Project Environmental Management Plan
Version 2.2
May 2008

Rhyl Flats Wind Farm

Project:	Rhyl Flats Offshore Wind Farm
Date:	May 2008
Document Reference:	RF/PEMP/Version 2.2
Owner:	RFWF Offshore Ltd
Sponsor:	Npower Renewables Limited
	Trigonos
	Windmill Hill Business Park
	Whitehill Way
	Swindon
	Wiltshire
	SN5 6PB Tel: 01793 877 777
Contacts:	Jamie May, Environmental Manager Tel: 01793 896120 Mobile: 07825 995446
Statement prepared by:	Gill Moore, Environmental Manager

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1. Rhyl Flats Offshore Wind Farm Ltd

Project Environmental Management Plan

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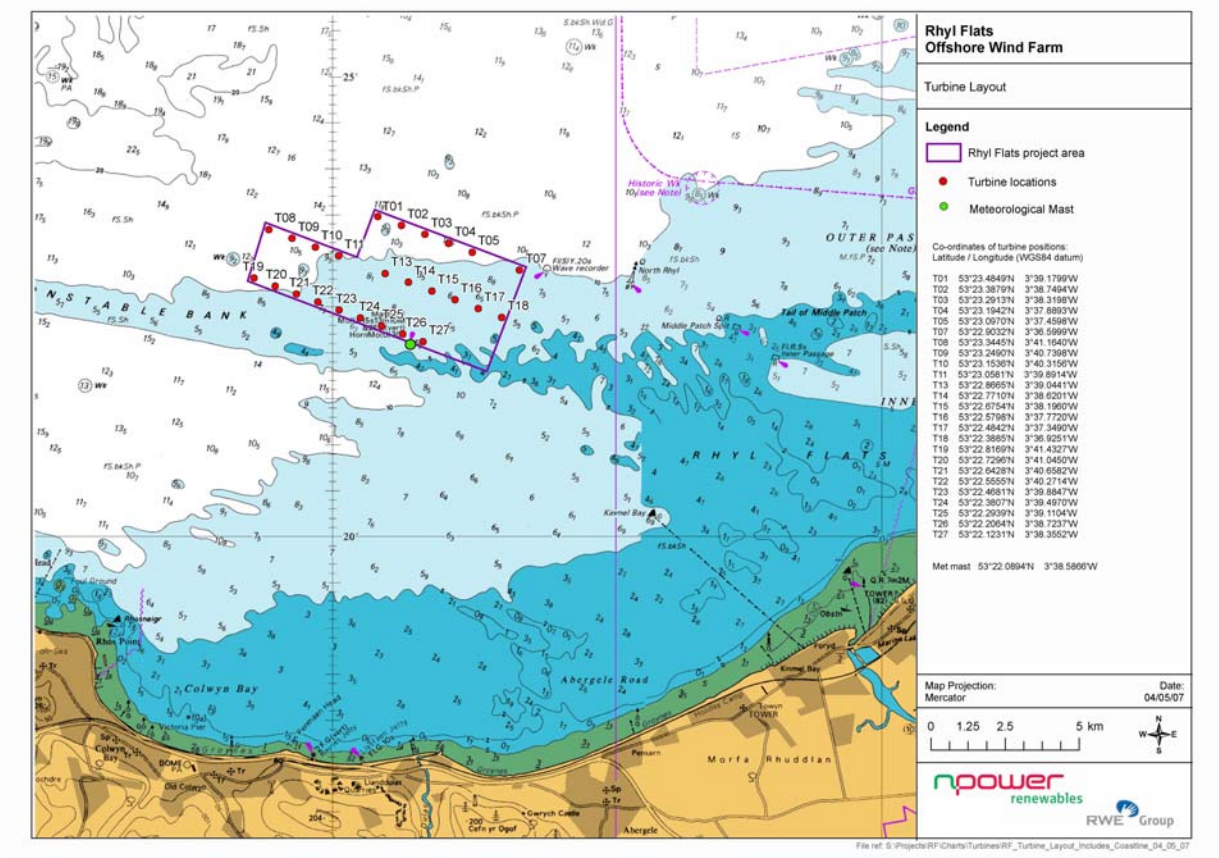
1. Introduction

1.1. Project Overview

Rhyl Flats Wind Farm Ltd (RFOWFL) is progressing the construction of an off shore wind farm and associated infrastructure at Rhyl Flats. The main development area lies approximately 8km north of Abergele and 10 km north-west of Rhyl, on the North Wales coast. The wind farm will consist of 25 turbines, with an approximate generating capacity of 90 MW. It is linked to the coast by cable routes that continue in-shore, connecting to the electricity distribution network inland of Abergele.



1.2. Project Organisation

Construction on site will take place in 3 phases under a multi contract arrangement as follows: -

Phase 1 – completed Summer 2007
Turbine Foundation (Scour Protection) Contractor - MT Højgaard A/S (MTH)

Phase 2 - commencing Spring 2008
Foundation Installation, Contractor - MT Højgaard A/S (MTH)

Cable Installation, Contractor – Oceanteam Power and Umbilical (OPU)

Wind Turbine Erection, Contractor – Siemens AG

Phase 3 – Summer 2008
Commissioning and Operations

1.3. RFWF Contact Details

Project Role	Name	Contact Telephone Numbers
Project Manager	Gareth Penhale	01793 825102 07795 353804
Construction Manager (Foundations)	Julian Garnsey	01793 893190 07735 353603
Construction Manager (Cable Installation)	Alan Hannah	07989 493655
Construction Manager (Wind Turbine Erection)	Peter Geddes	01793 893273 07989 493608
Environmental Manager	Jamie May	01793 896120 07825 995446
Fisheries Liaison Officer	Jim Andrews	0845 8802540 07908 225865
Vessel Co-ordinator	Lee Cornwall	07825 558303
Project Off shore Archaeologist	Steve Webster	01722 326867 07767 495773
Offshore Client Representative (Foundations)	Richard Parkinson	01745 561426 07966 570364
Offshore Client Representative (Cable Installation)	Contacts to be circulated on vessels	Contacts to be circulated on vessels

2. Environmental Policy

The RFOWFL has developed an Environmental Policy Statement to complement the Corporate Policies of RWE npower, but which is specific to the development of the Rhyl Flats Wind Farm.

RFOWFL aims to be at the forefront of the development of renewable energy generation in the UK, and the reduction of harmful emissions to the environment.

We aim to continually improve our environmental performance by: -

- Integrating the principals of sustainable development into management decisions,
- Employing best management practices and appropriate methods of pollution prevention to minimise any adverse effects to the environment
- Ensure that all relevant legislation and consent conditions are complied with,
- Ensuring that all staff are adequately trained for the tasks they undertake, and understand the potential environmental effects of their actions,
- Continually monitoring and reviewing our environmental performance and continually improve our environmental performance,

3. Project Environmental Management Plan

3.1. Purpose

The purpose of the PEMP is to ensure that the construction of the offshore elements of the Rhyl Flats Offshore Wind Farm meets the requirements established by legislation, legal consents and environmental commitments, and that it follows environmental best practice.

The document has two functions:

- to provide guidance to contractors on how to prevent and/or mitigate environmental impacts occurring; and
- to provide a means to monitor, measure and improve project environmental performance.

The PEMP will fulfil these functions by: -

- Identifying the specific environmental compliance requirements pertaining to the Rhyl Flats Offshore Wind Farm development under relevant permits, licenses and legislation;
- Identifying the interactions between the Rhyl Flats Offshore Wind Farm development, the environment, and other sea users and identifying appropriate control measures;
- Describing the structure and responsibility for responding to marine oil spills, through the inclusion of the MPCP;
- Raising awareness of control measures with relevant personnel;
- Assigning responsibilities for the implementation of these control measures to key personnel;
- Providing a means of recording adherence to these measures, thereby ensuring that the project's environmental interactions are appropriately managed; and
- Providing a mechanism for other detailed management plans to cover specific marine contingencies.

3.2. Scope

This PEMP addresses the actual and potential environmental impacts arising from the construction and commissioning of the Rhyl Flats Offshore Wind Farm.

The scope of the PEMP includes all off-shore work, i.e. all activities which take place below the mean high water mark; also included are the cable laying operations which take place on the shingle bank between the mean high water mark and the cable transition joint pits.

Revised versions of the PEMP, and the associated documents, will be issued as the construction programme progresses. It is anticipated that revised versions will be submitted at the following times: -

- *Version 1.1 (Issued July 2007)* *Turbine Foundation (Scour Protection)*
- Version 2.1 (April 2008) Turbine Foundation Installation,
  Version 2.2 (May 2008) Cable Installation,
  Version 2.3 (June 2008) Wind Turbine Erection
- Version 3 (August 2008) Commissioning and Operations

Each version of the PEMP will be reviewed on a three monthly basis and updates made as required by the progress of the project, legal requirements, construction techniques or equipment, management structures or perceived best practice. The RFOWFL Environment Manager will make this review and circulate any changes accordingly.

Operation and decommissioning of the Rhyl Flats Offshore Wind Farm is excluded from the scope of this document.

3.3. Structure

This document has been developed by RFOWFL following identification of potential environmental impacts relating to the Rhyl Flats Wind Farm, particularly those identified during the Environment Impact Assessment process. Specific controls have been identified from the consent requirements and environmental best practice.

RFOWFL has produced an umbrella PEMP which describes the common elements of environmental management to ensure consistency of approach and performance throughout the construction, and commissioning of the Rhyl Flats Wind Farm.

Each Contractor engaged by RFOWFL will be required to submit an EMP specific to their area of work. These will be submitted to allow adequate time for review and approval by RFOWFL, and the Marine Fisheries Association (MFA), prior to the Contractor commencing work.

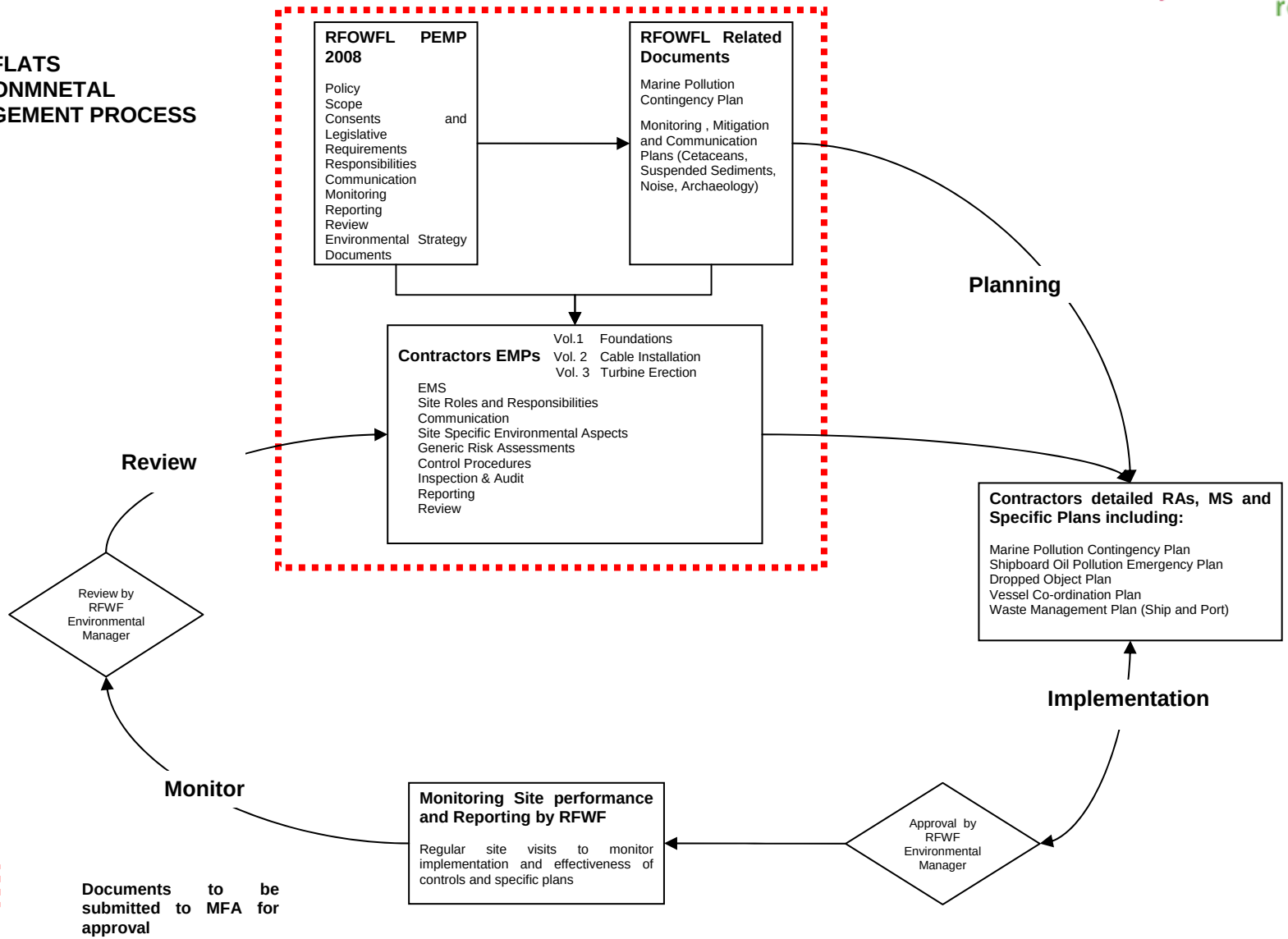
3.3.1. Related Documents

The PEMP is to be used in conjunction with other documentation which contain environmental and health and safety management controls and supporting information. These documents include, but are not limited to the following: -

- RFOWFL Master Consents Schedule
- RFOWFL Monitoring Statement
- RFOWFL Baseline Monitoring Reports
- RFOWFL Marine Mammal Protection Plan
- RFOWFL Marine Mammal Mitigation Work Instruction
- RFOWFL Marine Pollution Contingency Plan
- RFOWFL Method of Measurement of Piling Noise
- RFOWFL Noise Monitoring Plan
- RFOWFL Archaeological Written Scheme of Investigation
- RFOWFL Archaeological Communication Plan
- RFOWFL Scour Protection Plan
- RFOWFL Cable Burial Plan
- RFOWFL Vessel Co-Ordination Plan
- RFOWFL Construction Health and Safety Plan

Figure 1 shows the relationship between the RFOWFL PEMP, Contractors EMPs, and other related documents. It also outlines the environmental management process including RFOWFL role in the approval of Contractor's documentation, and the monitoring, reporting and review of the implementation and effectiveness of controls and specific plans.

RHYL FLATS ENVIRONMNETAL MANAGEMENT PROCESS



3.4. Environmental Impacts

The main environmental impacts, associated with the construction and commissioning of the Rhyl Flats Offshore Wind Farm have been identified in the Environmental Statement, the Monitoring and Mitigation Plans and through an on-going process of environmental impact assessment which will continue throughout the project.

This PEMP describes the compliance and monitoring requirements to be taken by RFOWFL during the construction phase to ensure that pollution prevention measures, incident reporting and environmental best practice measures are undertaken by the Contractor to manage the environmental impacts effectively.

All Contractors are required to identify the impacts associated with their area of operations. Site specific environmental aspects will be included within their EMPs, which will also describe the Contractors approach to managing the environmental aspects.

Detailed Risk Assessments, Method Statements and Specific Plans will be produced by the Contractors in relation to all aspects of the work which are critical to the environment. These documents must be approved by RFOWFL prior to use.

3.5. Consents and Legislative Requirements

A range of consent and licence conditions have been specified, which the RFWF development must adhere to. All consent requirements relating to environmental factors have been addressed in the relevant Environmental Management Strategy Documents (EMSD), Section 5 below.

All Contractors are required to ensure compliance with the consent conditions relating to their work scope, and with the mitigation measures which have been agreed between RFOWFL and the regulator to discharge consent conditions.

The following table relates the main environmental consent requirements, with the appropriate EMSD.

Legislation	Consent Condition Reference	Environmental Issue	EMSD
Electricity Act 1989	4& 5	Noise	EMSD 1
	8	Archaeology	EMSD 2
Food and Environmental Protection Act 1985	9.6	Noise and Vibration	EMSD 1
	9.1, 9.9-9.11, 9.28	Ecology	EMSD 3
	9.8, 9.12-9.15	Other sea users	EMSD 4
	9.17, 9.19	Seabed impacts	EMSD 5
	9.21-9.25, 9.27,	Effluent discharges	EMSD 6
	3, 5.1-5.3	General objectives	EMSD 7
Coast Protection Act 1949	1,2, 5	Other sea users	EMSD 4
	6	Sea bed impacts	EMSD 5
	4	General objectives	EMSD 7

It should be noted that, in accordance with clause 9.34 of the FEPA licence and 8(10) and 8(11) of the FEPA Act 1985 respectively, failure to adhere to the provisions within the FEPA Licence may lead to variation, revocation or suspension of the Licence.

