities			
		Port Authorities			
		Naval Authority			
		Media Management			

Appendix C – Drilling Application Template

Date:

Well Number: **Operator:**

Well Name: **Operator Representative:**

Block No: **Contact Details:**

Well Type:
(Exploration, Appraisal, Development)

UTM Co-Ordinates:

MODU Name: **MODU Owner:**

Water Depth m (msl) **RTE m above msl**

	MD m	MDss m	TVD m	TVDss m
Estimated Well Total Depth				
Estimated Primary Target Depth				
Estimated Secondary Target Depth				

Estimated Primary Target Thickness		**m**
Estimated Secondary Target Thickness		**m**

Primary Target coordinates and Tolerance
Secondary Target coordinates and Tolerance

Outline Sequence of Events:

Casing Programme

Hole Size/Casing Size (ins)	Casing Specification Weight, Grade and Connection			Planned Casing Setting Depth (m)		Designed LOT Value	Planned Casing Shoe Depth (m)	
	Wt	Grade	Conn	MD	TVD			

Cementation Programme

Casing Size	% OH Excess	BHST C	Planned TOC	Planned Shoe Depth	Weight ppg/SG	Job Description

Mud Programme

Hole Size	Mud Properties	
	Type	Mud Wt

Electric Logging Programme: MDW, LWD, Electric Line

Hole Size	Interval Section m	Logging Suites

Mud Logging Programme

Hole Size	Sample Intervals m	Wet	Washed	Dry

Well Survey Programme

Hole Size	Section Intervals m	Type of Survey	Anti-collision Controls (if applicable)

BOPs - Well Control

Size	
Rating	
Manufacturer	
Ram Configuration	

BOP Pressure testing interval

Casing & Casing Seat Pressure Test Programme

Casing Size	Casing Test Press.	Casing Seat Press.	LOT or FIT?

Wellhead Details

Manufacturer:
Type:
Pressure Rating:

Formation and Frac Gradient Plots

Estimated Time/Depth Plot

Well Schematic and Lithology Prognosis

Shallow Gas	Y/N?	**Outline Risk**
Drilling Hazards	Y/N?	
Outline Risk		

Appendix D - Well Termination Template Example

Depict the positions of all the plugs on a well schematic stating:

- Type of Plug
- Length of Plug
- Test and Type: Weight, pressure and/or inflow
- Annular fluid type and weight
- Well fluid type and weight