STEPS TAKEN TO ADDRESS NAVIGATIONAL SAFETY IN THE CONSENT REGIME FOR ESTABLISHMENT OF WIND FARMS OFF THE UK COAST[1]

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Introduction

1. The following procedures are recommended for all offshore wind farms planned, constructed and operated under United Kingdom authority. It is intended that they are followed within the consents process under section 34 of the Coast Protection (CPA) 1949 with section 36 of the Electricity Act (EA) 1989; and when maritime aspects of the Transport and Works Act (TWA) 1992 are being assessed. As regards the EA, maritime concerns are focussed upon the burying of cables taking power to the shore. The above routes also need a license under section 5 of the Food and Environment Protection Act (FEPA) 1985.

2. The MCA reserves the right to vary or modify these standards on the basis of experience and in accordance with internationally recognised standards in the interest of safety of life at sea and protection of the marine environment.

3. The development of wind farms off the UK coast necessitates establishing a clear consent regime to deal with effects that would be possibly detrimental to the safe navigation of vessels and shipping. The consent regime must take account of national standards and local factors that could influence the establishment of a wind farm. International aspects of the regime need also to be considered.

Actions required of wind farm developers

4. The consent regime shall require developers to take the following steps;

4.1 Undertake an up to date traffic survey of the area concerned. This must include not only all commercial traffic, but also fishing vessels and pleasure craft. The traffic survey should be properly representative of traffic in the area and is likely to be of at least four weeks duration, taking account of any seasonal variation in traffic patterns. Consultation with appropriate clubs, representative organisations for recreational craft and fishing federations will provide a more complete picture of seasonal variations.

4.2 Conduct a safety risk assessment of the relative siting, alignment and orientation of wind farm structures with vessel traffic flows in the particular area. The risk assessment should be used as the basis against which the following options can be assessed:

(i) no wind farm in the area;
(ii) a wind farm with conditions such as the establishment of an emergency management system including a shutdown procedure and a safety zone around the wind farm; or
(iii) a wind farm with no conditions.

4.3 Identify in the risk assessment should be tailored to the area concerned and should demonstrate the following items and factors:

(i) knock-on changes to traffic patterns arising through vessels' re-routeing to avoid the wind farm, including subsequent any new areas of convergence, bunching,

[1] Includes United Kingdom internal waters, territorial waters and in any future area for their development under UK jurisdiction established beyond territorial waters (a renewable energy zone).

choke points and the creation of new points where crossing traffic converges or directs marine traffic closer towards hazards, so endangering craft, their cargoes, crews and passengers;

(ii) increase in risk of collision between vessels and wind farm structures (including turbine blades) under all reasonably foreseeable weather and tide height conditions or between vessels under all conditions [2];

(iii) limitation on the use of such sites or adjacent waters for non-transit purposes. e.g. fishing, day cruising, racing, aggregate dredging, anchoring etc.;

(iv) co-operation with local and national search and rescue authorities, taking into consideration the types of vessels and equipment that would used and search patterns;

(v) national requirements and procedures employed for turbine shutdown and how rotor blade rotation and power transmission might best be controlled by emergency services (standards copied at Annex 1);

(vi) emergency use of the structures by persons seeking refuge and rescue balanced against reasonable levels of security;

(vii) foreseeable interference with shipboard systems particularly radio systems, such as caused by reflections or phase-changes with respect to aids to navigation, ship/shore radar and Automatic Identification Systems (AIS);

(viii) problems for rescue services, including obstructions to use of helicopters and lifeboats;

(ix) preserving access for servicing of adjacent aids to navigation;

(x) radar reflections, blind spots and shadow areas created by structures;

(xi) sonar interference caused by the structures and the generators;

(xii) electromagnetic fields created by the generators or cabling, affecting compasses and other navigational systems;

(xiii) visual blocking view of the coastline and other navigational features such as buoys and lights;

(xiv) tidal streams that could cause vessels to set into danger in the event of power or steering failures;

(xv) other adverse effects on the set and rate of tide;

(xvi) siltation, deposition of sediment or scouring created by the structures such as to affect the navigable depth of water; and

(xvii) wind masking, turbulence or sheer created around structures and impacting on vessels nearby.

4.4 Demonstrate through the risk assessment the increased risk to navigation from the proposed siting of the wind farm and the effectiveness of proposed protective measures designed to mitigate that additional risk. Examples of protection measures for ship's routeing purposes are given in Annex 2.

5. In considering the results of the developer's risk assessment the competent authority (the MCA) will assess whether the site for the wind farm represents an acceptable increase in navigational risk to enable granting of the consent, made conditional if necessary on the developer taking and maintaining specified protective measures.

[2] A minimum safe (air) clearance shall be maintained between sea level conditions at mean high water springs (MHWS) and the turbine blades that:

.1 is suitable for all vessel structures of vessels involved in current maritime traffic flows and operations; and additionally

.2 is no less than 18 metres.

The proposed wind farm could pose problems at high water that do not exist in low water conditions.