The EMSDS, contained in Section 5, identify the principal pieces of environmental legislation applicable to the key environmental aspects. Contractors are also required to identify, within their EMPs, the environmental legislation associated with their work.

3.6. Key Environmental Considerations

Consideration of the environmental impacts and the consent and other legal requirements has identified the following to be the key issues of environmental concern: -

- Potential impacts upon seabirds, marine mammals and other marine species from effluent discharges, including oil, which could be released to the marine environment during an emergency event.
- Impacts upon seabirds, marine mammals and other marine species as a result of disturbance to the seabed and as a result of noise and vibration generated during the construction phase.
- Sea bed impacts causing damage to marine archaeology.
- Disturbance of onshore residents as a result of noise generated during the construction phase.
- Impacts upon other sea users from dropped objects left in-situ.
- Generation of waste

The RFOWFL Environmental Monitoring Statement (2007) sets out the environmental monitoring programme from pre-construction through to post construction. Its purpose is largely to carry out monitoring to establish if any changes to the environment have taken place resulting from construction and operation of the RFWF. The implementation of the monitoring programme is the sole responsibility of the client and requirements for monitoring are not considered further in this document. RFOWFL, however, expects full co-operation from contractors and subcontractors in order to fulfil monitoring commitments in or around the wind farm construction area, or where direct interaction with a vessel crew is required (e.g. marine mammal monitoring).

The RFOWFL Environmental Manager will co-ordinate the monitoring requirements specified within the FEPA Licence, and agreed with the regulatory body.

3.7. Responsibilities

The following section describes the responsibilities of key RFOWFL personnel, for contact details see Section 1.3 above.

RFOWFL Project Manager (Offshore), RFOWFL Construction Managers

- Comply with the requirements of the PEMP;
- Communicate the RFOWFL environmental policy and actively promote environmental awareness and good practice;
- Ensure that the necessary resources are available to fully implement and maintain the PEMP.

RFOWFL Environmental Manager

- Comply with the requirements of the PEMP;
- Monitor compliance with the PEMP and ensure it effectively addresses the environmental impacts, consent conditions, and other legal requirements;
- Communicate the RFOWFL environmental policy and actively promote environmental awareness and good practice;
- Provide advice and guidance on environmental matters;
- Facilitate monitoring contracts and provide a central point of contact for environmental monitoring programmes;
- Provide a point of contact with regulatory authorities on environmental matters.

RFOWFL Offshore Site Engineer

- Comply with the requirements of the PEMP;
- Communicate the RFOWFL environmental policy and actively promote environmental awareness and good practice;
- Communicate site environmental information and requirements to personnel as appropriate, including inducting site personnel in the environmental policy and procedures and any specific construction restrictions imposed via consent conditions;
- Monitor compliance with the PEMP and ensure it effectively addresses the environmental impacts, consent conditions, and other legal requirements;
- Monitor and review the performance of all site personnel, including contractors, and sub contractors;
- Notify the Environmental Manager of all environmental incidents.

RFWF Fisheries Liaison Officer

- Monitor compliance with the PEMP and ensure it effectively addresses the impacts on other sea-users.
- Liaise with local fisherman, conservation groups and other sea users concerning any amendments to method statements and site environmental procedures, and other relevant environmental matters.

RFWF Vessel Co-ordinator

- Develop and implement a Vessel Co-ordination Plan to manage the risk of vessel collision with structures associated with RFWF and with other vessels and equipment involved in its construction.
- Co-ordinate marine operations on site to minimise potential for collision and ensure observation of exclusion zones.
- Act as a point of contact for work vessels and other sea users, and manage communication for general navigational safety.
- Implement contingency plans for responding to collisions or other emergency situations.

The EMSDs identify the organisation responsible for ensuring specific control measures are implemented and are effective; where appropriate the individual responsible is also identified.

Each Contractor will identify, as a minimum within their PEMP, a named individual who will have responsibility for environmental matters.

3.9 Communication and Routine Reporting

Due to the number of organisations engaged in the construction phase of the RFWF it is important that routes of formal communication and reporting are in place to ensure that information is shared effectively. The project organisation is described in Section 1.2.

Statistics of incidents, near-misses and observations will be reported to RFOWFL Environmental Manager on a regular basis. The essence of all reporting is that it is timely, factual, complete and transparent.

All contractors and RFOWFL personnel will alert the RFOWFL Site Engineer or Environmental Manager of any environmental incident as soon as practicable in accordance with Section 3.11.

The Project Management team will require reporting of important issues on a daily basis. Daily reports will include a summary of work completed, work scheduled for the forthcoming week and a summary of any incidents which have occurred. These will be submitted to the RFOWFL Site Engineer who will

prepare a weekly report and forward to the RFOWFL Environmental Manager. The Environmental Manager will in turn submit a weekly report to the MFA.

Each Contractor will submit a detailed Monthly Progress report to the RFOWFL Site Engineer. This will include the following standard environmental metrics: -

- Reportable incidents
- Near Misses
- Spills
- Dropped Objects
- RFOWFL Licence Non-conformance
- Notes of any contact with the Coast Guard
- Notification of any observation of dead or dying marine animal
- Observations

Environmental issues will be a standing item on the agenda of the monthly progress meetings, and other forum including sub-contractor and internal meetings. Minutes will be taken.

The RFOWFL Environmental Manager will submit summary reports regarding environmental and consent issues to the RFOWFL Project Manager. He will also provide a point of contact for communication with the MFA regarding consent issues, licence variations and environmental incidents.

3.10 Training

Each organisation has a responsibility to ensure that relevant environmental information is disseminated to the personnel under their control, including any direct employees or sub-contractors they have engaged. They will achieve this through induction training and site briefings/tool box talks.

All personnel must receive an induction which details as a minimum the environmental measures relevant to the scope of their operations, and the importance of compliance with the consent conditions, legal requirements and good environmental practice.

Records of inductions and briefings/tool box talks will be maintained, including a record of the content and date given. Attendees must complete a sign-off sheet to indicate they have received and understood the induction or briefing. All records will be passed to the RFOWFL Site Engineer.

Subjects to be included in site briefings will include: -

- Dealing with oil and chemical spills
- Waste management, recycling and minimisation
- On-board storage and handling of equipment
- Storage and handling of fuels and chemicals including bunkering
- Equipment maintenance
- Noise Management
- Archaeological material
- Marine mammal control procedures

3.11 Incident Reporting

In the event of an environmental incident, the RFOWFL Site Engineer or Environmental Manager shall be informed in the first instance immediately following an incident. They shall then communicate directly with the Licensing Authority as necessary. The RFOWFL Project Manager will be informed as soon as practicable of the extent of the incident, measures taken to control/mitigate, and the action taken to eliminate future incidents.

For the avoidance of doubt, the contractor or his employees, should not delay reporting a major spill to the Coastguard directly.

The RFWF Marine Pollution Contingency Plan describes the procedures for responding to an incident, including measures to prevent, mitigate, investigate and report incidents and near miss events.

4. Monitoring and Review of Environmental Performance

4.1 Environmental Targets

Reporting is the key to identifying problems and improving standards, and all Contractors are required to commit to reporting of all incidents and near miss occurrences. Targets are set as management objectives but in general, publication of these will be limited to avoid a “non-reporting” culture developing.

The following set of project specific environmental performance targets has been developed with consideration of similar offshore wind farm developments in the UK. The targets provide a realistic benchmark for RFWF project.

The project specific targets are:

- No reportable environmental incidents
- No objects left on seabed
- No consent violations
- Consent compliance 100% on schedule
- Reporting of all minor spills
- Toolbox talks: 100% completion of plan
- Inspection and audit plan: 100% completion of plan
- Satisfactory close out of Non Conformance Reports
- Environmental induction of all project personnel
- Regular inspections and audits, frequency and scope determined on a risk assessed basis

4.2 Environmental Inspections and Audits

Inspections will be undertaken at intervals to be determined by RFOWFL. An Environmental Inspection Plan will be kept in the project file at RFOWFL offices and within an electronic data room. The frequency of inspections will reflect the level of risk associated with areas of work. As a guide, it is anticipated that an inspection will take place at a minimum every month for each work area/vessel.

RFOWFL environmental representatives will plan and conduct environmental inspections and audits of all areas, and submit inspections, reports to the RFOWFL Project Management.

The basis of such inspections and audits will be the Environmental Management Plan (and associated plans), statutory consents, RFOWFL environmental monitoring plans and relevant legislation. Contractors shall fully co-operate with this activity and provide any information that may be requested. Where appropriate joint audits and inspections will be completed by RFOWFL and their Contractors.

All inspections, including those undertaken by Contractor personnel shall be recorded and reported to the RFOWFL Environmental Manager. The format of such inspections will be tailored to suit the work in hand.

The results of such inspection/audits shall be recorded. Any resulting instructions are to be passed in writing to the relevant Contractor and are to be complied with by the action date stated.

A file of all such reports shall be maintained and made available by RFOWFL. A summary of inspection and audit findings will form part of the Management Review process.

4.3 Non-Conformance, Corrective and Preventive Action

Thorough monitoring of environmental performance will identify if any non-conformances have occurred. Non-conformances will be documented by the RFOWFL Environment Manager and reported to the Project Directors, subcontractor Project Managers or Vessel Master as appropriate, in a Non-Conformance Report (NCR).

Personnel appointed by the RFOWFL Project Manager and Contractor Project Manager will investigate the non-conformance and ensure all mitigation measures are implemented, and preventative action is taken. A deadline for closure of the non-conformance will be determined according to the urgency and severity of the non-conformance.

Any changes in documentation that arise following the investigation of non-conformances, shall be undertaken by the RFOWFL Environmental Manager, or his delegate, and distributed accordingly. Toolbox talks will be arranged as appropriate to disseminate the information throughout the project organisations.

4.4 Liaison with External Authorities

The RFOWFL Project Manager and the RFOWFL Environmental Manager must be advised as soon as possible of all visits from the Maritime Coastguard Agency (MCA), or Marine Fisheries Agency (MFA - formerly DEFRA). A RFOWFL project representative reserves the right to be present on site during such visits. Co-operation must be given to the inspectors at all times and any instructions complied with.

The Coast Guard authority contact for this project is:

Holyhead Maritime Rescue Co-ordination Centre
Western Region HM Coastguard
Prince of Wales Road
Holyhead
Anglesey
LL65 1ET

Contact:

Rescue Co-ordination Centre Manager	-	Jim Paton, Tel: 01407 767951 Jim_paton@mcga.gov.uk
Emergency and out of hours contact	-	Duty Watch Manager, Tel: 01407 765624

All correspondence received from external Authorities must be copied to the RFOWFL Project Manager and the RFOWFL Environmental Manager who must review any proposed reply.

4.5 PEMP Review

This PEMP provides the framework for project-level environmental management, it is therefore essential that it is reviewed and amended to reflect changes in legislation, consent requirements, construction techniques and equipment, management structures, and perceived best practice.

The PEMP will be updated by the RFOWFL Environmental Manager. The changes will be communicated to all organisations engaged on the Project through the monthly progress meeting, or by other means if the change is urgent.

5. Environmental Management Strategy Documents

The following sections provide information on the main environmental aspects associated with the construction and commissioning of the RFWF. Each EMSD provides an overview of the key issues, the relevant environmental legislation, the potential environmental interactions, and control measures to be adopted. Where appropriate the responsible organisation has been identified, and where possible the responsible personnel have also been nominated.

5.1. EMDS 1 – Noise and Vibration

Overview

This EMSD covers all issues relating to noise and vibration resulting during the construction and commissioning stages of the RFWF.

Potential Impacts

The construction of the RFWF has the potential to cause noise and vibration, potentially affecting marine species (from subsea noise transmission), and local residents (from transmission of airborne noise).

Offshore Noise and Vibration

The effects of the construction and operation of the RFWF were fully assessed in the Environmental Statement. Noise and vibration will occur during the construction phase, particularly during piling and drilling operations and from construction vessel traffic.

RFOWFL Noise Measurement Methodology describes the technical criteria for measuring onshore noise arising from piling activity. RFOWFL Noise Plan describes how noise monitoring will be implemented during the project.

Compliance Requirements

- Control of Pollution Act 1974
- Town and County Planning Act 1990
- Noise and Statutory Nuisance Act 1993
- BS 5228 Parts 1 and 2, 1997, and Part 4, 1992. Noise and Vibration Control on Construction and Open Sites.
- Habitats Directive (92/43/EEC)
- Offshore Marine Conservation (Natural Habitats &c.) 2007
- Wildlife and Countryside Act 1981
- Marine Bill

Project Objectives

- To minimise the impacts of airborne and subsea noise and vibration as far as reasonably practical.
- To monitor noise and vibration levels to ensure compliance with the Consent conditions.

Control Measures

Consent Condition Ref.	Consent Requirement/Best Practice Technique	Responsibility	Mitigation Measure/ Frequency/Timing of Actions
Electricity Act 1989: Condition 4	All activities associated with the construction of the development should meet British Standard 5228, Parts 1 and 2:1997 and Part 4: 1992; Noise and Vibration Control on Construction and Open Sites	All organisations engaged in off shore construction phase	Contractors to assess activities prior to work commencing and comply with British Standard 5228, Parts 1 and 2:1997 and Part 4: 1992. Monitoring in accordance with RFOWFL Noise Monitoring

			Plan during construction phase.
Electricity Act 1989: Condition 5	The noise generated during the construction of the Development, when measured at Rhos-on-sea (OS Grid Reference 284250, 379900) or Llanddulas (OS Grid Reference 290625, 378600) or Kinmel Bay (OS Grid Reference 297600, 379800) shall not in neutral weather conditions exceed the following levels in any day during the following periods: 0700-2200 Leq = 45 dB(A) 2200-0700 Leq = 40 dB(A) except in an emergency or with the prior written approval of the Secretary of State in consultation with the Conwy County Borough Council.	RFOWFL are responsible for monitoring of noise during construction. Contractors must co-operate with RFOWFL	RFWOWL will implement noise monitoring in accordance with the RFWOWL Noise Measurement Methodology. Contractors will co-operate with the requirements of the RFOWFL Noise Monitoring Plan.
Electricity Act 1989: Condition 6	In any instance where a limitation referred to in condition 5 above is exceeded because of an emergency, the company shall as soon as possible, and at least within two working days, provide the Secretary of State with a written statement detailing the nature of the emergency and the reasons why the limitation could not be observed.	RFOWFL Environmental Manager will submit report as required by this condition	As RFOWFL Noise Monitoring Plan
FEPA 1985: Condition 9.10 (Revision submitted 20/12/07)	During construction the Licence Holder must ensure that disturbance to the cetaceans is minimised, including temporary suspension of the commencement of individual piling operations if cetaceans are detected in the area.	As RFOWFL Cetacean Mitigation and Monitoring Plan.	RFOWFL will appoint competent Marine Mammal Consultants to provide visual and acoustic monitoring as described in the RFOWFL Mitigation and Monitoring Plan for Cetaceans. Foundation Vessel Master will co-operate with the MM Consultant and comply with the requirements of the Marine Mammal Mitigation Work Instruction.

5.2. EMDS 2 – Marine Archaeology

Overview

This EMSD covers all issues relating to the protection of archaeological remains during the construction and commissioning of the RFWF.

Potential Impacts

The construction of the RFWF has the potential to disturb and damage wrecks and archaeological remains within the area.

Marine Archaeology

The potential effects of the construction of RFWF on known and unknown archaeology have been assessed in the Environmental Statement.

The RFOWFL Archaeological WSI describes the methods for protecting known archaeological and shipwreck remains, and for recording, and if necessary, protecting any archaeological and shipwreck remains discovered during construction. RFOWFL Archaeological Communication Plan summarises how the requirements of the WSI will be implemented on the project.

Compliance Requirements

- Protection of Wrecks Act 1973
- Merchant Shipping Act 1995
- Protection of Military Remains Act 1986
- Joint Nautical Archaeology Policy Committee Code of Practice for Seabed Developers

Project Objectives

- To protect known archaeological remains.
- To record, and protect any features of archaeological importance discovered during the course of construction.

Control Measures

Consent Condition Ref.	Consent Requirement/Best Practice Technique	Responsibility	Mitigation Measure/ Frequency/Timing of Actions
Electricity Act 1989: Condition 8	The commencement of the Development shall not take place until there has been submitted to and approved in writing by the Secretary of State detailed schemes for each of the following: a. The protection of known archaeological and shipwreck remains as identified in the submitted Environmental Statement; and b. The recording and, if necessary, protection of any archaeological and shipwreck remains discovered during the construction of the generation station.	RFOWFL	RFOWFL have agreed a Marine Archaeological WSI with CADW and CPAT as required by this condition. All contractors will comply with the mitigation and reporting requirements of the WSI, and with the requirements of the RFOWFL Archaeological Communication Plan.

