



Hywind Scotland Pilot Park Environmental Management Plan

2020-003027

Title:		
Hywind Scotland Pilot Park Environmental Management Plan		
Document no.:	Contract no.:	Project:
2020-003027		Hywind Scotland Pilot Park

Classification:	Distribution:
Internal	Marine Directorate
Expiry date:	Status:
N/A	Final

Distribution date:	Rev. no.:	Copy no.:
20/11/2020	4	

Author(s)/Source(s):	
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Subjects:	
Document informing of Hywind Scotland Pilot Park Environmental Management, roles responsibilities, organisation, pollution prevention, contingency planning and incident notification.	
Remarks:	
Rev 2: Update to operational control room contact details and Plant Manager name.	
Rev 3: Inclusion of davit crane scope.	
Rev 4: 2025 updates to amend survey frequency and mechanism for updates.	
Valid from:	Updated:
20/11/2020	21/02/2025

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1. Introduction

1.1. Background

Equinor ASA (formerly Statoil ASA) received a Marine License to develop the Hywind Scotland Pilot Park Project (Hywind Scotland) on the 30th October 2015. The project consists of five 6 MW floating wind turbines which were installed off the Aberdeenshire coast in Scotland during summer 2017. Hywind Scotland has been in production since October 2017 and is the world's first fully operational floating wind farm.

The Marine License requires (re. condition 3.2.1.2) that an Environmental Management Plan (EMP) must be submitted to the Licensing Authority for their written approval following consultation with the Joint Nature Conservation Committee (JNCC), Scottish Natural Heritage (SNH), the Scottish Environmental Protection Agency (SEPA), Aberdeenshire Council (AC) and any other advisors or organisations as may be required at the discretion of the Licensing Authority.

In agreement with Marine Scotland (now the Marine Directorate), the first EMP for Hywind Scotland was integrated into the "Hywind Scotland Pilot Park Project Plan for Operation and Maintenance" (Document no. C178-HYS-Z-GA-00004, December 2016)¹. This current document outlines the updated EMP for the operation and maintenance activities at Hywind Scotland and has been prepared on request by the Marine Directorate.

1.2. Objectives of this document

The objective of this document is to provide the over-arching framework for on-site environmental management during the operational lifespan of Hywind Scotland. It supersedes the EMP contained within "Hywind Scotland Pilot Park Project Plan for Operation and Maintenance" (Document no. C178-HYS-Z-GA-00004, December 2016)². The current EMP supports the revised "Hywind Scotland Pilot Park Plan for Operation and Maintenance (Document no. C178-HYS-Z-GA0004, October 2019).

This EMP is in accordance with the Application as it relates to environmental management measures. It sets out the roles, responsibilities and chain of command of any Licensee personnel, any contractors or sub-contractors in respect of environmental management for the protection of environmental interests. It also sets out a mechanism for the approval process for proposed updates to the EMP.

The issues covered in this EMP are listed below, with reference to the relevant Marine License conditions:

- mitigation measures to prevent significant adverse impacts to environmental interests (ref. condition 3.2.1.2 a)
- A completed Written Scheme of Investigation ("WSI") approved by Historic Scotland (ref. condition 3.2.1.2 b)
- pollution prevention measures and contingency plans (ref. condition 3.2.1.2 c)
- management measures to prevent the introduction of marine non-native marine species (ref. condition 3.2.1.2 d)
- measures to minimise, recycle, reuse and dispose of waste streams (ref. condition 3.2.1.2 e)
- methods for responding to environmental incidents and the reporting mechanisms that will be used (ref. condition 3.2.1.2 f)
- chemical usage (ref. condition 3.1.7)

¹ <http://www.gov.scot/Topics/marine/Licensing/marine/scoping/Hywind>

² <http://www.gov.scot/Topics/marine/Licensing/marine/scoping/Hywind>

1.3. Target audience

The target audience for this document is all persons working on all onshore and offshore locations related to the Hywind Scotland Offshore Wind Farm, including Equinor employees, contractors and sub-contractors. Locations include:

