

Hywind Scotland - Plan for HDD activities 2016

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Remarks: This updated plan include minor modifications following feedback from consultees, and necessary modifications to handle unexpected challenges when boring the final part of the borehole close to the exit point (described in separate addendum)

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1 Executive summary

The purpose of this document is to partially discharge the conditions given in the Marine Licence for the Hywind Scotland Pilot Project (Licence number 05515/15/0).

The document provides technical and operational details on the planned HDD activities which will take place in 2016. It covers the marine part of the HDD activities only. Onshore activities fall under the Planning Permission granted by Aberdeenshire Council, and conditions given as part of the Planning Permission will be dealt with separately.

Further detailed plans for the remaining offshore constructions works which will take place in 2017, and plans for the operational phase, maintenance and decommissioning will be submitted for consultation and approval during the second half of 2016.

As the actual marine operations planned in 2016 will be limited to the HDD activities, Statoil has agreed with Marine Scotland to develop one single document covering the necessary details needed to partially discharge all conditions necessary to execute the HDD activities. The specific conditions in the Marine Licence which are considered to be relevant for the marine HDD activities, are listed below. The list includes reference to the sections of this document where the related information can be found.

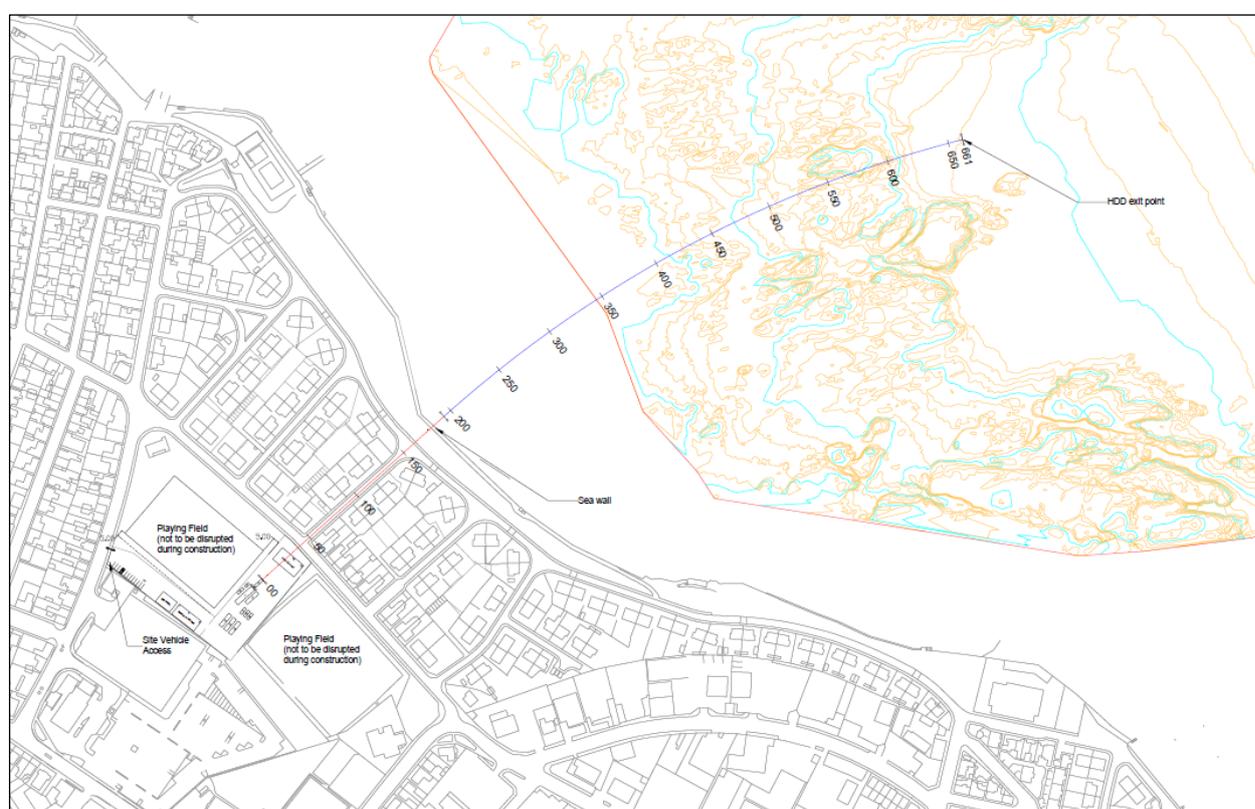
- Condition 3.2.1.2 – Environmental management plan (section 4, 6, 7 and 8)
- Condition 3.2.1.3 – Fisheries Management and Mitigation Strategy (section 9)
- Condition 3.2.1.7 – Health and Safety Incident (section 10)
- Condition 3.2.1.10 – Emergency Response and Co-operation Plans (section 10)
- Condition 3.2.2.4 – Construction Programme (section 3)
- Condition 3.2.2.5 – Construction Method Statement (section 3)
- Condition 3.2.2.7 – Vessel Management Plan (section 11)
- Condition 3.2.2.8 – Navigational Safety Plan (section 12)
- Condition 3.2.2.9 – Cable Plan (sections 3, 4 and 5)
- Condition 3.2.2.15 – Navigation and Aviation Safety and Charting (section 12)
- Condition 3.2.2.19 – Marine Archaeology Reporting Protocol (section 13)