RFWF Marine Archaeological Plan	Compliance with requirements of RFOWFL Marine Archaeological Plan.	All organisations engaged in off shore construction	The co-ordinates of the archaeological exclusion zones have been passed to all vessels and will be input into the vessels navigational systems. All vessel movements will be monitored by the Vessel Co-ordinator by GPS. The Vessel Co-ordinator will be able to contact the vessels at all times. No vessel will moor, nor construction activity take place, within an archaeological exclusion zone.
RFWF Marine Archaeological Plan	Compliance with requirements of RFWF Marine Archaeological Plan.	Cable laying Contractor	Should further geotechnical surveys become necessary RFOWFL will consult with CADW and CPAT to determine whether archaeological recording is required.
RFWF Marine Archaeological Plan	Compliance with requirements of RFWF Marine Archaeological Plan.	Cable laying Contractor	Pre-grapnel runs will be completed by the cable laying Contractor. These will be reviewed by an appropriately qualified archaeologist appointed by RFOWFL, further mitigation will be developed as necessary, including in the first instance re-routing to avoid areas of archaeological potential. The results will be reported to CADW and CPAT.
RFWF Marine Archaeological Plan	Compliance with requirements of RFWF Marine Archaeological Plan.	Cable laying Contractor	Archaeological finds will be reported in accordance with the RFWF Marine Archaeological Plan Appendix VI, and the Archaeological Communication Plan.

5.3. EMDS 3 – Ecology

Overview

This EMSD covers all issues relating to the impact upon marine and avian ecology during the construction and commissioning of the RFWF.

Potential Impacts

The construction and commissioning of the RFWF has the potential to affect marine and avian species, through temporary disturbance during construction, and by the removal and destruction of habitat. The movement and deployment of vessels during construction (e.g. jack up barge activities, anchor spreads etc) will affect both the seabed benthos and marine and avian species through disturbance. There is also a risk to birds of collision with turbine structures, particularly during commissioning. Pollution incidents could have a direct effect on marine ecology in the immediate and wider area.

Compliance Requirements

- Food and Environment Protection Act (FEPA) 1985
- Offshore Marine Conservation (Natural Habitats &c.) 2007
- Conservation of Seals Act 1970
- Habitats Directive (92/43/EEC)
- Wildlife and Countryside Act 1981
- Merchant Shipping (Prevention of Oil Pollution) Regulations 1996
- Merchant Shipping (Oil Pollution Preparedness and Response Convention) Regulations 1998
- Merchant Shipping (Reporting of Pollution Incidents) Regulations 1987
- Merchant Shipping (Dangerous or Noxious Liquid Substances in Bulk) Regulations 1966
- The Offshore Chemical Regulations 2002
- The Prevention of Oil Pollution Act 1971

Project Objectives

- To minimise disturbance to marine and avian species during construction.
- To minimise net loss of habitat as a result of construction impacts.
- Avoiding pollution incidents.

Control Measures

(Note: see also control measures under EMSD 6 Effluent Discharges)

Consent Condition Ref.	Consent Requirement/Best Practice Technique	Responsibility	Mitigation Measure/ Frequency/Timing of Actions

FEPA 1985: Condition 9.1 (Revision submitted 20/12/07)	To minimise impacts on fisheries, spawning fish and over-wintering Common Scoter, construction works must not be undertaken between 16 December and March (inclusive). The majority of construction works must take place between April to September (inclusive) the only exceptions to this being works associated with testing and commissioning, the installation of turbines and the meteorological mast in the northern row , turbines 8-13 in the middle row and turbines 19 & 20 in the southern row and the installation of cabling between the turbines and the meteorological mast in the northern and middle rows, which may be undertaken, if necessary, between October and 15 December (inclusive). To minimise the impacts on fish spawning, pile driving can only be undertaken as follows: (i) - Piling on the southern row from 1st April -Piling on the central row from 1st May -Piling on the northern row from 15th May - Piling must be completed within 1 calendar year (from the first day of construction) - Pile driving does not overlap with any other Offshore Wind Farm developments in Liverpool Bay - Only one pile driving vessel must be in operation at any point in time (ii) The Licence Holder must provide the Licensing Authority with a written weekly update of progress throughout pile driving activities (for all 30 monopiles). This update must include the location and number of the piles installed per row, a rough duration of pile driving activity per pile, any problems encountered, the reasons for any request for consent to	RFOWFL Project Manger	Construction activity will be co-ordinated to comply with the restrictions imposed by this condition. If the programme requires that wind turbines are installed within the period between October and 15 December (inclusive) RFOWFL will submit for approval a vessel routing plan which will avoid the main Common Scoter areas. RFOWFL will consult with CEFAS and CCW and obtain prior written approval from the Licensing Authority should any other work be required during the period between October and 15 December (inclusive).

	amend the installation schedule, and Marine Mammal Monitoring Team effort (times of observation and times of duration of observations) and sightings data. The licence holder will submit for approval a vessel routing plan, to apply to the turbine installation vessels carrying out the permitted work during the period between October and December 15th. The route will avoid the main Common Scoter areas and is to be approved before the turbine erection works are undertaken in the period commencing October 1st. Should it be critical that works, other than that specified above, are necessary between October and 15 December (inclusive), written approval should be sought, in advance, from the Licensing Authority (following consultation with CEFAS and CCW) which will consider the request on a case by case basis.		
FEPA 1985: Condition 9.9	Ornithological Monitoring: Ornithological monitoring must be carried out as outlined in Annex 2 attached to this Schedule. The full specification for the monitoring programme will be subject to separate written agreement with the Licensing Authority following consultation with CEFAS and the Countryside Council for Wales prior to the proposed commencement of the monitoring work. Post-construction monitoring must be undertaken annually for three years. The level of any subsequent ornithological monitoring, during the lifetime of the wind farm's operation, will be determined, in consultation with the Countryside Council for Wales, having regard to the magnitude of any change in bird populations observed during the initial monitoring period.	RFOWFL Environmental Manager	In accordance with RFOWFL Monitoring Statement
FEPA 1985:	During construction the Licence Holder must ensure that	As RFOWFL Cetacean Mitigation	See Section 5.1 above EMDS 1 – Noise and

Condition 9.10 (Revision submitted 20/12/07)	disturbance to the cetaceans is minimised, including temporary suspension of the commencement of individual piling operations if cetaceans are detected in the area. .	and Monitoring Plan.	Vibration
FEPA 1985 Condition 9.28	The Licence Holder must ensure that the top layers of sediment are separated from the sub-surface sediments during works in the intertidal zone (where practicable) and replaced in the trench in the appropriate sequence to assist re-colonisation of benthic organisms.	Cable Laying Contractor	Cable plough technique will be utilised for works in the inter-tidal zone. If any excavation work is necessary the sediments will be separated and replaced as required by this condition.

5.4. EMDS 4 – Other Sea Users

Overview

This EMSD covers all issues relating to interaction with other sea users during the construction and commissioning of the RFWF.

Potential Impacts

The physical presence of the RFWF development may present an obstacle to other sea users. Vessel movements associated with the construction and commissioning of the wind farm are a potential cause of hindrance. A Vessel Co-ordination Plan has been developed to reduce the risk of vessels colliding with structures, known sea bed objects and other vessels. The RFOWFL Vessel Co-ordinator will observe all project vessel movements, and will be able to contract them at all times.

Monopiles

Vessels may collide with the monopiles. Such an event would have the potential for pollution to arise as well as raising significant safety concerns. **Construction Vessels**

Increased vessel movements during construction, and diverted vessel traffic, create a collision risk which also have the potential to cause pollution as well as being a significant safety concern.

Compliance Requirements

- Continental Shelf Act 1964
- Food and Environmental Protection Act 1985
- Coast Protection Act 1949
- Energy Act 2004
- IMO Mandatory Instruments
- MCA Marine Guidance Note 275 (2007 revision)

Project Objectives

- To minimise interference with other sea users
- To minimise the risk of collision during construction and operation.
- To comply with international marine safety

Control Measures

Consent Condition Ref.	Consent Requirement/Best Practice Technique	Responsibility	Mitigation Measure/ Frequency/Timing of Actions
FEPA 1985: Condition 9.8	The Fisheries Liaison Officer (see condition 9.13) shall pay due regard during the conduct of any fisheries survey to the need to safeguard the safety of any persons engaged in fishing operations on the site of the wind farm.	RFOWFL Fisheries Liaison Officer	Throughout construction in accordance with the RFWF Vessel Co-ordination Plan.
FEPA 1985: Condition 9.12	Interference: The Licence Holder must ensure that a Notice to Mariners is issued at least 10 days prior to works commencing warning of the start date for the construction of the wind farm and the expected supply/construction vessel routes from the local service	RFOWFL Vessel Co-ordinator and Project Manager	10 days prior to discrete elements off-shore work commencing. Updates as required.

	ports to the array. These Notices to Mariners must be updated and reissued at appropriate intervals and supplemented by VHF radio broadcasts as deemed appropriate and agreed with the Maritime and Coastguard Agency. A second Notice to Mariners must be issued warning of the timing and route of laying the submarine cable.		
FEPA 1985: Condition 9.13	The Licence Holder must ensure that a suitably qualified and experienced liaison officer or officers are appointed (for fisheries and environmental liaison) and the Licensing Authority notified before any work commences, to establish and maintain effective communications between the Licence Holder, contractors, fishermen, conservation groups and other users of the sea during the project.	RFOWFL Environmental Manager	RFOWFL have appointed a Fisheries Liaison Officer for Phase 2 of the Construction works, and have notified the MFA.
FEPA 1985: Condition 9.14	The Licence Holder must ensure that information is made available and circulated in a timely manner through the liaison officer(s) to minimise interference with fishing operations and other users of the sea.	RFOWFL Vessel Co-ordinator and Project Manager	Throughout off-shore works
FEPA 1985: Condition 9.15	The Licence Holder must ensure that the liaison officer's environmental remit includes: Monitoring compliance with the commitments made in the Environmental Statement and the Environmental Management Plan. Providing a central point of contact for the monitoring programme described in Annexes 1 and 2. Liaison with fishermen, conservation groups and other users of the sea concerning any amendments to the method statement and site environmental procedures. Inducting site personnel on site / works environmental policy and procedures.	RFOWFL Environmental Manager	Throughout off-shore works
CPA 1949 Condition: 2	A timely and efficient Notice to Mariners and other navigational warning of the position and the nature of the works are	RFOWFL Vessel Co-ordinator, Project Manager and Fisheries Liaison	Notice to Mariners 10 days before construction work commences.

	promulgated to mariners in the shipping and fishing industry, as well as recreational sailors.	Officer	Establish and maintain Kingfisher Bulletin during off-shore works
CPA 1949 Condition: 5	You must notify the Hydrographic Office, Ministry of Defence, Taunton, Somerset, TA1 2DN of both the progress and completion of the works in order that all necessary amendments to nautical charts are made, to ensure navigational safety.	RFOWFL Environmental Manager	The initial notification of Phase 1 construction works was submitted on 21/05/07. Further notification will be made prior to the commencement of Phase 2 construction and at appropriate intervals throughout the duration of the off shore works
IMO Regulations / MGN 275	Aids to navigation (cardinal marks with radar beacon or lighting) must be deployed for the duration of the construction phase to warn vessels of the work area to be avoided.	RFOWFL Project Manager	The required aids to navigation will be installed and maintained throughout the construction phase of the project.
IMO Regulations / MGN 275	Any incomplete structures (monopile foundations with or without transition piece installed) should be marked and clearly visible via the use of temporary lighting	RFOWFL Project Manager	All contractors will comply with the requirement to clearly mark incomplete structures by the use of temporary lighting.

5.5. EMDS 5 – Seabed Impacts

Overview

This EMSD covers all seabed impacts arising during the construction and commissioning of RFWF, with the exception of the potential impacts upon marine archaeology which are considered in EMSD 2.

Potential Impacts

A range of factors may result in seabed impacts during the construction and maintenance of the RFWF.

Jack-Up Rig

The Jack Up Rig will have an immediate but localised impact upon the seabed. Subsequent infill of any jack up leg depressions and re-colonisation of the affected areas is expected to take place.

Vessel Anchoring

Vessel anchoring will have an immediate, localised impact upon the seabed, with anchor mounds potentially being created. The sweeping motion of anchor chains upon the seabed can have a greater impact in terms of geographical extent. Seabed impacts arising from anchoring are anticipated to be minimal, with subsequent re-colonisation by benthic species.

Pile Driving (and Drill Cuttings if required)

Pile driving will have an immediate impact upon the seabed, though the RFWF Environmental Statement identified that the impacts, in terms of scale and extent, are minimal. The only permanent feature, other than the monopiles, will be the addition of scour protection as necessary.

It is not anticipated that there will be any requirement for drilling to take place during the construction of the wind turbine foundations, however if drilling is required, the generated drill cuttings will be broken down to approximately gravel size, and deposited on the seabed as mounds. These mounds are anticipated to disperse over time through the natural influence of sub-sea currents and erosion.

Offshore Cable Laying

The cables being installed offshore, both connecting the turbines within the array and the array to shore, are to be layed in accordance with the Cable Burial Plan.

The installation process will impact directly upon the seabed, with the release of suspended sediments into the water column, this has the potential to smother benthic organisms. However impacts upon benthic communities were not considered to be significant when assessed during completion of the RFWF Environmental Statement, and further information collated from monitoring of suspended sediments at North Hoyle Wind Farm, supports the conclusion that the predicted effects will be small.

Dropped Objects

Dropped objects may prove hazardous to other sea users as well as having a localised impact upon the benthic communities in the vicinity. Should any objects be dropped, the Contractors Dropped Objects and Materials Recovery Procedure will be invoked.

Compliance Requirements

- Food and Environment Protection Act (FEPA) 1985
- Coast Protection Act 1949
- Merchant Shipping (Prevention of Oil Pollution) Regulations 1996
- Merchant Shipping (Oil Pollution Preparedness and Response Convention) Regulations 1998
- Merchant Shipping (Reporting of Pollution Incidents) Regulations 1987
- Merchant Shipping (Dangerous or Noxious Liquid Substances in Bulk) Regulations 1966
- The Offshore Chemical Regulations 2002
- The Prevention of Oil Pollution Act 1971

Project Objectives

- To minimise the impact upon sea bed habitats.
- To minimise the mobilisation of sediment, and effects upon water quality.

Control Measures

Consent Condition Ref.	Consent Requirement/Best Practice Technique	Responsibility	Mitigation Measure/ Frequency/Timing of Actions
FEPA 1985 Condition: 9.17	Seabed Morphology and Scour: The Licence Holder must produce a scour protection plan and submit it for approval by the Licensing Authority at least 6 weeks before the start of the operation. The plan must address the need for scour protection, a rationale for the choice of scour protection, the type and grading of material to be used, the protection design and the full construction method statement.	RFOWFL Environmental Manager	Scour Protection Plan for Phase 1 Construction works was submitted to MFA for approval 29 May 2007. Scour Protection Plan for Phase 2 Construction works will be submitted March 2008.
FEPA 1985 Condition: 9.19	General: The Licence Holder must ensure that any debris or temporary works placed below MHWS are removed on completion of the works authorised by this Licence. (NB Drill cuttings, if drilled with water-based muds, can be left on the seabed within the area leased from the Crown Estate for the construction of the offshore wind farm to which this licence refers).	All Contractors engaged in offshore works	All Contractors engaged in off-shore works will develop and implement a Dropped Object Plan which will be approved by RFOWFL. Where temporary works are placed below MHWS the timing and method of their removal will be agreed by RFOWFL during approval of Contractor Method Statements.
FEPA 1985 Condition: 9.20	The Licence Holder must undertake a pre-construction bottom and side scan sonar survey in grid lines across area of development (turbine array, cable route, and any vessel access routes from local service port(s) to the construction site) following discussions with the Licensing Authority as to those parts of the operation for which this is deemed necessary. Local fishermen must be invited at reasonable notice to send a	RFOWFL Environmental Manager	RFOWFL will appoint a Consultant to complete surveys in a timely manner. RFOWFL will submit reports to the regulator.

	representative to be present during the survey. All obstructions found on the seabed must be plotted. A post construction survey must be undertaken along the same grid lines (within operational and safety constraints), any new obstructions associated with the construction of the wind farm must be removed at the Licence Holder's expense.		
CPA 1949 Condition 6	Cables must be buried to a nominal depth of between 1 and 3 metres' - as indicated on the attached plan 70223 (*Amendment 22nd June 2006)*	RFOWFL Project Manager	In accordance with the Cable Burial Plan prepared by the cable laying contractor.
Best Practice	Jack Up movement and pile handling operations only to commence in favourable sea states, currents and weather conditions, reducing likelihood of dropped objects and seabed damage as well as safety issues.	Vessel Master	All organisations involved in offshore work will make appropriate assessment of the safety and environmental impacts associated with the sea state, currents and weather conditions to
Best Practice	Buoying of anchor chains to prevent the impacts of anchor sweep upon the seabed.	Vessel Master	All organisations involved in offshore work prior to work commencing
Best Practice	Determination of any areas where anchoring would be environmentally harmful, and avoidance of any identified areas during construction.	RFOWFL Environmental Manager/Vessel Co-ordinator	All organisations involved in offshore work prior to work commencing
Best Practice	Strict inventory of all objects taken offshore to be maintained and checked upon return to shore to ensure all objects are accounted for.	Vessel Master	All organisations involved in offshore work during construction work
Best Practice	All materials to be securely fastened in place to prevent overboard loss	Vessel Master	All organisations involved in offshore work during construction work
Best Practice	If cable ''trenches'' have been created introduce checks to ensure that the "trench" has been adequately refilled by natural processes following installation to ensure the cable does not provide a	Cable Laying Contractor	Post cable installation

	snagging hazard to other sea users at a later time.		
Best Practice	All spare cable to be taken to shore for appropriate reuse or disposal	Cable Laying Contractor	Post cable installation

5.6. EMDS 6 – Pollution Discharges

Overview

This EMSD covers all potential effluent and fugitive discharges to the marine and onshore environment during construction and commissioning of the RFWF.