6. In assessing the need for protective measures and safety zones with reference to the traffic surveys, risk assessment (referred to above) and expert opinion, developers may include recommendations for the vessel safe operating distances from the structures. These may include the size and types of vessels and those activities that may continue to operate and exercise rights of navigation.

7. In navigable waters, if the appropriate protective measures include safety zones around structures and subsea cables the safety of navigation and any persons involved in working on the structures shall be the primary validation. Existing users' rights and activities may be interfered with only so far, as:

.1 is necessary for purpose of safety, with avoidance of the blanket use of 'Exclusion Zones'; and

.2 when Protection measures are consistent with the principles of Article 60 of the UN Convention on the Law of the Sea (UNCLOS) (copied at Annex 3).

8. An application for consent should also indicate the contractors' proposals on how to bring evidence of breach against any navigational advice or requirement established in association with protective measures, to the attention of MCA or other relevant body to take action as appropriate. The application should also outline the methods to be employed by the developer for promulgating necessary safety information to vessels that operate in the vicinity of the wind farm [3].

9. In the event of protective measures being required, the MCA will advise the developer whether international agreement for them is necessary. When so advised, the developer will be required to support and co-operate with the MCA at the International Maritime Organization (IMO) for the introduction of such measures. (Recognised standards for the establishment of safety zones and safety of navigation around offshore installations and structures are contained in IMO Resolution A.671(16))

10. Consent granted by the MCA shall indicate that the proposal meets suitable national and international standards for the navigational safety of wind farm developments, providing that any conditions specified in the consent are met.

11. Additional consideration of safety factors not included in this document will be required for projects that utilise offshore wave, tidal power or any future offshore structures necessary for renewable power generation.

12. National points of contact on navigation safety issues:

Navigation safety, pollution at sea and search and rescue concerns - MCA

Aids to navigation, in England and Wales - Trinity House
In Scotland – The Commission of Northern Lighthouses
In Northern Ireland – The Commissioners of Irish Lights

Safety on the offshore structures - The Health and Safety Executive
Charting and hydrographic information – The United Kingdom Hydrographic Office
Within the limits of the harbour authority – Local harbour authorities

[3] Developers will promulgate information (e.g. footprint diagrams) on any detrimental affects to propagation of ship and shore radio, aids to navigation, radar and Automatic Identification Systems (AIS).

Annex 1

STANDARDS AND PROCEDURES FOR WIND TURBINE GENERATOR SHUTDOWN IN THE EVENT OF A SEARCH & RESCUE, COUNTER POLLUTION OR SALVAGE INCIDENT IN OR AROUND A WIND FARM

Design Requirements

The wind farm will be designed and constructed to satisfy the following design requirements for emergency rotor shut-down in the event of either a search and rescue (SAR), counter pollution or salvage operation in or around a wind farm:

1. All wind turbine generators (WTGs) will be marked with clearly visible unique identification characters. The identification characters shall each be illuminated by a low-intensity light visible from the sea at a suitable distance away from the structure. The size of the identification characters in combination with the lighting shall be such that under normal conditions of visibility, as to be clearly readable by an observer stationed 3 metres above sea level under all known tidal conditions, equal to twice the range at which significant interference with VHF communications is predicted. It is recommended that lighting for this purpose be hooded or baffled so as to avoid unnecessary light pollution or confusion with navigation marks.
2. All WTGs will be equipped with control mechanisms that can be operated from the Central Control Room of the wind farm.
3. The WTG control mechanisms will allow the Control Room Operator to shut down any or all of the WTGs within 60 seconds of initiating the shutdown procedure. Shutdowns shall be limited to those WTGs in the immediate vicinity of an emergency and for as short a period as is safely practicable to do so.
4. The WTG control mechanisms will allow the Control Room Operator to fix and maintain the position of the WTG blades:

   .1 in the case of three-bladed turbines to within 5 degrees of either the 12/4/8 or 10/2/6 o'clock positions ("Emergency Shut-Down Positions"); or

   .2 in the case of two-bladed turbines, either in the 12/6 or 3/9 o'clock positions; and

   .3 as determined by the Maritime Rescue Co-ordination Centre or Maritime Rescue Sub Centre (MRCC/SC).
5. Nacelle hatches should be capable of being opened from the outside. This will allow rescuers (e.g. helicopter winch-man) to gain access to the tower if tower occupants are unable to assist and when sea-borne approach is not possible.
6. Access ladders for use in emergency shall be placed in the optimum position taking into account the prevailing wind, wave and tidal conditions. In many cases this it likely to be on the down-weather side of the WTG tower.

Operational Requirements

7. The Central Control Room will be manned 24 hours a day.
8. The Central Control Room operator will have a chart indicating the WTG identification numbers and the GPS positions of each of the WTGs in the wind farm.
9. All MRCC/SCs will be advised of the contact telephone number of the Central Control Room.