- Equinor control room site in Great Yarmouth
- ASCO Base at Peterhead
- Peterhead substation
- Crew Transfer Vessel (CTV) used to access the wind turbines
- Crew Transfer Vessel (CTV) berth at Seagate Quay, Peterhead port
- Siemens Gamesa Renewable Energy sites
- Ad hoc contractors' sites
- Personnel at other locations providing support

All operational environmental management documentation developed for the Hywind Scotland project must comply with this EMP.

1.4. Location of plan

Copies of this EMP will be held in the following locations:

- Equinor control room site in Great Yarmouth
- ASCO Base at Peterhead
- Peterhead substation
- Crew Transfer Vessel (CTV)
- Equinor documentation centre

1.5. Structure of this plan

This EMP is divided into the following sections:

1. Introduction
2. Project description
3. Operation & maintenance activities
4. Environmental Management Framework
5. Roles and responsibilities
6. Updates and amendments to this EMP
7. Environmental mitigation
8. Written Scheme of Investigation
9. Pollution prevention and contingency planning
10. Measures to prevent the introduction of marine non-native marine species
11. Waste management
12. Mechanisms for responding to environmental incidents and reporting section 13. Chemical usage

2. Project description

Hywind Scotland is located at Buchan Deep, approximately 25 km offshore to the east of Peterhead (figure 1.1). The pilot park covers around 4 square kilometres in water depths varying between 95—129 metres. The onshore operation and maintenance (O&M) base for Hywind Scotland is located in Peterhead.



Figure 1.1. Location of the Hywind Scotland Pilot Park project

Hywind Scotland Pilot Park consists of five 6 MW turbines and a total installed capacity of 30 MW. With a transmission voltage of 33 kV, the pilot park has the capacity to power up to 35,000 households. Each of the five floating wind turbines is anchored by three suction anchors, and the turbines are connected by inter-array cables (figure 1.2). A 30 km export cable transports the generated electricity to the shore.