2 Introduction

Statoil ASA received a Marine Licence on the 30th October 2015 to develop the Hywind Scotland Pilot Project (“Hywind”). The development will involve the installation of five 6 MW floating wind turbines to be located approximately 25 km off the coast of Peterhead. Each turbine will be anchored by a three-point mooring spread, and they will be connected by inter-array cables. An export cable will transport the generated electricity to the shore. The cable landfall will be installed using a HDD solution. The HDD activities will take place in 2016, whereas the rest of the offshore installation works will be done in 2017.

3 Technical description and construction method statement for the HDD activities

Several landfall locations and methods have been evaluated for the export cable from the Hywind Pilot Park to the shore, and a horizontal directional drilling (HDD) method has been chosen considering a number of different criteria (construction risk, safety, experience, environmental impact and operational risk).



An HDD construction compound will be set up in Barclay Park in Peterhead, located approximately 150m from the foreshore. Drilling will be done from Barclay Park starting by drilling of a 660 m borehole using a 600-700 mm diameter drill head. Drilling fluid will be pumped through the drill string and the drill head (rock bit) forcing it to rotate, and then flow back to the onshore drill site and bring the cuttings to the surface through the annulus between the drill string and the borehole walls. The borehole will exit at angle of approximately 16% (9 degrees).

Shortly prior to exiting a multi-cat vessel will be anchored at the exit location using 3 anchors with approximately 40 m long anchor chains. This multi-cat vessel, which will have a large open deck and high capacity crane of approximately 20-30 m in length, will be used as a support vessel during the breakthrough and diving operations. It will stay on the location throughout the operation, and will also act as coordination vessel.

Loose overburden material will be removed from the breakthrough point using divers and an airlift system, supported by a small dredging machine, a boulder grab and the crane, should there be any boulders which cannot to be moved using the airlift system. In the case there should be excessive boulders and/or instable rock near the exit point, the borehole may be grouted, and drilling of the final part may be repeated after the concrete has hardened (see Addendum giving a detailed method statement for such works). A RIB will be used to assist the operation and act as an emergency vessel and also for personnel/diver transfer. Overall personnel transfer is expected to be limited due to the short duration of the works. When not in use, the RIB will be placed on the multi-cat vessel.

A single approximately 400 mm HDPE duct slightly longer (2-3 m) than the borehole will be manufactured in the Peterhead area (on the southern breakwall of the Peterhead port) and towed to the borehole exit point. In order to facilitate later pull in of the cable, a bellmouth will be installed at the tail end of the duct. A small tug boat will be used for towing the duct from Peterhead harbour to the borehole exit point, assisted by a small work boat at the tail end of the duct to keep it in line. The towing is expected to last for a couple of hours. The multi-cat vessel will as described be anchored at the borehole exit point, and the workboat will remain at the tail end of the duct to keep it in position.