Potential Impacts

A range of effluent discharges may occur during the construction and operation of the RFWF.

Oil Spills

Small oil spills, which could occur from minor vessel leaks, would disperse rapidly upon entering the marine environment. Larger-sized oil spills could occur as a result of bunker tank overflows, transfer hose or hull leakage's, and would have a greater potential to impact upon the marine environment. Refer to the RFOWFL Marine Pollution Contingency Plan for comprehensive details on the management of oil spills.

Chemical Spills

The likelihood of chemical spills occurring during this project is low, however chemical releases to the marine environment could have a detrimental impact depending upon the size of spill and the chemical concerned. Risk of spills from chemical use has been identified during grouting and cementing exercises offshore, as well as anti-freeze for use within the wind turbines throughout the project life. The RFOWFL Marine Pollution Contingency Plan also addresses the management of these marine pollution events.

Deck Wash-Down

Normal deck wash-down will enter the marine environment via exit drains on the jack up rig and other marine vessels. Depending on the nature and volume of any chemicals there is the potential for temporary localised toxic impacts, whilst, in the case of oil discharge, there may be a temporary sheen on the water surface.

Sewage Disposal

Sewage generated during the offshore construction phase may, if discharged, have a localised enrichment effect upon the marine environment; however, due to the amounts concerned and the tidal regime in the vicinity, this impact is anticipated to be transient.

Compliance Requirements

- Merchant Shipping (Prevention of Oil Pollution) 1996
- Merchant Shipping (Oil Pollution Preparedness and Response Convention) Regulations 1998
- Merchant Shipping (Reporting of Pollution Incidents) Regulations 1987
- Merchant Shipping (Prevention of Pollution by Garbage) Regulations 1988
- Merchant Shipping (Dangerous or Noxious Liquid Substances in Bulk) Regulations 1966
- The Offshore Chemical Regulations 2002
- The Prevention of Oil Pollution Act 1971
- MARPOL 73/78 Annex IV
- Water Resources Act 1991

Project Objectives

- To minimise the risk of spills of any magnitude to as low as reasonably practicable
- To ensure that sufficient clean-up procedures and spill containment equipment are in place
- To ensure that personnel are fully aware of clean-up procedures and equipment

- To ensure that appropriate handling and storage of oil and chemicals is undertaken to minimise the risk of spill events
- To use lowest toxicity chemicals wherever possible

Control Measures

Consent Condition Ref.	Consent Requirement/Best Practice Technique	Responsibility	Mitigation Measure/ Frequency/Timing of Actions
FEPA 1985 Condition 9.21	All chemicals utilised in the drilling operation must be selected from the List of Notified Chemicals assessed for use by the offshore oil and gas industry under the Offshore Chemicals Regulations 2002 (this list can be viewed/downloaded at www.cefas.co.uk). Should any system other that a water-based mud be considered for use in the drilling operation written approval and guidance of disposal of any arisings will be required from the Licensing Authority.	Vessel Master	All organisations engaged in offshore works will select chemicals from the List of Notified Chemicals.
FEPA 1985 Condition 9.22	The Licence Holder must ensure that any chemical agents placed within the void of the monopile, e.g. biocides, corrosion inhibitors etc, are selected from the List of Notified Chemicals (see condition 9.21). The use of any chemical not contained on this list will require prior consent from the Licensing Authority following a comparable ecotoxicological hazard/risk assessment undertaken at the Licence Holders own expense.	Vessel Master RFWF Environment Manager	All organisations engaged in offshore works will select chemicals from the List of Notified Chemicals. An ecotoxicological hazard/risk assessment will be submitted by RFOWFL Environment Manager should any chemicals be required that are not contained on the list.
FEPA 1985 Condition 9.23	The Licence Holder must ensure that all protective coatings; paints etc used are suitable for use in the marine environment and, where necessary, are approved by the Health and Safety Executive.	Vessel Master	All organisations engaged in offshore works will select chemicals from the List of Notified Chemicals.
FEPA 1985 Condition 9.24	The Licence Holder must ensure that storage, handling, transport and use of fuels,	Vessel Master	All organisations engaged in offshore works will implement

	lubricants, chemicals etc during construction on vessels and equipment should prevent releases to the marine environment, i.e. bunding should be 10% total volume of all reservoirs, containers etc.		adequate storage, handling, transport and use of chemicals, lubricants and fuels.
FEPA 1985 Condition 9.25	The Licence Holder must produce a Marine Pollution Contingency Plan for spills, collision incidents during construction and operation, and this must be adhered to. The Contingency Plan must have regard to plans for North Wales Coast, Liverpool Bay, Dee Estuary, Mersey Estuary & offshore installations. Practices used to refuel vessels at sea must conform to industry standards.	RFOWFL Environment Manager	Submit RFOWFL MPCP for approval February 2008 (with this PEMP) Review and approve Contractors MPCP and SOPEP.
FEPA 1985 Condition 9.27	The Licence Holder must ensure that all reasonable care is taken to prevent the accidental release of wet cement/grout into the marine environment.	Vessel Master	Appropriate controls will be described in Method Statements, which will be reviewed and approved by RFWF Environment Manager
Best Practice	Vessel staff to be competent in the application of the Shipboard Oil Pollution Emergency Plan (SOPEP) and the development's Marine Pollution Contingency Plan (MPCP).	Vessel Master	Staff to be appropriately trained and competent.
Best Practice	Conduct SOPEP and MPCP drills and exercises to maintain personnel awareness	Vessel Master	At regular intervals throughout off shore project
Best Practice	Report any marine spill to the NRL Environment Manager, and appropriate authorities and mobilise appropriate response immediately as per SOPEP and MPCP	Vessel Master	As RFOWFL MPCP
Best Practice	If spills occur use appropriate clean-up equipment and dispose of material in accordance with approved waste management procedures	Vessel Master	As Contractors SOPEP
Best Practice	Assessment of spill clean up equipment on board each vessel to ensure adequacy for dealing with any spill events.	Vessel Master and RFOWFL Environment Manager	During inspections and audit which will take place at regular intervals throughout off shore project

Best Practice	Visual inspection of diesel bunkering hoses before and after use, including couplings, to ensure integrity.	Vessel Master	Each Contractor will appoint a deckhand to be responsible for monitoring at each bunkering operation.
Best Practice	Visual monitoring of diesel bunkering hoses throughout bunkering operations by a designated Watch	Vessel Master	Each Contractor will appoint a deckhand to be responsible for monitoring at each bunkering operation.
Best Practice	The Watch posted during bunkering operations will raise the alarm in the event of any problem, firstly resulting in the cessation of bunkering operations, and secondly initiating actions as per SOPEP / MPCP	Vessel Master	Each Contractor will appoint a deckhand to be responsible for raising alarm in the event of a problem during bunkering operations.
Best Practice	Bunkering not to be undertaken during hours of darkness or during periods of inclement weather	Vessel Master	Throughout offshore construction
Best Practice	Ensure deck areas are kept clean and free from oil and chemical contamination.	Vessel Master	Throughout offshore construction
Best Practice	Grouting and/or cementing material selected must be of as low toxicity as possible. Grout specified in Method Statement, which is environmentally inert, should be used.	Offshore Contractors	Method Statements will be approved by RFWF Environment Manager prior to work commencing
Best Practice	Use of grouting and/or cementing material during installation to be minimised to reduce the potential effects upon water quality	Offshore Contractors	Method Statements will be approved by RFWF Environment Manager prior to work commencing
Best Practice	All excess chemicals, including anti-freeze etc not used to be returned to shore to be stored for re-use, or for disposal by a licensed waste disposal contractor	Vessel Master	Each Contractor will be required to maintain a balance inventory of materials
Best Practice	Maintain inventory of all materials taken offshore and keep records of materials used to ensure a balance of inventory.	Vessel Master	Each Contractor will be required to maintain a balance inventory of materials
Best Practice	All sewage will be macerated prior to discharge, meeting the requirements specified under MARPOL, Annex IV where reasonably practicable	Vessel Master	Throughout off shore project

Best Practice	Regular maintenance of sewage plant machinery to ensure adequate treatment is maintained	Vessel Master	Throughout off shore project

5.7. EMDS 7 – General Environmental Objectives

Overview

This EMSD describes the general controls which are to be implemented by all organisations involved in the RFWF.

Control Measures

Consent Condition Ref.	Consent Requirement/Best Practice Technique	Responsibility	Mitigation Measure/ Frequency/Timing of Actions
Best Practice	Each organisation shall display the Environmental Policy (Section 2) throughout their offices, including all site offices	All organisations involved in off shore work	Continuously
Best Practice	Each organisation shall ensure that the environmental policy is understood, implemented and maintained at all levels. Initial toolbox talk to discuss environmental policy. Ongoing toolbox talks to maintain environmental awareness	All organisations involved in off shore work	Throughout offshore project.
Best Practice	Each organisation shall ensure that its members are aware of the potential environmental effects of their activities and the environmental benefits of improved performance	All organisations involved in off shore work	Throughout offshore project.
CPA 1949 Condition 4	A copy of the Coast Protection Act 1949: Section 34 Consent must be given to each contractor appointed	RFOWFL Project Manager	At appointment
FEPA 1985 Condition 3.1	A copy of the FEPA License and any attached Schedule, any special conditions and any subsequent revisions or amendments thereto is given to: All Agents and Contractors The Masters of all Vessels	RFOWFL Project Manager	At appointment
FEPA 1985 Condition 3.2	Copies of the FEPA License to be available at the following locations: At the location of the License Holder At the site office, located at or adjacent to the works On board each vessel or at the office of any transport manager with responsibility for vehicles from which licensed deposits are to be made	RFOWFL Project Manager and all Offshore Contractors	

Best Practice	Each organisation shall work with their consultants, suppliers and subcontractors to develop and progress environmental best practice throughout the project.	All organisations involved in off shore work	Through implementation of PEMP
Best Practice	Each organisation shall conserve and protect the environment by operating in a socially responsible manner according to high standard of environmental management available and the application of strict quality assurance disciplines	All organisations involved in off shore work	Through implementation of PEMP
Best Practice	Each company shall comply with all existing regulatory legislation, consents and codes issued at national and local level, and adopt a pro-active stance in anticipating future, more stringent, regulatory requirements	All organisations involved in off shore work	Through implementation of PEMP
Best Practice	Each organisation shall design, operate and maintain all plant and equipment to the highest practicable standard according to the principles of BAT (Best Available Techniques), as appropriate, and improve working practices as and when new technology becomes available	All organisations involved in off shore work	Throughout offshore project
Best Practice	Each organisation shall, where economically feasible, efficiently use resources such as energy, water, oils, fuels, manufacturing and construction material, and minimise waste through re-use, reduction and recycling and develop a strategy of minimising waste at source	All organisations involved in off shore work	Throughout offshore project
Best Practice	Each organisation shall provide appropriate environmental training for all employees on the project, and actively promote and encourage the pursuit of environmental excellence, as well as encouraging this throughout all consultants, suppliers and subcontractors	All organisations involved in off shore work	Through implementation of PEMP and specific plans, and Method Statements
Best Practice	Each organisation shall carry out regular environmental	All organisations involved in off shore	As RFOWFL PEMP

	audits of all aspects of the project, both to ensure effective implementation of environmental policy, and to lessen the risk of operational failures which might lead to environmental damage	work	
Best Practice	Each organisation shall deal with only reputable, registered waste carriers who have been vetted and whose premises and operations are subject to regular inspection and auditing	All organisations involved in off shore work	All offshore Contractors will develop and implement a Waste Manage Plan for off and on-shore. This will be approved by RFOWFL Environment Manager

2. Rhyl Flats Offshore Wind Farm Ltd

Marine Pollution Contingency Plan

Marine Pollution Contingency Plan
Version 1.3
April 2008

Rhyl Flats Wind Farm

Project:	Rhyl Flats Offshore Wind Farm
Date:	March 2008
Document Reference:	RF/MPCP/Rev 1.3
Owner:	Rhyl Flats Offshore Wind Farm Ltd
Sponsor:	Npower Renewables Limited
	Trigonos
	Windmill Hill Business Park
	Whitehill Way
	Swindon
	Wiltshire
	SN5 6PB Tel: 01793 877 777
Contacts:	Jamie May, Environmental Manager (Tel: 01793 896120) Hugh Morris, Environmental Manager (Tel:01793 893352)
Statement prepared by:	Jamie May

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1. Introduction

This Marine Pollution Contingency Plan (MPCP) has been developed to ensure that activities implemented by Rhyl Flats Offshore Wind Farm Limited (RFOWFL) which have the potential to cause the release of oil or other chemicals that may cause a hazard or danger to individuals or the marine environment are minimised. Should such a contingency situation occur, the Plan sets out contingency measures to be put into place in order to minimise environmental and health and safety impacts.

The plan covers the management of environmental risks related to spills and the relevant authorities to contact in case of an emergency relating to the offshore and onshore works for the Rhyl Flats Offshore Wind Farm Project (RFOWF).

The focus should be with avoidance of contingency situations through risk identification and management, and through stringent controls being put into place (e.g. through implementation of the RFOWFL Project Environmental Management Plan). However, if a major incident has occurred the emphasis immediately shifts to marine pollution control. This can be defined as:

> *"products, systems or services for controlling, clean up and minimising marine pollution. Examples include products such as oil absorbents and booms; and services such as marine pollution prevention training, monitoring and clean up services".*

The owners and masters of ships and the operators of offshore installations bear the primary responsibility for ensuring that they do not pollute the sea. Harbour authorities are likewise responsible for ensuring that their ports operate in a manner that avoids marine pollution, and for responding to incidents within their limits. However, ships, offshore installations and harbour authorities may face problems that exceed the response capabilities that they can reasonably maintain (especially in the provision of counter pollution equipment). Similarly, coastal local authorities may face incidents that require equipment or expertise beyond their capabilities. Therefore, the Maritime and Coastguard Agency (MCA) may need to use national assets in the response to a marine pollution incident.

Offshore construction at the RFOWF is planned to take place from April 2008 until November 2009.

1.1. Purpose of the Plan

This MPCP is designed to minimise environmental impacts in response to an oil spill. It also aims to cover other marine pollution events associated with construction such as fuel, grout or chemical spillages.

Within the UK there is an adopted structure and procedure for response to marine oil spills, which clearly defines the roles and responsibilities of the Industry, UK Government (including environmental agencies) and Local Maritime Authorities. Each statutory body has a designated area of jurisdiction within zones extending from the High Water Mark up to 200nm or the UK Territorial Limit (or, in the case of controlled waters up to 3nm offshore, this would be the jurisdiction of the Environment Agency).

Since RFOWF contractors and sub-contractors will perform most of the works offshore, should an oil/chemical spill occur it would be the responsibility of the contractor to ensure a suitable response. In the event of a marine pollution incident from the RFOWF, the Contractor Project Manager will be responsible for ensuring a response proportionate to the size of the spill and informing and mobilising the appropriate members of all teams that may need to be involved in a spill. This is illustrated in Figure 2 (in Section 3.1.3) which illustrates the command, control and communication routes between the offshore, onshore, response contractors and statutory bodies.

The procedures detailed in this plan provide general guidance which should be adhered to. Each construction vessel will Marine Pollution Contingency Plan, in addition Shipboard Oil Pollution Emergency Plan's (SOPEP's). These documents will detail the specific actions which will be taken by each vessel to respond to spills and pollution incidents. SOPEPs are required under the International Safety Management Code (ISM) for all self propelled vessels in excess of 400 tonnes. The project

requirement for RFOWF is that all construction vessels (self propelled or otherwise) and barges should have an approved SOPEP issued via the MCA or the Dutch Shipping Inspectorate.