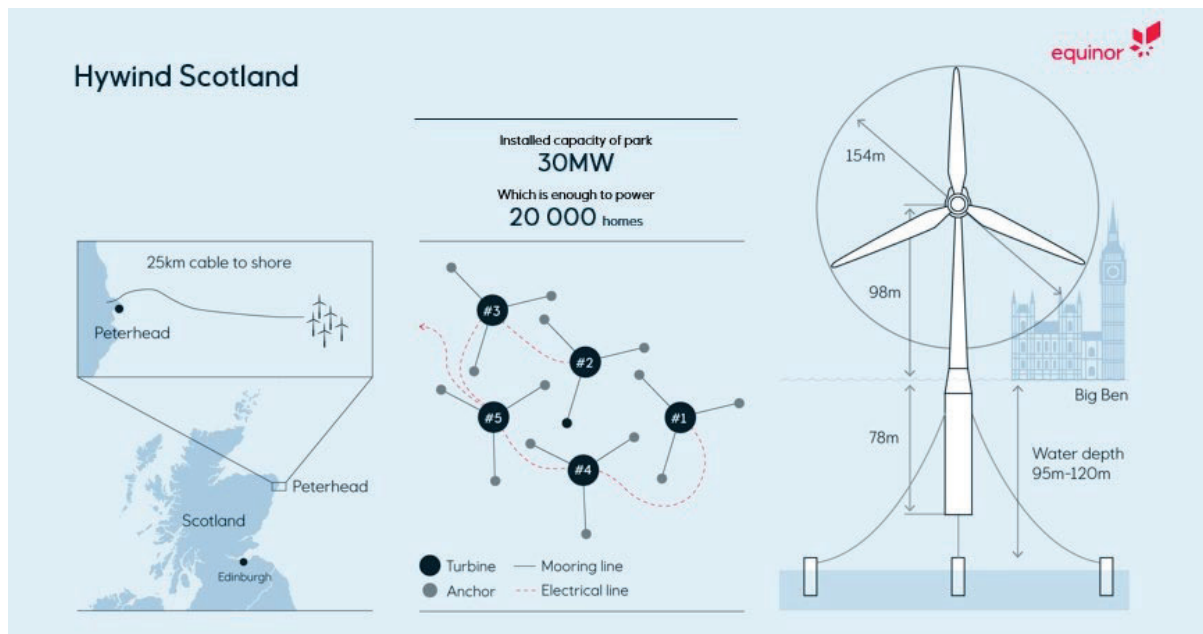


Figure 1.2. Illustration of the Hywind Scotland Pilot Park Project

3. Operation & maintenance

3.1. Operation and maintenance principles

The Hywind Scotland operation and maintenance philosophy follows the same principles as for any other wind farm in Equinor. This chapter aims to give a holistic overview of the operation and maintenance programme for Hywind Scotland. The operation and maintenance of a wind turbine placed on a floating foundation using the Hywind concept is comparable to a bottom fixed turbine for all normal maintenance tasks. Operational experience from the Hywind Demo turbine has verified this assumption. Main component failures and work related to the substructure and mooring system will be different from a bottom fixed wind turbine. Inspection and maintenance of the substructures and mooring systems will be conducted on a campaign basis, using relevant competency within Equinor. Main component exchange requires further planning, and will, if necessary, be performed as a small stand-alone project.

3.2. Operation and maintenance strategy

The planning assumptions for a SWT6.0-154 turbine are five days scheduled maintenance and on average ten days unscheduled maintenance per year; which sums up to about 75 days of maintenance for Hywind Scotland per year. In addition, there will be some visits for maintenance and certification of other equipment on the structures. The ambition is to schedule these events on the same visits as the scheduled turbine maintenance.

The resource strategy selected for Hywind Scotland is to have a pool of technicians to draw on in the event a turbine needs to be unscheduled visited, and a dedicated crew transfer vessel stationed in Peterhead. The organisation is ready to work on the turbines every day needed when the weather allows sailing and safe access to the turbines. Siemens Gamesa Renewable Energy provide the maintenance requirements for the turbines and handle normal operations under Equinor's management and control from the Equinor control room site in Great Yarmouth. Siemens also handles the daily interface towards the vessel provider. Equinor is therefore not permanently present at the operational base in Peterhead during normal operation. This operation and maintenance strategy was revisited after the first year of operation and based on the good experience this is being continued.

3.3. Operation and maintenance activities

The operation and maintenance activities for Hywind Scotland are detailed in the “Hywind Scotland Pilot Park Plan for Operation and Maintenance (Document no. C178-HYS-Z-GA-0004). Key elements of the O&M plan are summarized below:

3.3.1. Wind turbine maintenance

Initially Hywind Scotland had a five-year service agreement with Siemens Gamesa Renewable Energy (SGRE). A five-year extension from the original service agreement end date of 8th November 2022 was agreed with Siemens Gamesa Renewable Energy (SGRE) which will run to 8th November 2027. After the five-year period, Equinor will evaluate the way forward, and chose either to continue with a service provider or take the maintenance of the wind turbines in-house. The scope of this contract covers the maintenance of the turbines, tower internals, high voltage switchgear, the control system - SCADA and instrumentation and the statutory certification of lifting equipment, anchor/rescue points, fall arrest and pressurised systems. The turbine supply agreement includes a five-year defect notification period, covering spare parts, this has not been extended as part of the 2022 agreement. The work release, management and control is from Equinor's control room. SGRE will handle the maintenance for all equipment located on the turbine. Siemens will continue to undertake monitoring and equipment alarm handling for the wind turbines from their centralised control room in Newcastle. In 2027 Equinor will evaluate the way forward, and chose either to continue with a service provider or take the maintenance of the wind turbines in-house.