The front end of the duct will be water filled and connected to the drill string (reamer) and then pulled back towards the entry point until the duct is fully installed and the reamer removed. After connecting the duct to the drill string, the divers will be demobilised and brought to the shore. The whole duct will be filled with water during pull back to aid buoyancy during the pull and to reduce the net groundwater and drilling fluid pressures on the duct. During duct pullback the drilling fluid will be removed from the excavation and the annulus between the duct and the excavation wall will be filled with grout. The whole pullback operation is expected to take 10-12 hours. A messenger wire will be installed within the duct prior to pullback to allow for the installation of the power cable in 2017.

Following completion of the duct pullback, a small length of pipe will be left on the sea bed. Approximately 2-3 m of duct will be left protruding from the excavation onto the seabed. As the borehole will exit at a narrow angle, the duct will not extend more than 0.5 m above the seabed level, which is less than the maximum 5% alteration of the navigable depth at the location (14 m). Because of the short length protruding and the robustness of the duct, there is no need for any protection measures to avoid damage to the duct itself. Following consultations with SFF it has been agreed to place rock bags beneath and around the exit point to avoid any snagging of gishing gear.

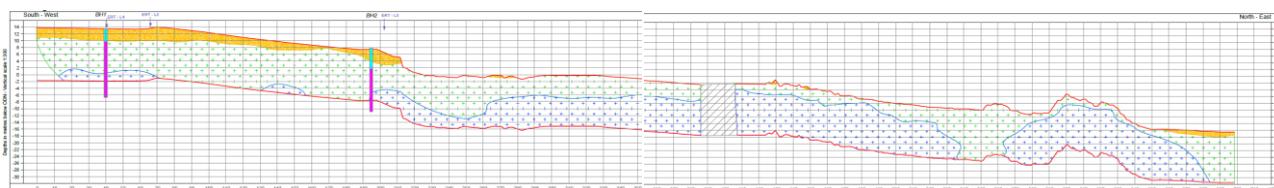
All near shore activities which includes vessels and diving activities are weather sensitive, and may be delayed due to weather. In order to reduce the risk of delays, the work was initially planned to take place in the period May-September when weather conditions are likely to be most favourable but is not expected to start before July. The marine operation is expected to last just a few days (3-6 days), but will take longer in the case of unforeseen events or unexpected rock/sediment condition at the exit point.. Statoil will notify Marine Scotland and statutory consultees when the work starts and finishes.

4 Environmental sensitivities

The Hywind Scotland Environmental Statement did not identify any specific environmental sensitivity close to the HDD borehole exit point.

Geotechnical surveys have been made in the landfall area in order to determine the suitability of the rock and subsurface sediments for selecting the HDD landfall alternative (see figure next page). These surveys have documented the sub surface layers to consist primarily of weathered granite, except at the

exit point where there is a shallow layer of sand at the seabed. Benthic surveys have been performed along the cable corridor as input to the Environmental Impact Assessment. Based on sediment samples and other data available it was concluded in the Hywind Scotland ES that sediments in the cable corridor are not significantly contaminated. The patches of sand amongst the bedrock in this area are determined as “Infralittoral fine sand” and “Infralittoral mobile clean sand with sparse fauna”. The infauna is characterised by the bivalve *Angulus fabula* and the polychaete *Nephtys longosetosa*.



Marine mammals do occur in the project area, with Harbour Seal as the species most likely to be observed followed by Grey Seal. However, no seal haul-out sites are found in the vicinity. The Environmental Statement has identified presence of guillemots with chicks in the project area during their swimming migration from the breeding colonies in August/September. Seabird survey data from the area close to the borehole exit point is not available. However, tracking studies have indicated that the guillemots are primarily occurring further offshore. It is likely that the HDD activities will take place during the spring or summer, prior to the most sensitive period for the seabirds. All personnel will be required to adhere to the Scottish Marine Wildlife Watching Code during the operations, and no significant interference with sensitive wildlife is therefore expected.