In order to familiarise the RFOWF response personnel in the use of this Marine Pollution Contingency Plan training exercises will be undertaken. These shall either be paper exercises to verify understanding and communication procedures or operational exercises involving deployment of personnel, equipment and materials. RFOWFL consider the primary aim of their response strategy is to:

- Ensure personnel safety and integrity of the installations and vessels.
- Minimise potential environmental and socio-economic impact and ensure a fast recovery to affected resources.
- Where practicable, utilise the prevailing environmental conditions to complement the response.

The Appendix at the end of the document contain report forms and checklists to assist in dealing with a spill, additional guidance in the form of **MCA STOp notices**, may help to clarify some of the more technical information provided in the plan.

For smaller more minor spills the **Environmental Incident Form** should be used and reported to RFOWFL.

2 Description of the Project

The Rhyl Flats Offshore Wind Farm site is located 8km north of Abergele and 10 km north-west of Rhyl, off the North Wales coast. The wind farm will consist of 25 turbines, with an approximate generating capacity of 90 MW. It is linked to the coast by cable routes that continue in-shore, connecting to the electricity distribution network inland of Abergele.

The turbine foundations will be steel monopiles. The pile will be driven into the seabed using a hydraulic hammer from a jack-up barge/drilling rig. Transition sections will be used to connect the wind turbine tower to the foundation by means of a grouted joint.

The turbines will be connected via a network of 33kV cables (inter-array cables) that are laid between the wind turbines and three export cable to bring the generated electricity ashore.

The wind farm is planned to be fully operational by the end of 2009.

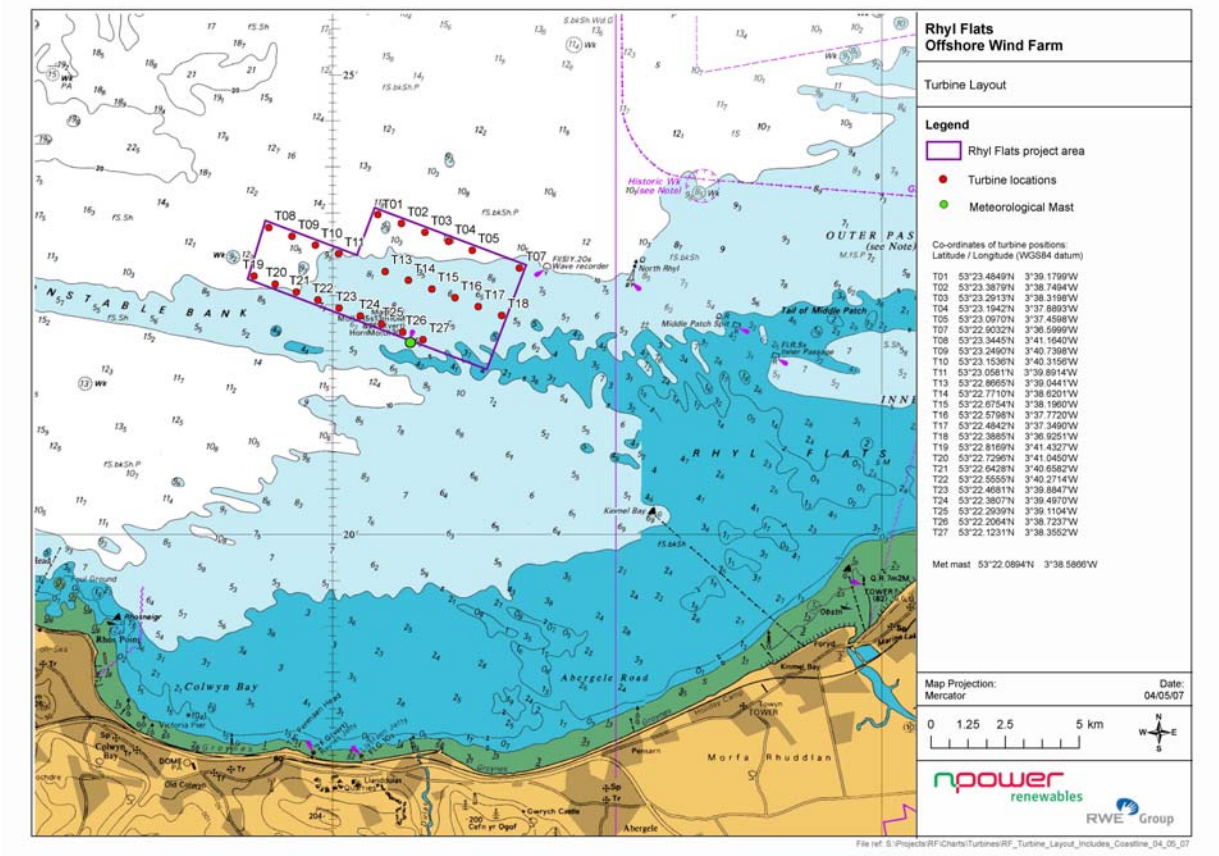


Figure 1: RFOWF Site.

2.1 Construction Programme

The following preliminary programme has been devised to enable construction:

Task	Start	Finish
Foundation & Turbine Installation Key Dates 2008	01/04/08	14/11/08
MTH Foundation Installation	01/04/08	04/06/08
MTH Internal Secondary Works	03/04/08	07/06/08
MTH External Secondary Works	01/04/08	11/06/08
OPU Cable Installation	13/06/08	08/09/08
McNicholas 1st Fix Sub-Sea Cable Connections to Foundation Switchgear	28/06/08	04/10/08
McNicholas 2nd Fix Cable Connections Pre Tower Installation 2008	09/09/08	02/11/08
Siemens Turbine Tower Installation 2008	11/09/08	07/11/08
McNicholas Turbine to Foundation Cable Connections 2008	15/09/08	10/11/08
Precommisioning Checks 2008	18/09/08	12/11/08
WTG Commisioning 2008	20/09/08	14/11/08

2.2 Project Requirements

The Project requires the following to be met:

- Compliance with UK and European maritime legislation;
- Compliance with all RFOWFL statutory consents including Electricity Act 1989 (ref GDBC/C/001/00026); Food and Environment Protection Act (FEPA) Licence 31640/07/1 and Coast Protection Act, 1949, Consent Number 70223;
- Implementation of Best Practice such as BWEA and EWEA Guidelines.

In particular, condition 9.25 of the RFOWFL FEPA Licence 31640/07/1 (Food And Environment Protection Act 1985 : Part II (as amended) - Deposits In The Sea In Connection With Marine Construction Works) states:

> *The Licence Holder must produce a Marine Pollution Contingency Plan for spills, collision incidents during construction and operation, and this must be adhered to. The Contingency Plan must have regard to plans for North Wales Coast, Liverpool Bay, Dee Estuary, Mersey Estuary & offshore installations. Practices used to refuel vessels at sea must conform to industry standards.*

This Plan is intended to meet this consent condition. It should also be noted that the RFOWFL FEPA Licence states the following in Condition 9.34 which the Main Contractor and subcontractors should have regard for in the context of marine spills:

> *In addition to the powers of variation or revocation set out in sections 8(10) and (11) of the Food and Environment Protection Act 1985, the Licensing Authority may suspend this Licence if it appears to the Licensing Authority that there has been a breach of any of its provisions or if it appears to the Licensing Authority that this Licence ought to be suspended because of a change in circumstances relating to the marine environment, the living resources which it supports or human health or because of increased scientific knowledge relating to any of those matters or for any other reason that appears to the Licensing Authority to be relevant. Any such suspension may apply to some or all of the activities permitted by this Licence (as specified in the notice of suspension) and may be imposed either for a period of time specified in the notice of suspension or for an indefinite period until the Licensing Authority is satisfied that conditions specified in the notice of suspension have been met.*

Contractors must also comply with RFOWFL FEPA Licence conditions 9.21 to 9.24 inclusive and 9.27, in addition to those quoted above, relating to considerations for use of chemicals and grout offshore, storage and handling of fuel and lubricants, accidental release of wet cement/grout etc. Audits and inspections will be carried out under the auspices of the Project Environmental Management Plan (PEMP) to ensure compliance with the above.

2.2.1 Compliance Requirements

The following legislation and guidelines are relevant to this document:

- International Convention on Oil Pollution Preparedness, Response and Co-operation 1990 (the “OPRC Convention”).
- Merchant Shipping (Reporting of Pollution Incidents) Regulations 1987
- Merchant Shipping (Oil Pollution Preparedness, Response and Co-operation Convention) Regulations 1998
- Merchant Shipping (Prevention of Pollution: Substances Other than Oil) (Intervention) Order 1997
- Civil Contingencies Act 2004
- Merchant Shipping Act 1995
- Prevention of Oil Pollution Act 1971
- Food and Environment Protection Act (FEPA) 1985
- Coast Protection Act 1949
- MARPOL 73/78
- Offshore Installations (Emergency Pollution Control) Regulations 2002, made under section 3 of The Pollution Prevention and Control Act 1999

Marine pollution is also considered in the following relevant environmental legislation:

- Habitats Directive (92/43/EEC)
- Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007

2.3 Links to Associated Documentation

This MPCP is to be used in conjunction with existing documentation and management controls, including, but not limited to:

Document Title
Rhyl Flats Offshore Wind Farm Environmental Statement
Rhyl Flats Offshore Wind Farm Master Consents Schedule
Rhyl Flats Offshore Wind Farm Project Environmental Management Plan
Rhyl Flats Offshore Wind Farm Works Vessel Co-ordination Procedure
Rhyl Flats Offshore Wind Farm Construction Stage Health & Safety Plan
Rhyl Flats Offshore Wind Farm Quality Plan
Rhyl Flats Offshore Wind Farm Communications Plan
Vessel SOPOPs

The potential for major spills are most likely to come from the construction vessels themselves, and such potential spills would generally be covered adequately by the vessels own Shipboard Oil Pollution Emergency Plans (SOPEP's) which are approved by MCA or their international equivalent (e.g. Netherlands Shipping Inspectorate for the installation vessel 'Svanen').

Provision for safeguarding against fugitive releases of oil from the turbine nacelles into the sea is also considered briefly. Oil sources within the nacelle include oil filled transformer, gearbox oil and lubricant oils in various motors and equipment. The volumes of these are an order of magnitude lower than those present as fuel oil and other mineral and lubricant oils on the construction vessels. Furthermore, the pathways that any releases may take are largely restricted to within the turbine tower, and hence the risk of their exposure to the marine environment is low. Therefore, the management of these is more suitably controlled through a RFOWFL Environmental Management Plan for Operations Phase.

3 Communication

3.1 Management Structure and Responsibilities

3.1.1 Definition of Responsibilities

Function	Duty Holder	Contact Details
Client	RFOWFL	01793 825102 07795 353804
RFOWFL Project Director	David Wallis	01793 892470 07989 494285
RFOWFL Project Manager	Gareth Penhale	01793 825102 07795 353804
RFOWFL Environment Manager	Hugh Morris	01793 893352 07989 492697
RFOWFL Package Manager Foundations	Julian Garnsey	01793 893190 07735 353603
RFOWFL Package Manager Cables	Alan Hannah	07989 493655
RFOWFL Package Manager WTGs	Pete Geddes	01793 893273 07989 493608

Function	Duty Holder	Contact Details
Vessel Co-ordinator	Lee Cornwall	07825 558303
RFOWFL Health & Safety Advisor	Paul Hocking	07795 112331
RFOWFL Client Rep	Richard Parkinson	01745 561426 07966 570364
Fisheries Liaison Officer	Jim Andrews	0845 8802540 07908 225865
Contractor Foundations MTH	Emelie Glave	+4522709709
Contractor Turbine installation	Siemens	TBC
Contractor Sub-Sea cables	Ocean Team	TBC

Following notice from its sub contractor of an oil/chemical spill from the RFOWF, the Main Contractor will immediately establish the designation of the incident category. Incident designation will be confirmed by the Contractor Project Manager.

It is important to determine the size of the spill and to classify it. Where possible, the volume of oil spilled should be calculated from methods other than the evaluation of a spill on the sea. The weather and sea state conditions are crucial in deciding on a practical response strategy for an incident.

In the event of an incident the notification matrix shall be used to provide guidance on who to contact and the size of spill at which they are required to be notified.

The RFOWFL Environmental Manager (EM) shall be the formal point of contact with the Licensing Authority and its consultees unless communication is delegated to other RFOWFL project officers (for example whereby the Site Engineer is permitted to contact the Licensing Authority directly to notify them of an incident or loss of marine life). The RFOWFL EM will have primary responsibility for advising on environmental best practice management and any incidents that may occur in the course of the project and relaying project information to the Licensing Authority.

The RFOWFL Site Engineer/Client Rep shall be the point of contact between the Principle Contractor, sub contractors construction/ vessel staff and RFOWFL in regard to environmental matters. Third party liaison shall be referred to the RFOWFL EM. The exception to this is emergency dialogue with the Coastguard in regard to incident response control.

3.1.2 Statutory Bodies

Within the UK there is an adopted structure and procedure for response to marine spills, which clearly defines the roles and responsibilities of the Industry, UK Government (including environmental agencies) and Local Maritime Authorities. Each statutory body has a designated area of jurisdiction within zones extending from the High Water Mark up to 200nm or the UK Territorial Limit.

Above Low Water Mark - Local Authority

- Co-ordinates local response for oil spill clean up operations
- Co-ordinate with MCA concerning establishment of Shoreline Response Centre (SRC)

Up to 3 nautical miles (nm) – Environment Agency

- Consultation regarding Waste Disposal
- Responsible for water quality in controlled waters (rivers, estuarine and coastal areas)

Up to 12nm – Countryside Council for Wales (CCW)

- Advisors to Government on environmental matters in Wales
- Concerned with the conservation of coastal, inter-tidal and sub-tidal habitats and communities, coastal sea birds and mammals
- Provide environmental data scientific assessment

- Liaise closely with Joint Nature Conservation Committee (JNCC)

Up to 200nm – Various
Maritime & Coastguard Agency (MCA) as the executive agency of DfT (Department of Transport)

- It is the responsibility of the HM Coastguard to inform the MCA of any incident.
- HM Coastguard
  - Primary Contact in the case of a spill
  - Reports all spills to MCA
  - Support MCA response
- Maritime & Coastguard Agency (MCA)
  - Prevent coastal pollution
  - Advice on oil spill response
  - Authority to co-ordinate response in accordance with national contingency plans
  - Establish Shoreline Response Centre (SRC) with local authority or Marine Response Centre (MRC)

BERR (Department for Business, Enterprise and Regulatory Reform):

- Under the "Prevention of Oil Pollution Act 1971" BERR are responsible for monitoring and reporting the illegal discharges of oil at sea of offshore installations to the relevant prosecuting authorities.

JNCC (Joint Nature Conservation Committee):

- Advisors to Government on environmental matters
- Concerned with the conservation of offshore and coastal seabirds and mammals
- Provide environmental data scientific assessment

The Marine and Fisheries Agency (MFA):

- Responsible for protection of UK fisheries interests and the marine environment
- Authority to consult with concerning the use of oil spill treatment products (e.g. dispersents, loose sorbents) in shallow water areas. Shallow waters are defined as any sea which is less than 20 metres deep, or is within 1 nautical mile of such an area.

3.1.3 The Main Contractor

The Oil Pollution (Preparedness, Response and Co-operation Convention) Regulations, 1998 (SI1056) (as amended) (OPRC) require all ships, ports and harbours to report all incidents of pollution to the MCA. In the event of an oil or chemical spill from the relevant RFOWF Contractor will be responsible for implementing an immediate response proportionate to the size of the spill and in accordance with SOPEP procedures and informing RFOWFL.

The Main Contractor Project Manager
In the event of an incident the Contractor Project Manager will assess the situation and depending on the classification of the incident will contact RFOWFL representatives and the appropriate members of the Onshore Team individually requesting their assistance and mobilisation instructions. The Main Contractor will then be required to establish an Emergency Incident team. The team will then mobilise to a dedicated Emergency Control Room (ECR) (as appropriate). The Contractor Project Manager will assume overall command.

Response Co-ordination
Once the Onshore Team is operational the Contractor Project Manager may place Oil Spill Response Contractors on standby. He will then assess the requirement for them to mobilise a representative to onshore to form part of the team onshore. Thereafter, the Contractor Project Manager, the Oil Spill Response Contractor Representative and the Oil Spill Response Contractor will manage, co-ordinate and mobilise strategies, personnel and equipment in response to the spill. Figure 2 illustrates the command, control and communication routes between the offshore, onshore, response contractors and statutory bodies.