3.3.2. Electrical infrastructure maintenance

The maintenance for the electrical infrastructure in Peterhead is delivered by Ventus. The contract will be monitored by Equinor's back-office organisation located in the control room site in Great Yarmouth.

3.3.3. Maintenance and monitoring of foundation, mooring system and subsea cables

The relevant competence areas in Equinor are involved in the planning and execution of foundation, mooring system and subsea cable inspection and maintenance. These competence areas have decades of relevant experience from subsea inspections of foundations, mooring systems and subsea cables for offshore oil and gas installations.

An operations survey for Hywind Scotland using an ROV was completed towards the end of 2018 inspecting the subsea structures, mooring systems, infield dynamic cables and export cable. This survey was repeated late summer 2020 and a partial survey completed in 2022. In 2024 a survey of the site was completed as part of the major component replacement campaign. None of these surveys identified any major findings. Therefore, Hywind Scotland intends to reduce the frequency of planned surveys to a minimum of one every five years. It should be noted that wider project surveys will be required more frequently to ensure infrastructure integrity with any unusual findings reported to the Marine Directorate as appropriate..

In the event of accidental discovery of cultural remains, this shall be reported in line with The Crown Estate (2014) Protocol for Archaeological Discoveries.

3.3.4. Heavy component exchange

The platform crane on the crew transfer vessel (CTV) and the CTV itself is designed to handle all standard components and spare parts, with a maximum limit of 2 tonnes. This will cover everything, excluding the main components, i.e., transformer, generator/main bearing, yaw bearing, blade bearing, blades and the hub.

Transformer exchange will be done using a standard Dynamic Positioning offshore service vessel. The transformer will be lowered externally from the nacelle to the platform on the tower base before being lifted off using the service vessel crane.

In the event of a Davit crane defect that requires removal of the crane this will be done similar to the transformer exchange. A standard DP offshore service vessel will remove the crane from the platform using the service vessel crane.

For the other main components, the lifting operation will be at nacelle height (about 100 m). The water depth is too great for jack-up vessels, meaning that the lift will have to be between two floaters. This operation is very sensitive to motions and is not feasible in the offshore environment outside Peterhead. The turbines would therefore have to be towed back to sheltered waters if there is a need for such components to be exchanged. The most likely location for major component exchange is the Norwegian fjords where the installation was done.

If at the required exchange time new technological developments have made it possible for these activities to be undertaken in situ, Equinor will consider this in our evaluation of the most appropriate way to undertake these activities.

3.3.5. Deballasting

In order to maintain an air gap which meets the engineering design requirements, the turbines are designed to be deballasted to compensate for the weight of marine growth on the substructures over time. As the ballast water has a pH of 10.5, it would be transported to shore for safe disposal. Deballasting will be managed by robust operating procedures, the use of well-maintained and certified equipment, and the utilisation of suitably trained and competent personnel.

4. Environmental Management Framework

In all our business activities, Equinor complies with applicable laws, acts in an ethical, sustainable and socially responsible manner, practices good corporate governance and respects internationally recognised human rights. We maintain an open dialogue on ethical issues – both internally and externally. Open, honest and accurate communication is essential to our integrity and business success.