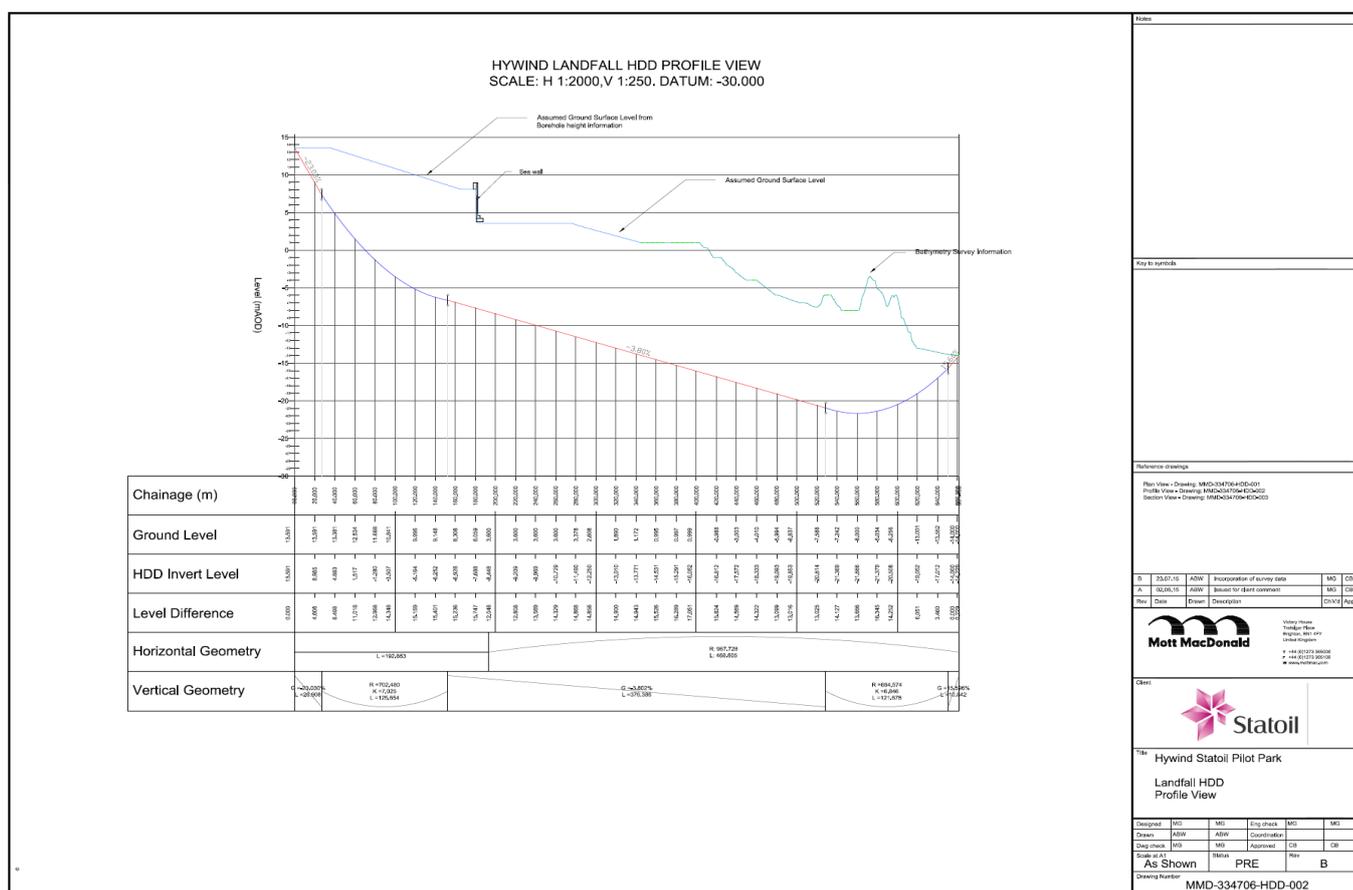
5 Burial risk and protection measures at exit point

Burial risk will not be an issue for the HDD part of the cable route, as the cable will be placed in the borehole/duct well below the seabed (see figure below). As described in section 2 above, there will be no need for specific protection measures at the exit point to protect the protruding end of the duct prior to cable installation in 2017 (because of its short length and robustness). Rock bags will be temporarily placed beneath and around the protruding end of the duct to avoid snagging of fishing gear. Should it be deemed necessary to have permanent protection at and close to the exit point, this will be considered in consultation with relevant stakeholders following installation of the cable in 2017.