10. All MRCC/SCs will have a chart indicating the GPS position of each of the WTGs in all wind farms.

Operational Procedures

11. Upon receiving a distress call or other emergency alert from a vessel who is concerned about a possible collision with a WTG or is already close to or within the wind farm, the MRCC/SC will establish the position of the vessel and the identification numbers of any WTGs which are visible to the vessel. The position of the vessel and identification numbers of the WTGs will be passed immediately to the Central Control Room.
12. The control room operator will immediately initiate the shut-down procedure for those WTGs as requested by the MRCC/SC, and will maintain the WTG in the appropriate shut-down position again as requested by the MRCC/SC until receiving notification from the MRCC/SC that it is safe to restart the WTG.
13. The communication and shutdown procedures must be tested satisfactorily at least twice a year.

*Precise dimensions to be determined by the height of lights and necessary range of visibility of the identification numbers.

Annex 2

Examples of additional Marine Routeing Safety Measures to establish in association with wind farms during operation

Measures are to be consistent with international standards contained in SOLAS Chapter V, IMO Resolution A.572(14) and Resolution A.671(16).

A – Lower risk wind farms

All of the structures situated in areas with less than 3 metres of water below chart datum away from all shipping routes, channels, recognised fairways and significant levels of other maritime activity including recreational craft and fishing vessels.

Associated Routeing Measures:

Dissemination and promulgation of information through radio-warnings and notices to mariners, including details of the nature of activities that should not be carried out within a specified range of the structures and any adverse effects upon navigational systems.

B – Medium risk wind farms

All of the structures situated in areas with less than 7 metres of water below chart datum away from all shipping routes, channels, recognised fairways, but may be associated with other maritime activity including recreational craft and fishing vessels.

Associated Routeing Measures:

Dissemination and promulgation of information through radio-warnings and notices to mariners.

Safety zones up to 50 metres from the structures with monitoring by radar and a continuous watch by multi-channel VHF including DSC. Appropriate measures to notify and provide evidence of infringements of safety zones.

C – Higher risk wind farms

Structures situated in areas with more than 7 metres of water below chart datum close to or across shipping routes, channels and recognised fairways.

Associated Routeing Measures:

Dissemination and promulgation of information through radio-warnings and notices to mariners.

Safety zones up to 50 metres from the structures with monitoring by radar, AIS transponders at the extremities and a continuous watch by multi-channel VHF including DSC.

Use of a guardship or guardships to provide a visible indication of the limits of a safety zone, to alert other mariners when they may be running into danger and to share in the task of monitoring the safety of the wind farm.

Area to be avoided (ATBA) around the whole of the wind farm and up to 500 metres from the extremities preventing access to a range of craft (e.g. vessels of over 300 GT, of over 25 metres in registered length or carrying dangerous or polluting goods) and marine activities.

Continuous vessel monitoring/information service using radar/AIS and radar by appropriately training staff.

Closure of nearby shipping routes where there are suitable alternatives (subject to consultation)

Other routeing measures will be considered where warranted by traffic patterns. Appropriate procedures in place to notify and provide evidence of infringements ATBAs or safety zones.

Annex 3

Article 60 UNCLOS
Artificial islands, installations and structures in the exclusive economic zone

1. In the exclusive economic zone, the coastal State shall have the exclusive right to construct and to authorize and regulate the construction, operation and use of: (a) artificial islands; (b) installations and structures for the purposes provided for in article 56 and other economic purposes; (c) installations and structures which may interfere with the exercise of the rights of the coastal State in the zone.
2. The coastal State shall have exclusive jurisdiction over such artificial islands installations and structures, including jurisdiction with regard to customs fiscal health, safety and immigration laws and regulations.
3. Due notice must be given of the construction of such artificial islands, installations or structures, and permanent means for giving warning of their presence must be maintained. Any installations or structures which are abandoned or disused shall be removed to ensure safety of navigation, taking into account any generally accepted international standards established in this regard by the competent international organization.
Such removal shall also have due regard to fishing, the protection of the marine environment and the rights and duties of other States. Appropriate publicity shall be given to the depth, position and dimensions of any installations or structures not entirely removed.
4. The coastal State may, where necessary, establish reasonable safety zones around such artificial islands, installations and structures in which it may take appropriate measures to ensure the safety both of navigation and of the artificial islands, installations and structures.
5. The breadth of the safety zones shall be determined by the coastal State, taking into account applicable international standards. Such zones shall be designed to ensure that they are reasonably related to the nature and function of the artificial islands, installations or structures, and shall not exceed a distance of 500 metres around them, measured from each point of their outer edge, except as authorized by generally accepted international standards or as recommended by the competent international organization. Due notice shall be given of the extent of safety zones.
6. All ships must respect these safety zones and shall comply with generally accepted international standards regarding navigation in the vicinity of artificial islands, installations, structures and safety zones.
7. Artificial islands, installations and structures and the safety zones around them may not be established where interference may be caused to the use of recognized sea lanes essential to international navigation.
8. Artificial islands, installations and structures do not possess the status of islands. They have no territorial sea of their own, and their presence does not affect the delimitation of the territorial sea, the exclusive economic zone or the continental shelf.