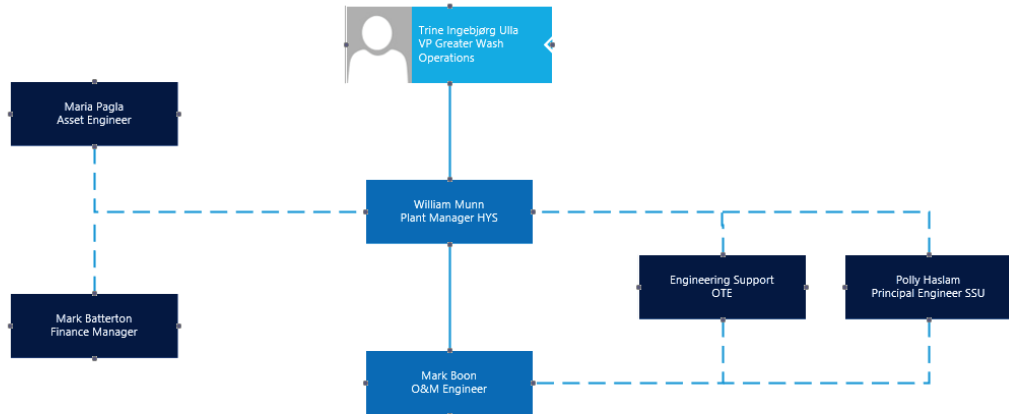
Equinor is committed to preventing harm to the environment and aim for outstanding natural resource efficiency in our business activities. We actively work to limit greenhouse gas emissions from our activities and comply with all applicable environmental laws and regulation.

Our approach is integrated in our Management System, and we have developed guidance and tools for everyone who works for us. The Equinor environmental management system is fully compatible with recognised environmental management standards, including ISO 14001.

Health, Safety and Environment (HSE) is an integrated part of Equinor's operational activities. The HSE goal for Hywind Scotland is to develop, operate and decommission the pilot park with no injuries, accidents or harm to the environment. Equinor assurance activities are undertaken in the form of audits, verifications and/or self-assessments, according to both authority regulations and internal management system requirements.

5. Roles and responsibilities

The current roles and responsibilities for Hywind Scotland is as follows:



The Hywind Scotland Plant Manager is responsible for operations and maintenance and for following up the HSE performance and environmental management, for all works within the scope of Hywind Scotland operations.

Health, safety and environmental support is provided by Safety and Sustainability (SSU) function for advising, monitoring and following up on HSE.

The onshore base at Peterhead provides office facilities for maintenance planning and reporting, spare part storage. Quayside facilities for loading and unloading the crew transfer vessel used for O&M of the turbines is located approximately 3km from the onshore base. Back-office functions such as the follow-up of O&M activities, monitoring of asset integrity, production forecasting and following up service contracts are shared with other Equinor wind farms within the Equinor UK wind organization and by Equinor's control room based in Great Yarmouth. Emergency Response is also managed by the shared facilities in Great Yarmouth.

6. Updates and amendments to this EMP

Equinor will undertake an internal review every 12 months to identify the need to update the EMP, where no material changes are required, this will be communicated with the Marine Directorate Licensing and Operations Team (MD-LOT) by email to ensure continued compliance with our Marine Licence.

In the event updates are required, Equinor will submit a draft EMP to MD-LOT who will consult with SNH, SEPA, JNCC, AC and any other advisors or organisations as may be required at the discretion of MD-LOT as part of the approval process.

7. Environmental mitigation

A commitment register including all commitments made during the Environmental Impact Assessment (EIA) phase was included in the Environmental Statement. The commitments register provides a summary of key management and mitigation measures identified during the EIA process, and has been supplemented by the requirements stipulated in the Marine License for Hywind Scotland.

The commitments register for Hywind Scotland is continuously updated. In this way, environmental management is an ongoing iterative process, continuing beyond the identification of mitigation measures during the EIA process. It also ensures that the Hywind Scotland development remains responsive to continual improvement, findings from survey and monitoring activities and changing regulatory requirements.

8. Written Scheme of Investigation

The Marine Directorate has confirmed that Marine License condition 3.2.1.2. b) requiring a completed Written Scheme of Investigation ("WSI") approved by Historic Scotland is no longer relevant for the Hywind Scotland development.

9. Pollution prevention and contingency planning

Hywind Scotland has mechanisms in place for dealing with a major oil spill as well as discharge of oils/chemicals to sea from the wind turbines or during vessel-to-asset operations. Details of who to notify and how to establish an emergency response team is embedded in Equinor's Great Yarmouth Incident Management Plan (IMP) which Equinor shares with all our contractors.