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6 Chemical usage

No hazardous chemical will be used during the HDD activities. Drilling fluid will be used during the drilling operation. The drilling fluid will be based on bentonite – which is a clay occurring naturally. In small volumes, this drilling fluid is not a pollutant. Prior to break through the majority of the drilling fluid will be either vacuum pumped from the bore hole or washed through to reduce the volume discharged into the sea as described in section 2 above. In the case there should be a need to grout the borehole near the exit point, it will be filled with concrete and the boring of the last part will be repeated. Concrete is not expected to escape from the borehole into the sea. An approximate 1500 kg bentonite mixed in 30 m³ water is assumed to be released into the sea at the break through point over a short period (a couple of minutes). Due to the strong currents in the area this will be quickly dispersed, and is not expected to cause any damage on the environment. Other chemicals will not be used, with the exception of standard fuel and lubrication oils used on the vessels involved. Due to the short duration of the marine works, no refueling/bunkering of vessels will be necessary during the operation.

7 Environmental management

As a company, Statoil has a clear goal to ensure sustainable development and is committed to minimising environmental impacts. An introduction to Statoil's Safety and Sustainability policy, the Management System and how this will be implemented within Hywind Scotland Pilot Park project is presented in the Hywind Scotland Environmental Statement (ES). Our management system is fully compatible with recognised environmental management standards, including ISO 14001. Also our contractors are required to meet the ISO 14001 standard.

A commitment register including all commitments made during the Environmental Impact Assessment phase was included in the Environmental Statement, and this has been supplemented by requirements given in the Marine Licence. Those commitments relevant for the HDD activities will be included as contract requirements for the HDD contractors, and implementation will be monitored and followed up by Statoil. Any deviation will have to be approved by Statoil, following clarification of consistency with the Marine Licence and if needed approval by the Marine Licensing Authority (MS LOT).

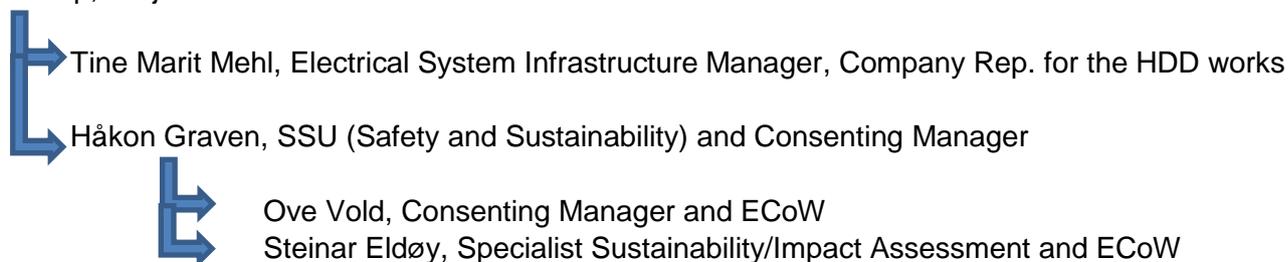
Ecological Clerk of Works (ECoW) will be appointed as required in the Marine Licence. Statoil will use internal resources to fill this role.

8 Roles and responsibilities

A project organization for the Hywind Scotland project has been established and is based in Norway. A principal contractor will be appointed, and will have the primary responsibility for the HDD activities. The principle contractor will report to the Electrical System Infrastructure Manager in Statoil's Hywind Scotland project team (who will be Company Representative for the contract).

Statoil's project personnel responsible for HDD activities and key support functions (safety, sustainability and consenting):

Leif Delp, Project Director



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Statoil will establish one single contract including all onshore and HDD related construction works. Balfour Beatty has been awarded the contract, and will act as the Principal Contractor. Details on the Principle Contractor's project organisation (including roles and responsibilities and eventual subcontractors) will be supplemented at a later stage.