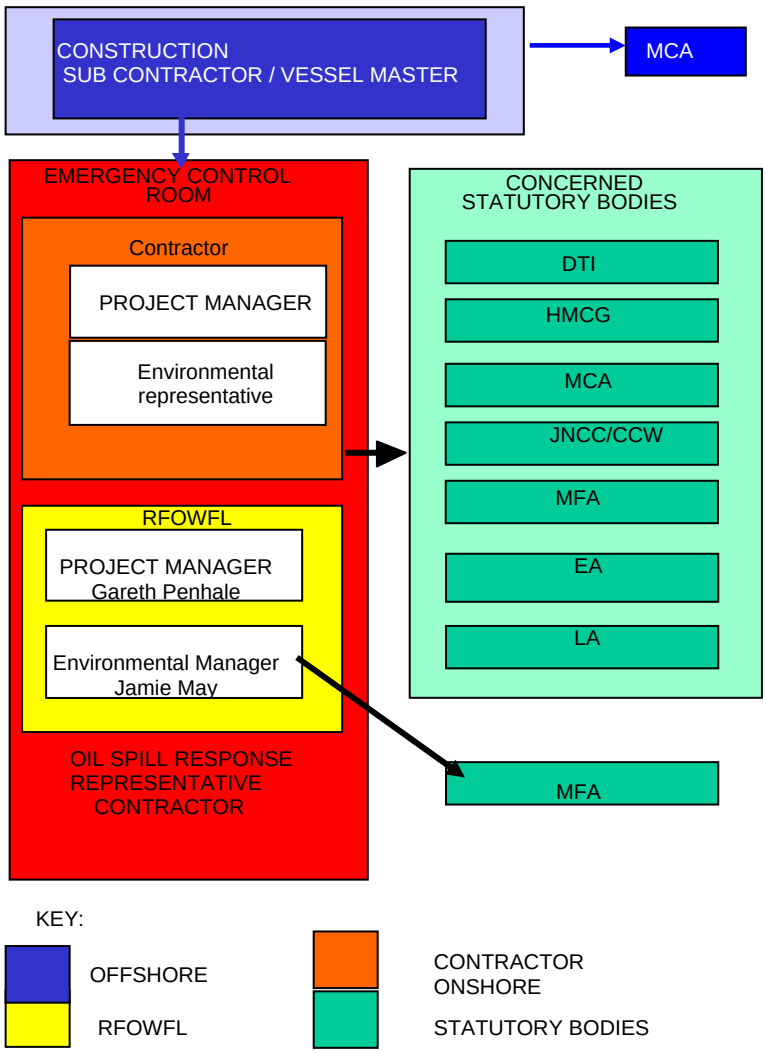


Figure 2: Routes of communication between RFOWFL, Flour, Statutory Bodies and Response Contractors.

3.2 Interfaces with other Emergency Procedures and Marine Pollution Contingency Plans

The procedures detailed in this plan provide guidance for dealing with pollution aspect of an emergency and assume that it is safe to undertake the spill response operation. Oil drifting towards neighbouring installations may instigate the activation of their own 3rd party plans.

3.2.1 All Vessels and Construction Rigs

The statutory duty for reporting and dealing with pollution from any vessel or rig lies with the vessel / rig owner.

For vessels and rigs involved in the wind farm construction: in the event of a spill it is the Vessel Master's responsibility to report to the MCA and Contractor and to implement the appropriate MARPOL approved Shipboard Oil Pollution Emergency Plan (SOPEP). Such plans are approved by a classification society or flag state and is required under Regulation 26, Annex 1 of MARPOL 73/78.

3.2.2 Local Authority Council Plan

In the event of any incident which may possibly lead to, or require, shoreline clean-up operations the Local Authority, the local authorities, in this case Conwy County Borough Council would activate their own callout procedures in accordance with their own Shoreline Response Plans. Other North Wales Oil Pollution Plans may also be invoked if coastal processes or marine conditions threatened coastlines to the south west or south east.

3.2.3 National Contingency Plan (NCP)

Major spills including those that threaten the shoreline may require the activation of the Maritime Coastguard Agency's National Contingency Plan. The NCP is not an operations manual, rather it is a guide to the role of the MCA, agencies and organisations and their responsibilities and involvement in dealing with oil at sea and along the shoreline. The NCP also sets out the UK Government's policy for dealing with pollution at sea.

The RFOWF and ancillary works are located within the 'Western' UK Pollution Control Zone. As part of MCAs function for pollution protection (Counter Pollution and Response Branch) any 3rd party call for assistance would be relayed to a Marine Rescue Co-ordination Centre (MRCC) most likely to be Holyhead or Liverpool (Marine Rescue Sub Centre).

3.2.4 Port of Mostyn Dee Estuary Oil Spill Contingency Plan

In the event of an oil spill encroaching upon the Dee Estuary the above mentioned plan may be mobilised.

3.2.5 BHP Douglas Platform Oil Spill Contingency Plan

BHP's Douglas platform is the nearest installation to the RFOWF. In the event of an incident encroaching upon their 500m exclusion zone the Douglas Field OSCP will be activated by BHP.

4 Actions and Operations

4.1 Call Out and Reporting

Initial designation of the incident category will be made by the Vessel Master or the Contractor environmental representative immediately following an oil spill from the RFOWF. Incident designation will be confirmed by the Contractor Project Manager and the RFOWFL EM following further spill evaluation.

The MCA has adopted the following tiered approach to describing the scale of an incident under their National Contingency Plan:

- **TIER ONE** : A small operational spill employing local resources during any clean-up (i.e. using in house resources).
- **TIER TWO** : A medium sized spill, requiring regional assistance and resources.
- **TIER THREE** : A major spill, requiring national assistance and resources. The National Contingency Plan will be activated in this case.

These Tiers are not given generic quantification. Assessments are made based on potential risks in specific areas, i.e. ports and local authority areas and responses are planned accordingly. As a rule of thumb a relatively small spill in the order of 1-200 litres is likely to be controlled in-house as a Tier 1 spill. Should a larger spill occur then notification to all staff must be communicated and the emergency number in this document must be called. Whilst waiting for the response, a clean up operation must be implemented to reduce the chances of greater risk/pollution.

Tier	Response Team	Response Time	Function
1	Construction Vessel	Max 0.5 hours	Small spills where events can be controlled by onsite resources. A Tier 1 spill is not likely to require intervention by resources outwith the scope of the wind farm, an external incident response organisation or external authorities, except for purposes of notification.
2 / 3	**Added to:**		
	Contractor CEM	1 hour	Medium/large sized spills that are required to be handled by the RFOWF team onshore and the nominated contractor or other external assistance as nominated within this plan. The Contractor Project Manager will be in overall control of the response.
	Contractor Project Manager		
	External Contractor	Approximately 4 hours	

Table 1: Three Tiered Incident Response System

The responsibility for elevating an incident classification from Tier 1 to Tier 2 lies with the Vessel Master, in conjunction with the Contractor Project Manager and in discussion with the RFOWFL Project Manager and the RFOWFL EM. On elevation to a Tier 2 response level, the Contractor Project Manager will still control the incident response.

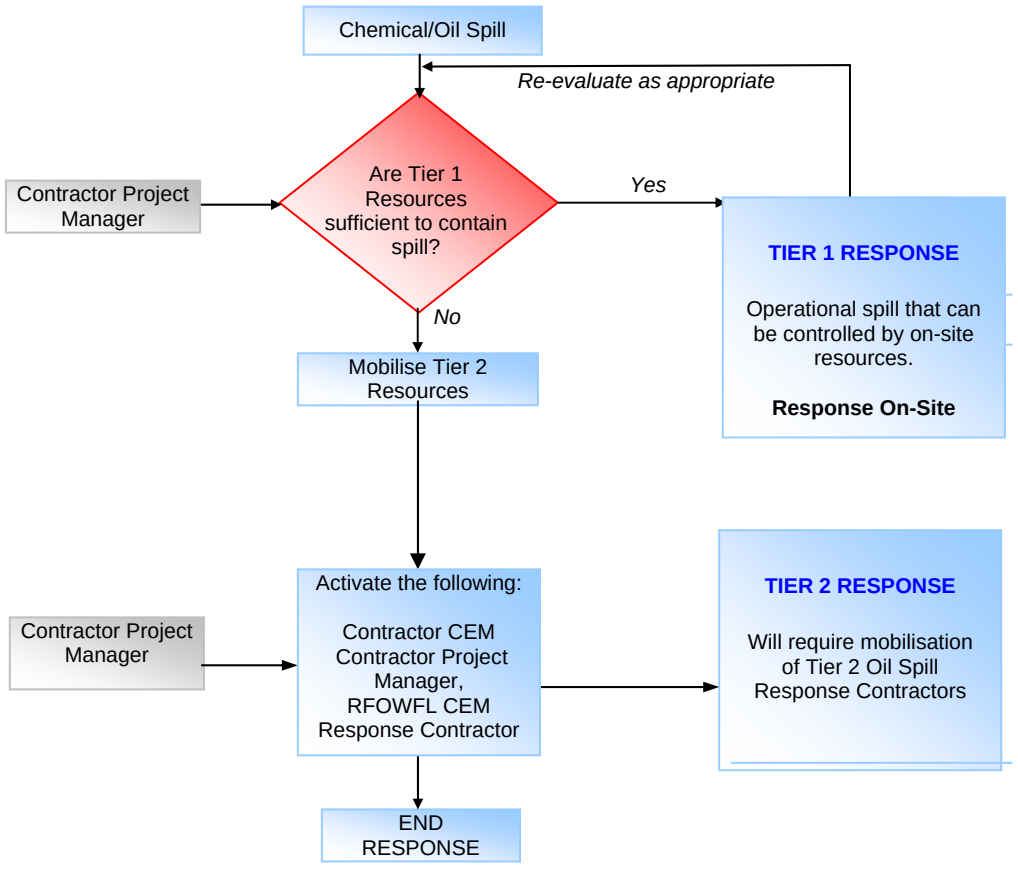


Figure 3: Tiered Response Levels

4.1.1 Initial Reporting

All marine pollution spillages must be reported to RFOWFL including:

- Any spillage of diesel, hydraulic oils; gear oil and lube oil
- Any visible sheen of oil on the seas surface;

- Any oil spill of un-attributable source.
- Any chemical spill including antifreeze, anti corrosion substances, grout and plasticisers

It is the responsibility of the person observing the spill to report this immediately to the Contractor Environmental Representative or the Project Manager providing as much information as possible including:

- Name and position;
- Type and size of spill;
- Location of spill;
- Source of spill and whether ongoing situation;

Do not delay in reporting even if you do not have all the necessary information. If further information is required then this will be requested.

Contractor Environmental Representative

It is the responsibility of the Contractor's environmental representative under approval of the Contractor Project Manager to initially report an oil spill immediately to MCA to activate the appropriate RFOWF call-out. Level of call-out will depend on the seriousness of the incident and level of response required. If there is any doubt as to the level of call-out, it is better to over classify and step down as required. Use the oil spill report proforma provided in the Appendix and the notification matrix at the end of this section for further guidance.

Contractor Project Manager

The Contractor Project Manager has a responsibility under RIDDOR to report to the Health and Safety Executive (HSE) "any dangerous occurrence" involving the release of hydrocarbons or hazardous chemicals. HSE should be notified by telephone and a follow up made with Report Form F2508 within 10 days. For Tier 1 spills the Contractor Project Manager must notify BERR, JNCC, CCW, MFA, EA and the affected Council. In addition he is responsible for ensuring HM Coastguard have been informed of the incident by the Contractor environmental representative and for agreeing actions with the RFOWFL Project Manager. RFOWFL will be responsible for reporting to MFA under FEPA commitments.

Call-out of Response Contractors

If support is required from an Oil Spill Response Contractor, it is the responsibility of the Contractor Project Manager to call-out external response contractors.

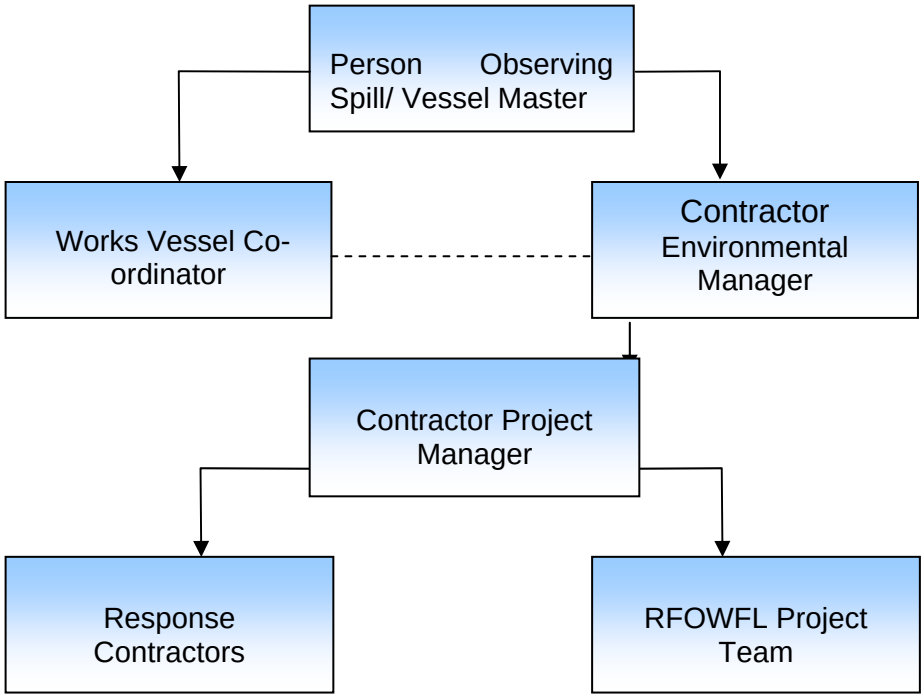


Figure 4: Oil Spill Reporting and Call-Out

4.2 Training and Drills

4.2.1 Strategy

In order to familiarise the Contractor response personnel in the use of this MPCP exercises will be undertaken on a regular basis. These are either paper exercises to verify communication procedures or operational exercises involving deployment of personnel, equipment and materials. On completion of each exercise, an evaluation is conducted to examine any deficiencies that may have been identified. This allows revisions and amendments to be made to improve the effectiveness of the MPCP.

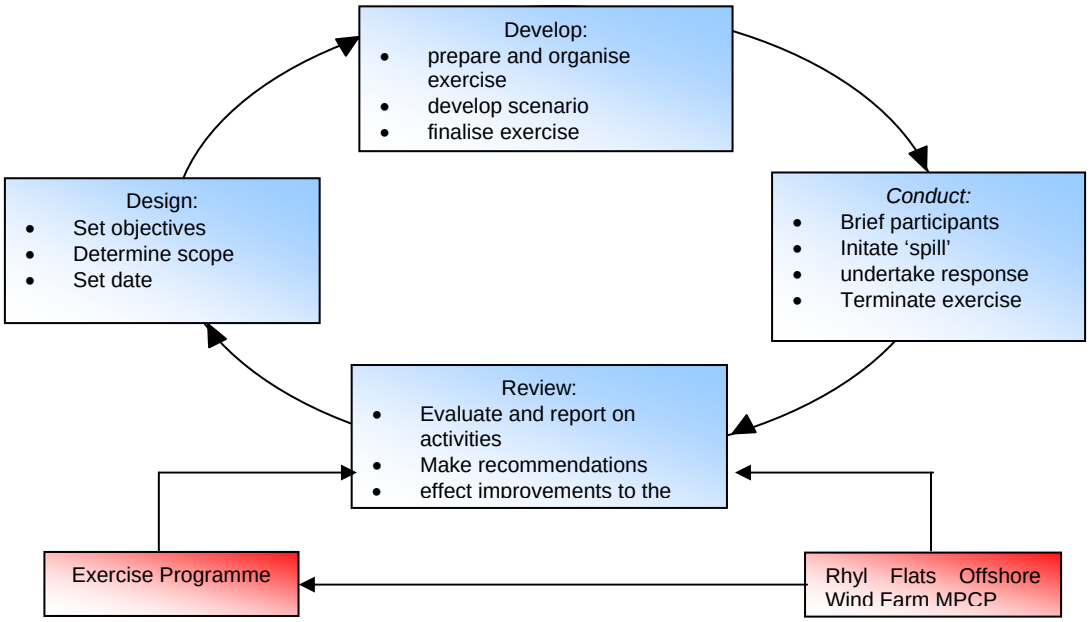


Figure 5: Exercise Planning and Review

1	Assess Situation & Commence Response	
	Contractor Project Manager	
2	Report Spill	
	Contractor Project Manager	Contractor Environmental Rep
3	Quantify Spill Size	
	Contractor Project Manager	Standby Vessel
4	Decide Upon Course of Action	
	Contractor Project Manager	Contractor Environmental Rep
5	Complete and Send Proforma Fax Notification	
	Contractor Project Manager	Contractor Environmental Rep
6	Sample the Oil	
	Contractor Project Manager	Standby Vessel
7	Track the Slick	
	Contractor Project Manager	Standby Vessel
8	Ongoing Responsibilities	
	Contractor Project Manager	Contractor Environmental Rep

Figure 6: Offshore Response Summary

NOTIFICATION MATRIX

In the event of an incident, the following matrix can be followed for contact numbers.