There is an Emergency Response Co-Operation Plan (ERCoP) between Hywind Scotland Pilot Park and HM Coastguard (ref. Marine License condition 3.2.1.10), including a responsibility matrix covering Hywind Scotland onsite contractors and Hywind Scotland vessels. This is integral to Equinor's IMP and this document provides the relevant information regarding HyS for the HM Coastguard that they may need in the event of an incident. This document is subject to regular review and is current and issued to the coastguard.

Key emergency contacts are specified in the ERCoP including a 24-hour line to Equinor's single point of contact (see table below) The core emergency contacts are identified within this document and additional contacts required for Equinor incident management are maintained on a single reference point within the Incident Management Plan – this key contact list includes all our internal and external contacts and extended stakeholders.

EMERGENCY CONTACT INFORMATION	
[REDACTED]	

Equinor also has in place an internal system SYNERGI for recording and reporting any incidents, and our contractors are required to use this system. If any health, safety or environment incidents occurs on the site, Equinor will ensure that, where relevant, we will report this to the relevant authorities including the Marine Directorate within the time set by the regulations.

10. Measures to prevent the introduction of marine non-native marine species

Invasive non-native species pose a significant threat to biodiversity as they may have negative impacts on native species and threaten regional ecosystems and economies.

Two main sources of risk for potential introduction of non-native marine species were identified for Hywind Scotland in the EIA; via the ballast water in the wind turbine substructure during the towing from Norway to Scotland, and via the hulls of vessels involved in project installation.

During the current operations and maintenance phase, risks for the introduction of non-native marine species are likely to be limited to major heavy component exchange necessitating towing back to the Norwegian fjords.

In order to minimize the risk of introducing non-native marine species, Equinor requires that all vessels involved in all stages of the Hywind Scotland project adhere to all relevant guidance regarding ballast water and the transfer of non-native marine species, including the IMO guidance on ballast water and transfer of non-native marine species (ref. MGN 81, Guidelines for the Control and Management of Ship's Ballast Water to Minimise the Transfer of Harmful Aquatic Organisms and Pathogens).

11. Waste management

Equinor has internal waste handling procedures which all our projects and contractors are required to adhere to. These requirements build on a strategy where the priority is to avoid waste generation. Where waste generation cannot be avoided, technical and operational measures, including separation, collection and disposal solutions for different classes of waste, shall be implemented to optimise the reuse, material recycling or energy recovery of the waste. Waste shall be stored and transported in such a way that accidental releases are prevented.

Equinor and its contractors comply with relevant waste legislation, including the Environmental Protection Act 1990 which places a duty on a person who imports, produces, carries, keeps, treats or disposes of controlled waste and to take measures to:

- Prevent unauthorised or harmful deposition, treatment or disposal of waste;
- Prevent the escape of the waste from his control or that of any person;
- On the transfer of waste ensure;
- That the transfer is only to the authorised person or to a person for authorised transport purposes
- That there is a written description of the waste that will enable other persons to avoid the contravention of the Environmental Protection Act 1990 and comply with the duty of care as respect to the escape of waste

Waste streams which are classified as having hazardous properties are referred to as Special Waste under Scottish legislation. The Special Waste Regulations 1 set out requirements for the disposal of, carrying and receiving special waste. Any movement of special waste is subject to these regulations and must be monitored by the producer, consignor, carrier and consignee.

Hywind Scotland's onshore O&M facility in Peterhead is operated by ASCO, and waste generated at this facility is managed by ASCO utilising their own established waste management processes and procedures. The extent of waste generated at the ASCO base only involves household type waste streams.