9 Fishery management

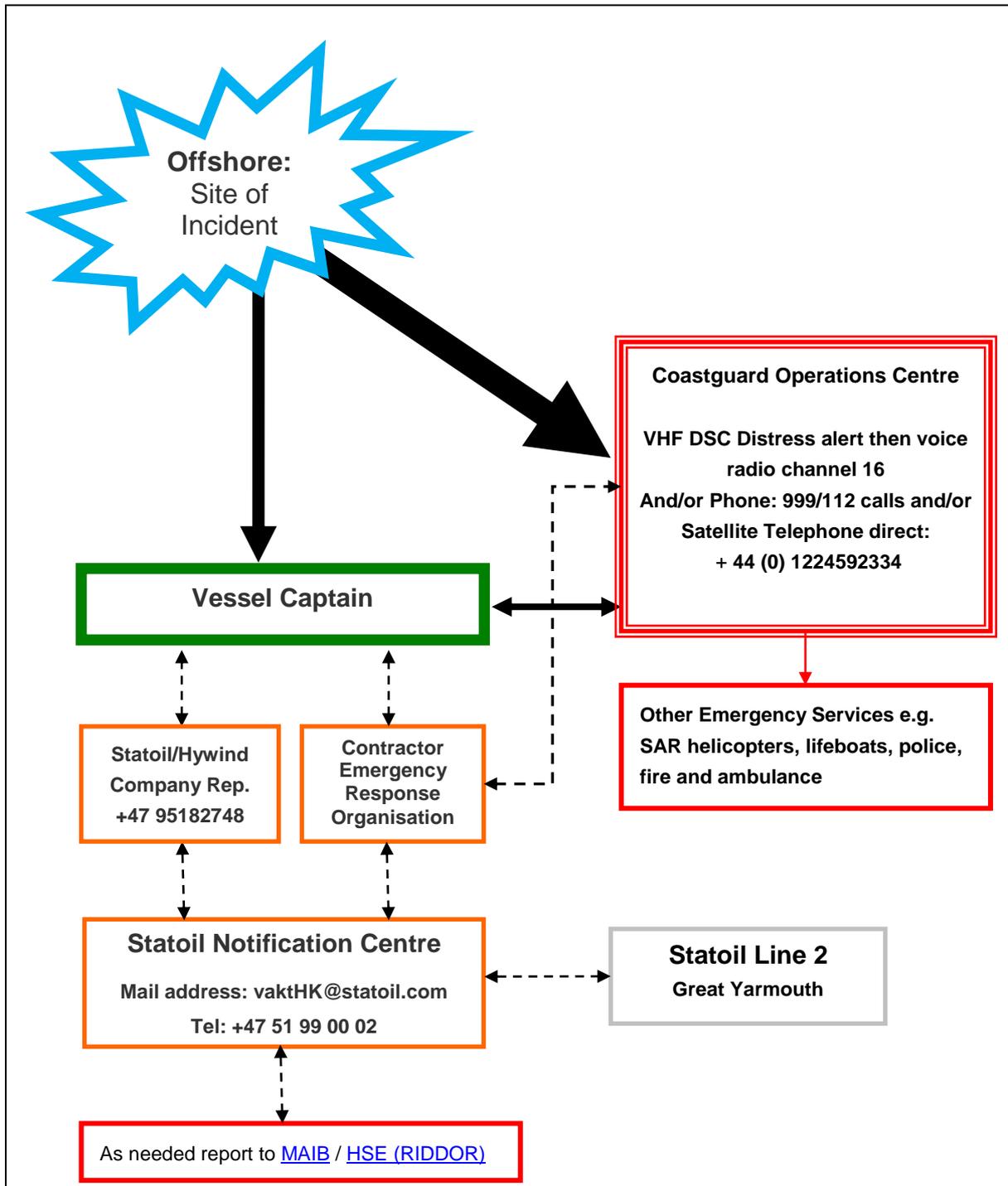
Statoil has during the pre-consent planning phase engaged with fishery associations and appointed a fishery liaison officer to ensure good communication with local fishermen to reduce and if possible avoid difficulties for the fisheries during surveys. This cooperation and arrangements will be continued during the HDD related activities in 2016. The fishery liaison officer (FLO) (to be approved by the Licensing Authority in consultation with SFF) will maintain communication between Statoil, the contractor(s), eventual sub-contractor, fishermen and other users of the sea during the works, and ensure compliance with best practice whilst doing so. The FLO will furthermore provide information relating to the safe operation of fishing activity during the HDD works, and ensure that information is made available and circulated in a timely manner to minimise interference with fishing operations and other users of the sea.