SIZE OF SPILL (TONNES)				CONTACT NAME	CONTACT DETAILS	REPORTEE
<1	1-25	26-100	101+			
☎	☎	☎	☎			
MT HØjgaard A/S (MTH) *Report any discharge or escape of pollutants entering the sea and any other sightings from the Wind Farm.*				Project Manager	☎ TBA ☎ TBA	
☎	☎	☎	☎	TBA	TBA	
Sub contractor *Report any discharge or escape of hydrocarbon entering the sea and any other sightings from the Wind Farm.*						
Vessel *Report any discharge or escape of hydrocarbon entering the sea and any other sightings from the Wind Farm.*						
☎	☎	☎	☎	Main Project Manager Gareth Penhale	☎ 01793 825102 Mob: 07795 353804	
RFOWFL *Report any discharge or escape of hydrocarbon entering the sea and any other sightings from the Wind Farm.*						
☎	☎	☎	☎	Holyhead	☎ Tel: 01407 762051 Fax: 01407 764373	
HM Coastguard /MCA *Report any discharge or escape of hydrocarbon entering the sea and any other sightings from the Wind Farm.*				Rescue co-ordinator	☎ Tel: 01407 767951 wm_holyhead@mcga.gov.uk	
	☎	☎	☎	Incident Response Desk Incident Response Administrator BERR Duty Officer	☎ : 01224 254058 (Office Hrs) ☎ : 01224 254045 (Office Hrs) ☎ : 0207 2153234 or 0207 2153505 (Out of Hrs) ☎ : 07693 776833 (Pager) Fax: 01224 254019	
BERR *Report any discharge or escape of hydrocarbon entering the sea and any other sightings from the Wind Farm.*						
	☎	☎	☎	Andrew Prior	☎ : 01224 655712 (Office Hrs) Fax: 01224 621488	
Joint Nature Conservation Committee *Report all spills. Data required for consultation in minimising the pollution impact to seabirds at sea.*						
	☎	☎	☎	Marine Pollution Response Team	☎ : 0870 785 1050 (Office Hrs) ☎ : 07770 977825 or 020 7270 8960 (Out of Hrs)	
Marine Fisheries Agency (MFA) *If action is required by MFA a telephone call must be made in addition to any message sent by fax or telex as the telex and fax machines are not monitored continuously.*						
	☎	☎	☎	Emergency line Jane Hodgeson (development control)	☎ : 0800 807060 (24 Hrs) ☎ : 08708 506506	
Environment Agency (EA) Wales *All spills likely to approach within 3nm of the coastline should be reported immediately. Data required to minimise impact to water quality in Rivers and Estuarine Areas.*						
	☎	☎	☎	Emergency Response	☎ 07659 140040 (24 Hrs) Fax: 01248 385510	
CCW *All spills likely to approach within 25nm of the coastline should be reported immediately by telephone. Data is required for consultation purposes in order to identify conservation interests within their jurisdiction.*						
			☎	General Emergency Planning Unit Jonathan Williams (unit manager)	Tel: 01492 575250 ☎ 01492 576099 Fax: 01492 592042	
Conwy County Borough Council *Notification required for all spills likely to approach <3nm of the coastline (low water mark)*						
			☎			
Notification required for all spills likely to approach <3nm of the coastline (low water mark)						

Key notifications: = ☎ Telephone Immediately

DATA DIRECTORY

CONTACTS DIRECTORY

It is important to note that all contact details within this section are placed in alphabetical order according to company/body name.

COMPANY/BODY NAME	CONTACT	TELEPHONE OFFICE HRS	TELEPHONE OUT OF HRS	FAX

Emergency Contact Number = 0800 374348
Briggs Marine 24 hour oil spill response

Port Authority
Harbour Master Mostyn
The Environment Agency: : 0800 807060 (24 Hrs)
MCA MRCC: Holyhead: **01407 767951**
Coastguard Rhyl: rhyl@rnli.org.uk
MFA Spill Response Team 0870 785 1050
MAIB (for incident reporting) 023 8023 2527

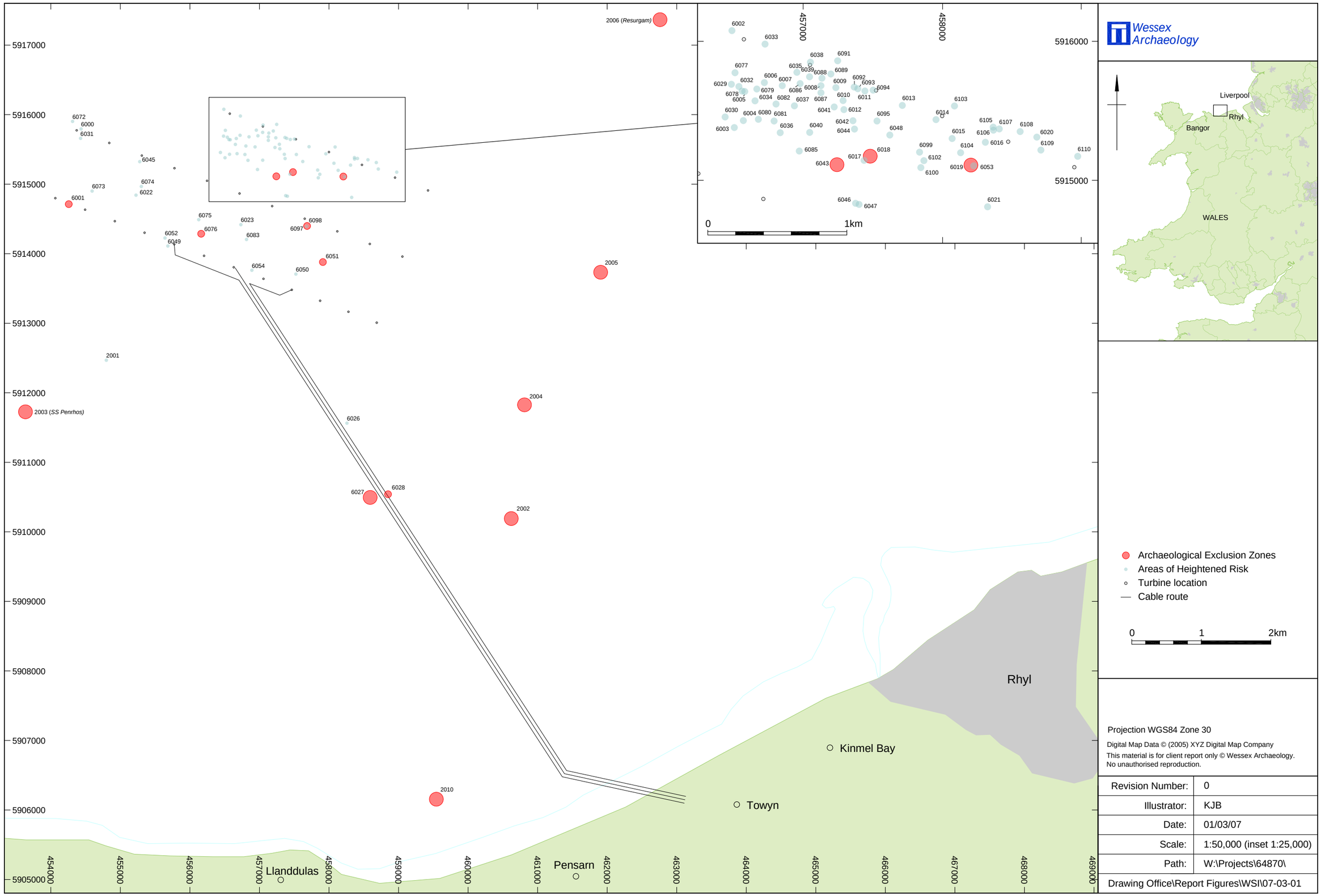
Appendix 1. Proforma for reporting Oil and Chemical Spills for Wind Farm Construction

Fax to: Nearest Coastguard Station
BERR
MFA
CCW
JNCC

Identity of Observer/reporter		
Full Name:		
Contact Telephone No.		
Incident Details		
Company Responsible for Incident:		
Date of Incident:	Time of Incident:	
Project Name:		
Latitude:	Longitude:	
Chemical Spill or Sheen Notification (tick below and complete column details)		
Oil Spill Notification:	Chemical Spill Notification:	
Quantity Spilled (tonnes):	Quantity Spilled (kg):	
Type of Oil:	Chemical spilled:	
%Oil if OBM or Base oil:	Chemical Use:	
Appearance:	Warning Label:	
Approx. spill area on sea surface if known:	Appearance:	
Tier of Response (1,2 or3):		
Is Spillage Ongoing? YES/NO (If YES the following details must be updated and faxed each 24 hr period for duration of incident) Spillage since last report (tonnes): Total Spillage to Date:		
Source of Pollution:		
Cause of Pollution:		
Steps taken to respond to spill:		
Spill likely to hit Shore: YES/NO (if YES approx location/time:		
Photographs taken: YES/NO	Samples taken for analysis YES/NO	
Weather Conditions		
Wind Speed (knots)	Wind Direction (0-360°)	
Beaufort Scale (1-12)	Wave Height (metres)	

3. Rhyl Flats Offshore Wind Farm Ltd

Archaeological Written Scheme of Investigation



Projection WGS84 Zone 30

Revision Number:	0
Illustrator:	KJB
Date:	01/03/07
Scale:	1:50,000 (inset 1:25,000)
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Drawing Office\Report Figures\WSI\07-03-01	

Archaeological Exclusion Zones

Figure 1

- Description of the results of the watching brief
- Summary and conclusions
- Bibliography of sources consulted.

7. ARCHIVE

A full archive including plans, photographs, written material and any other material resulting from the project will be prepared. All plans, photographs and descriptions will be labelled and cross-referenced, and lodged in an appropriate place (to be decided in consultation with the regional Sites and Monuments Record) within six months of the completion of the project.

8. STAFF

The project will be supervised by Andrew Davidson, Principal Archaeologist at the Trust, who has worked in various aspects of British archaeology for 18 years, and who has been responsible for managing all contract work at the Trust for the past five years, including archaeological programmes for major road contracts, pipeline construction and new development sites. The work will be carried out by fully trained archaeologists who are experienced in conducting watching briefs and working with contractors and earth moving machinery. (Full CV's are available upon request).

9. HEALTH AND SAFETY

The Trust subscribes to the SCAUM (Standing Conference of Archaeological Unit Managers) Health and Safety Policy as defined in **Health and Safety in Field Archaeology** (1999). A risk assessment will be undertaken prior to, and during, the fieldwork programme.

10. INSURANCE

The Trust holds public liability insurance with an indemnity limit of £2,500,000 through Russell, Scanlon Limited Insurance Brokers, Wellington Circus, Nottingham NG1 5AJ (policy 01 1017386 COM), and Professional Indemnity Insurance for £2,000,000 per claim (policy No. 59A/SA11818791).

11. REFERENCES

Gifford 2006. *Rhyl Flats Offshore Wind Farm, Report on archaeological observations and recording on onshore site investigations*, Report No. 13291.R02. Berridge, P. 1994. The lithics, in H. Quinnell and M.R. Blockley, *Excavations at Rhuddlan, Clwyd: 1969-1973, Mesolithic to Medieval*, CBA Res. Rep. 95, 95-114.

- *Coins* all coins from the same find provided they are at least 300 years old when found (if the coins contain less than 10% gold or silver there must be at least 10. Any object or coin is part of the same find as another object or coin, if it is found in the same place as, or had previously been left together with, the other object. Finds may have become scattered since they were originally deposited in the ground. Single coin finds of gold or silver are not classed as treasure under the 1996 Treasure Act.
- *Associated objects* any object whatever it is made of, that is found in the same place as, or that had previously been together with, another object that is treasure.
- *Objects that would have been treasure trove* any object that would previously have been treasure trove, but does not fall within the specific categories given above. These objects have to be made substantially of gold or silver, they have to be buried with the intention of recovery and their owner or his heirs cannot be traced.

The following types of finds are not treasure:
- Objects whose owners can be traced.
- Unworked natural objects, including human and animal remains, even if they are found in association with treasure.
- Objects from the foreshore which are not wreck.

All finds of treasure must be reported to the coroner for the district within fourteen days of discovery or identification of the items. Items declared Treasure Trove become the property of the Crown, on whose behalf the National Museums and Galleries of Wales acts as advisor on technical matters, and may be the recipient body for the objects.

The National Museums and Galleries of Wales will decide whether they or any other museum may wish to acquire the object. If no museum wishes to acquire the object, then the Secretary of State will be able to disclaim it. When this happens, the coroner will notify the occupier and landowner that he intends to return the object to the finder after 28 days unless he receives no objection. If the coroner receives an objection, the. find will be retained until the dispute has been settled.

5.5 Small finds

The vast majority of finds recovered from archaeological excavations comprise pottery fragments, bone, environmental and charcoal samples, and non-valuable metal items such as nails. Often many of these finds become unstable (i.e. they begin to disintegrate) when removed from the ground. All finds are the property of the land owner, however, it is Trust policy to recommend that all finds are donated to an appropriate museum where they can receive specialist treatment and study. At the very least the Trust would request access to the finds for a reasonable period to allow for study and publication. All finds would be treated according to advice provided within *First Aid for Finds* (Rescue 1999). Initial identification will be undertaken by Trust staff, but any additional advice would be sought from a wide range of consultants used by the Trust, including National Museums and Galleries of Wales at Cardiff, ARCUS at Sheffield and BUFAU at Birmingham.

6. REPORT

Following completion of the watching brief as outlined above, a report will be produced incorporating the following:

- Non-technical summary
- Introduction
- Specification and Project Design
- Methods and techniques
- Archaeological Background

5.2 Environmental samples

Relevant archaeological deposits will be sampled by taking bulk samples (a minimum of 10litres and maximum of 30 litres) for flotation of charred plant remains. Bulk samples will be taken from waterlogged deposits for macroscopic plant remains. Other bulk samples, for example from middens, may be taken for small animal bones and small artefacts.

5.3 Human remains

In order to excavate human remains, a licence is required under Section *25* of the Burials Act 1857 for the removal of any body or remains of any body from any place of burial.

In the event of unexpected discoveries of human remains, a licence will be obtained from the Home Office by telephoning them and explaining the situation. Any conditions attached to the licence will be complied with. The following procedural steps will be followed to ensure adherence to legal obligations with as little disruption to the project programme as possible while also keeping all parties informed of the situation:

- On first discovering any unexpected human remains the archaeological sub-contractor will endeavour as rapidly as possible to establish whether it is likely that they form part of a group (e.g. cemetery) or are isolated occurrences.
- The archaeological sub-contractor will immediately contact the Home Office, explaining the discovery and requesting the licence to be faxed to the archaeological sub-contractor.
  The archaeological sub-contractor will, without delay, inform the engineering contractor's site engineer and the Project Archaeologist.
  The Project Archaeologist will inform the Department's Agent, the District Coroner and if appropriate (on the advice of the Coroner) the Police.
  Until receipt of the licence limited archaeological excavations would continue in the area of the discovery, without disturbing the burials(s), to clarify the nature and extent of burial features.
- Should the discovery to be late in the working day, or the licence not received on the same day as the discovery in time to excavate and fully record the remains with due care and attention, they will be covered in an appropriate manner, and if necessary special overnight security provisions will be made to ensure that the remains are not disturbed by unauthorised persons.
- On receipt of the licence the remains will be excavated and recorded as soon as is practically possible, in accordance with any conditions attached to the licence.

Due care and respect will be accorded any human remains located in the course of archaeological excavations and monitoring of the construction works.

In order not to attract public interest of an undesirable kind, which might result in disturbance of the remains, site staff will be required not to discuss the discovery with unauthorised personnel.

Archaeological recording will be undertaken in accordance with good practice guidelines. No excavated remains will be left on site overnight, but will be removed to a safe store pending full compliance with any conditions for disposal required by the licence.