Waste generated offshore and on the CTV is collected directly from the CTV by the appointed waste carrier for Hywind Scotland Pilot Park. Equinor appointed Augean as its waste carrier for Hywind Scotland. Augean manages the waste streams on behalf of Equinor, retaining appropriate records for inspection, and provide monthly reporting data.

12. Mechanisms for responding to environmental incidents

Hywind Scotland has mechanisms in place for how to respond to environmental incidents including acute discharge of oils and chemicals to sea from wind turbines and vessels. Notification requirements, key emergency contacts and incident notification forms for reporting damage and spills to the environment are provided in the Equinor Great Yarmouth Incident Management Plan (IMP) which Equinor shares with all our contractors and applies to Hywind Scotland operations. The standard reporting expected within Oil and Gas regimes has been implemented, updating the typical PON 1 form to reflect the same data requirements but removing reference to Oil and Gas specific legislation.

Pre-determined general description of hazard/incidents have been identified for Hywind Scotland. These are documented within the IMP. The environmental hazards/incidents covers spills to sea e.g. transformer oil, diesel or other chemicals from WTGs, offshore substation or during vessel to vessel- and vessel to asset-refuelling. Potential initiation of spills and leakages includes:

- leakages from equipment inside WTGs
- leakages of oils/chemicals during transfer from CTV to WTGs
- hull damage from collision (vessel to vessel or vessel to WTG)

For any spills, all incidents are reported to the single focal point which is Equinor's Wind Control Centre in Great Yarmouth. The Control Room is responsible for gathering the relevant information and completing the incident report form. They notify the relevant authorities and stakeholders, notably the Marine Directorate and Crown Estate Scotland, along with the internal site management team. In the case of a spill to sea, the reporting requirements is any quantity that produces a visible sheen. Notification to the Marine Directorate (MD.MarineRenewables@gov.scot) is completed within 1 hour by Great Yarmouth Control Room, where possible.

The Incident Management Plan is further supported by our internal Equinor standard Incident Management Software system CIM. This system allows full access to Equinor at all levels and ensures that information is shared to the relevant parties and visible to those roles supporting. In addition, each respective role e.g. Control Room Engineers have a specific checklist which informs them who to notify and what to notify – this ensures that even in extreme situations we are consistently led by the system approach and all details are logged to ensure that there is transparency throughout Equinor.

Spills resulting from the vessels directly are reported to Great Yarmouth Control Room and notified in the same manner – whilst practically the effects are directly handled by the vessels themselves in direct liaison with Equinor. If the spill is significant, the vessels receive support from Equinor Great Yarmouth IMT who contribute with notification and mobilisation of required resources.

To support the organisation in dealing with an emergency situation, guidance is provided within the IMP to support the team in providing an appropriate and efficient response. Furthermore, an independent response plan has been prepared in the event of a Mooring Line Failure.

In the event of an emergency which includes Health, Safety and Environment Incidents, Equinor UK has the responsibility for Equinor's UK wind operations. There are three levels of emergency response provided within the Equinor structure:

Level 1 – Emergency Response Team (ERT) – Located at site – responsible for on scene management

Level 2 – Incident Management Team (IMT) – Located at the Great Yarmouth Control Room - responsible for supporting line 1, notifications and resource / support

Level 3 – Crisis Management Team (CMT) – Located in Norway - responsible for support to Incident Management Team and high-level stakeholder management

The level of emergency response is determined by the severity of the incident. The majority of incidents will fall within a Level 1 response and can be managed with a simplified incident management structure.

The levels of emergency response are defined within the IMP, including, but not limited to, the roles and responsibilities for each level. The purpose of this is to ensure that an appropriate and efficient response to any health, safety or environmental incident is achieved, along with the appropriate notifications.

13. Chemical usage

Equinor ensures that all chemicals used are on OCNS list, and that any chemicals which are not on the OCNS list are approved by the Marine Directorate, as per the Marine License conditions. This requirement is also stipulated in Hywind Scotland Operational Documentation which Equinor shares with all our contractors.