Several surveys have been performed related the Hywind Scotland Pilot Park Project since 2013. Statoil agreed to compensate the fishermen affected by such activities, based upon agreed guidelines on how such disruption compensation should be calculated. Compensation following the same guidelines will also be offered to the fishermen who will be affected by for HDD activity Q2/Q3 2016.

A complete Fishery Mitigating Management Strategy (FMMS) covering the remaining construction works will be submitted prior to start-up of installation phase in 2017. The preparation of this strategy will be done in close consultation with SFF.

10 Emergency response and reporting of HSE incidents

Statoil does have a well-established companywide system for emergency response upon which a specific emergency response and reporting procedures will be built also for Hywind Scotland. Even though the marine operations related to the HDD activities in 2016 will be very limited, the system will be in place and implemented. The flowchart below illustrates the reporting lines in case of an HSE incident.



The vessel captain(s) will have the primary responsibility to report an incident both to the Aberdeen Coastguard Operations Centre, to the contractor's emergency response organization and management and to Statoil/Hywind Scotland's company representative (Tine Marit Mehl). The contractor and Statoil/Hywind Scotland's company representative will both involve Statoil's central Notification Centre

based in Norway, who will take care of the necessary reporting to the Marine Accident Investigation Branch (MAIB) and to the Health and Safety Executive (HSE) – ref. RIDDOR (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013). Statoil will have a Line 2 emergency response organisation set up in Great Yarmouth which is also serving the Statoil operated Dudgeon Offshore Wind Farm.

11 Vessel management

It is envisaged to use only three vessels during the HDD activities in 2016:

- a multi-cat work/crane vessel
- a CTV RIB/safety boat
- a small tug work boat
- a small work boat

Each vessel is supposed to make one trip (potentially a daily trip) probably from Peterhead harbour to the borehole exit point, with the exception of the RIB/safety boat which may be used for transferring personnel between the vessels and shore. The multi-cat vessel will as described, be anchored at the HDD exit point during the operation, and will assist the whole work process and also act as a coordination vessel. The small tug boat will tow the duct to the borehole exit point during daytime, assisted by the small work boat. During towing a safety zone of approximately 50 m around the duct will be maintained and monitored by the multi-cat vessel and the tug work boat, and assisted by the rib/safety boat. The multi-cat vessel will be moored at the site during the operation, and will also act as a diver support vessel and guard vessel during the pullback of the duct. As mentioned in section 3 above, all personnel will be required to adhere to the Scottish Marine Wildlife Watching Code during the operations.

Details on each vessel will be notified to the Licensing Authority (Marine Scotland) no later than 14 days prior to the commencement of the works.

12 Navigational safety

As the marine operations planned for the HDD activities in 2016 will be very limited and confined to the near shore area (approximately 500 m from the shore), the navigational safety issues will be limited to the presence of a few vessels close to the exit point of the HDD borehole and during the towing of the duct from the construction site and during the pull in of the duct. Statoil will notify the UK Hydrographic Office (“UKHO”) of the proposed works to facilitate the promulgation of maritime safety information and updating of nautical charts and publications through the Notice to Mariners system. Local mariners, fishermen’s organisations and HM Coastguard (National Maritime Operation Centre) will be made aware of the marine operations related to the HDD activities through local Notice to Mariners and other means as appropriate. Furthermore, details of the works (timing, location and vessel routes) will be published in the Kingfisher Fortnightly Bulletin.

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The principal contractor will be responsible for the operational safety, and will be required to ensure that their personnel have the necessary competence and training to ensure that the works are performed in a safe manner and in compliance with the licence conditions and specified requirements and procedures.

13 Marine archaeology

Surveys done as part of the planning and Environmental Impact Assessment have not shown presence of any objects of marine archaeological interest in the area where the borehole exit is located. An additional survey (UXO-surveys) is planned early spring 2016. If this survey should document any objects which may be of marine archeological interest, Statoil will ensure that any such findings will be reported to Scottish Heritage.