5.4 Unexpected Discoveries: Treasure Trove

Treasure Trove law has been amended by the Treasure Act 1996. The following are Treasure under the Act:

- *Objects other than coins* any object other than a coin provided that it contains at least 10% gold or silver and is at least 300 years old when found.

contained intertidal organisms typical of a high water environment and these were suggested to date between 7.9ka to 8.1ka BP (i.e. within the Later Mesolithic period). It stated... 'The data indicate that the area immediately alongside the proposed cable route is unlikely to contain any evidence of human habitation; however, the palaeo-environmental conditions that probably prevailed within the area would have almost certainly provided excellent hunting and foraging conditions for early human settlers within this region of the Clwyd Plain'. This is borne out by the evidence of extensive Mesolithic and Neolithic activity at Rhuddlan, 4km to the south-east (Berridge 1994). Related evidence in the development area might be of timber trackways or jetties belonging to hunting or fishing activity in what would then have been a marshy estuary.

A very small potential exists for the discovery of evidence of Medieval activity related to the site of the Battle of Cae Coch, reputed to be in this general area, where the Welsh fought the Saxons (RCAHM 1914 *Inventory of the ancient monuments of Wales and Monmouth – Denbighshire*, CPAT PRN 102010).

A number of Post-medieval stone property markers have also been found in the area of Morfa Rhuddlan, and others could be encountered during the construction.

5. PROJECT METHOD

5.1 Watching brief

The watching brief will be preceded by a site walk-over and by a rapid desk-top study to assess relevant archaeological or historical sources not specified or illustrated in the EIA for instance historical maps, that might add to the assessment.

During the watching brief itself an archaeologist will be present during all significant periods of earth and hardcore moving that have the potential for revealing archaeological remains.

The watching brief is to be undertaken in a manner that allows for the immediate cessation of construction to allow the recording of archaeological evidence. This will involve close liaison between the archaeologist and the site agent and machine operators.

All stripped areas will be examined and potential archaeological sites identified; these will then be cleaned by hand trowelling or hoeing. If the features revealed can be understood and recorded with no further work required, then they will be photographed, described and located on OS 1:2500 plans. **However if any of the features are too complex to allow this, then recommendations will be made for further work, which would be in addition to the work undertaken for the watching brief**.

A continuous context numbering system will be used, with each context recorded on standard *pro-forma* sheets. Sections will be drawn if relevant.

The level of archaeological coverage during the watching brief will vary according to the archaeological sensitivity and potential of the area being stripped. A comprehensive watching brief (an archaeologist will be present during all ground disturbance) will be undertaken during stripping of the southern part of the area. The remainder will be intensive or intermittent depending upon initial results.

The substation will be constructed on the Rhuddlan Marsh, immediately North of the River Gele.

The cable route, access track and substation locations are all shown on the attached drawing 'Onshore Electrical System' dated 21/08/06.

4. ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

An archaeological assessment of the whole route was undertaken by Wessex Archaeology and is incorporated in the Onshore Environmental Impact Assessment Vol. 3, 2005. This included a desktop study of the geology, topography and archaeological and historical background. It also assessed archaeological potential and impact and made recommendations for mitigation.

A palaeo-environmental assessment of the route was also undertaken by Gifford by means of a series of 14 trial pits, followed by sampling and analysis of sediments (Gifford 2006).

The archaeological study area was a 10km square enclosing the development. 491 recorded archaeological or historical sites were identified in this area, including ten scheduled monuments, plus three historic parks or gardens (EIA Vol. 3, Fig. 11.1). Only one site is known in the immediate vicinity of the cable route, and none directly actually affected by the route.

The area as a whole has some potential for undiscovered features or finds because of the evidence for human activity. There are Mesolithic and Bronze Age finds from Splash Point, Rhyl and Mesolithic and Neolithic finds from Rhuddlan.

Rhuddlan Marsh (Morfa Rhuddlan), at the southern part of the route was identified in the EIA as an area of archaeological potential at three levels:

a. Near to the surface might be evidence relating to Medieval and later reclamation of the marshes and subsequent land use.

b. At greater depth might be evidence of marine use, such as wharfage or even vessels, from a period prior to drainage, when the area of the marshes may have still been part of the tidal estuary.

c. At even greater depth might be well-preserved prehistoric land surfaces or structures belonging to early use of the estuary, as has been found, for instance in the Severn Estuary.

The original assessment of potential relating to the lower depths has been superseded by the subsequent palaeo-environmental survey (Gifford 2006). This stated... 'The stratigraphic sequence exposed through the drilling of boreholes and excavation of trial pits are predominantly characterised by the presence of very soft, light grey, fine grained silty clays...' These overlay glacial till and were interpreted as predominantly early to mid-Holocene in age. Glacial clays lay at a shallower depth close to the shore line and it was suggested that there had been a glacial moraine there along which the shore had formed. It was also stated that 'Although the soft clay deposits at this location often contain isolated pockets of organic material, no complete horizon of such material was ever encountered within any sediment core or trial pit.' The presence of isolated pockets of organic material suggested that the deposits had been subject to erosion and re-working suggesting continuing tidal conditions. One more substantial isolated organic deposit at 6.20m below the surface (-2.13 OD)

APPENDIX IX: PROJECT DESIGN FOR INTER-TIDAL WATCHING BRIEF

RHYL FLATS OFFSHORE WIND FARM, DENBIGHSHIRE
On-shore Electrical System – Buried Cable, Substation and Access Track

PROJECT DESIGN FOR WATCHING BRIEF (G1929) – Prepared by Andrew Davidson, Gwynedd Archaeological Trust
Prepared for npower renewables 22/09/06 (amended 08/11/06)

1. INTRODUCTION
It is proposed to construct an off shore wind turbine assembly on the sea-bed called Rhyl Flats, *c*. 7km from the shore, north of Rhyl. This will require a power cable, part of which will be onshore. One part of the onshore cable is overhead, on poles. The other part is a buried cable and recommendations for archaeological mitigation require a watching brief during construction of this underground cable route. Gwynedd Archaeological Trust (GAT) was asked by npower plc to produce a project design with costs for undertaking an archaeological watching brief during construction of the buried cable section of the onshore part of the development. The brief also includes the works associated with the construction of a substation and the upgrading of an existing agricultural track.

2. THE ASSESSMENT BRIEF
The archaeological impact of the development is subject to approval by the Clwyd-Powys Archaeological Trust Development Control Officer. In complicated cases a special brief might be written but in this case GAT was asked to provide a project design conforming to the guidelines produced by the Institute of Field Archaeologists given in *Standard and Guidance for an archaeological watching brief* (IFA 1994, revised 1999), where a watching brief is defined as a 'a formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons. This will be within a specified area or site on land, inter-tidal zone or underwater, where there is a possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive'.

The objective of this programme of archaeological works is to create an archive record of any archaeological deposits or structures that may be revealed through on-site construction activity.

3. SITE LOCATION
The buried cable section of the landward cable route is situated 500m west of the centre of Tywyn, between Abergele and Rhyl. It runs from the inter-tidal zone across a narrow strip of low-lying level land between the shore at the north and the shallow valley of the Afon Gele at the south, where it will terminate at a sub-station. The cable route runs through an extensive caravan park and then across the marshy fields of Rhuddlan Marsh. The cable route largely follows existing trackways and will be approximately 1.8km long.

The track that is to be upgraded starts as a lane between two caravan sites, before running over Rhuddlan Marsh. The total length is approximately 800m.

APPENDIX VIII: DISCOVERIES ON THE SEABED: PRELIMINARY RECORDING FORM

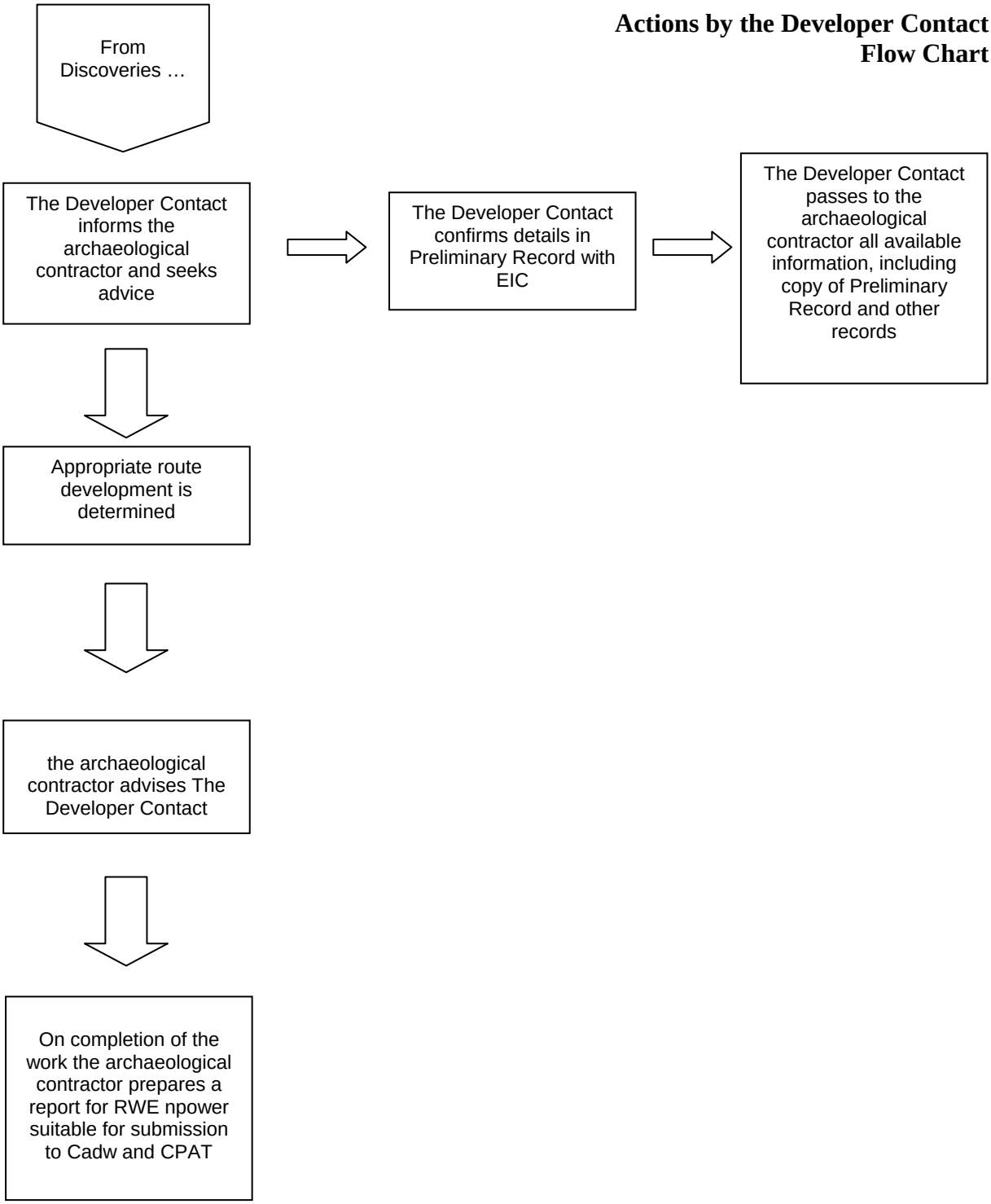
Discoveries on the Seabed: Preliminary Record

Date:	Name of Report Compiler:	Contact details:
Vessel Name:	Cable Name and Sea Area:	Name of Site Representative:
Name of Master/Officer of the Watch:	Name of Finder (if different from Officer of the Watch):	Time that anomaly was encountered:
Vessel position at time when the anomaly was encountered (KP):		
Latitude:	Longitude:	Datum (if different from WGS84):
Notes on position given: How accurate is the position given above? Is the position the original position of the anomaly on the seabed or have operations moved the material some distance from its original location?		
Description of the anomaly: Derived from Obstacle Avoidance Sonar or Cable Tensiometer?		
Apparent extent of anomaly: m long x m wide x m above general level of seabed:		
Extent of deviation and of route development:		
Date and time at which Subocean Contact was informed:	General notes:	

APPENDIX VII: VESSEL AND INSTALLATION EQUIPMENT SPECIFICATIONS AND PROJECT ORGANISATION CHART

Note: To be confirmed and, where relevant, circulated to Heritage Curators by the Archaeological Contractor once the details are known.

Actions by the Developer Contact Flow Chart



ACTIONS BY THE DEVELOPER CONTACT

Inform the Archaeological Contractor

Once informed of a find by the EIC, the Developer Contact shall inform the archaeological contractor as soon as possible so that advice can be sought.

The Developer Contact will confirm with the EIC that all the details set out in the Preliminary Record are comprehensive and correct. The Developer Contact shall pass on to the archaeological contractor all available information relating to the circumstances of the occurrence, including a copy of the Preliminary Record and copies of any other records that have been made.

ROUTE DEVIATION

Where the position of an anomaly or find is reasonably certain, the Developer Contact shall confirm the extent of any route deviation around the area of the anomaly and archaeological advice will be obtained.

Instigate Review of Route Survey Geophysical Data

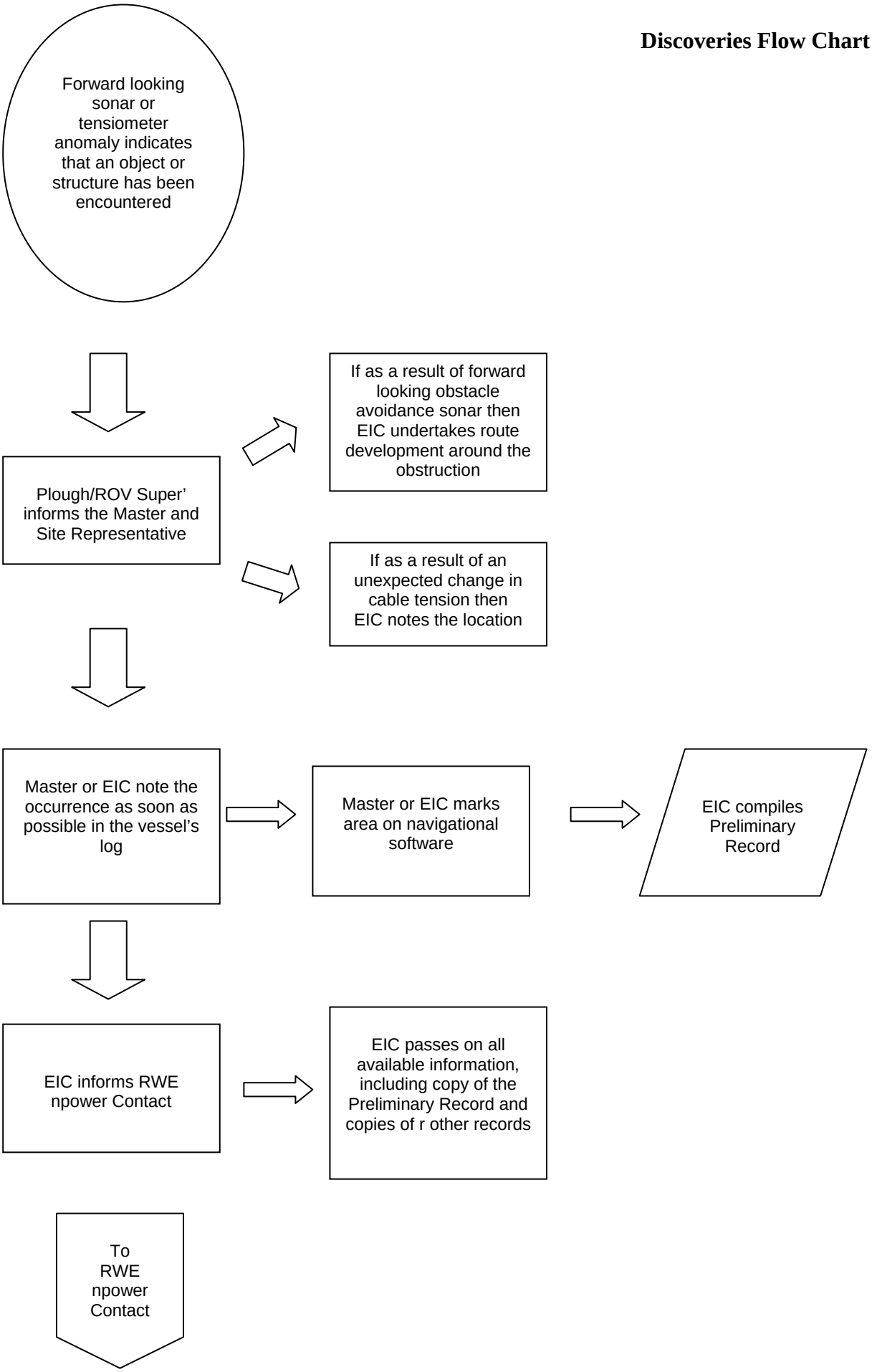
The Developer Contact shall arrange for the archaeological contractor to review the geophysical data to see if there is any evidence of an anomaly and to advise on its possible character.

Action by the Archaeological Contractor

Once contacted, information has been passed on and the archaeological contractor has been instructed, the archaeological contractor shall review all information relating to the occurrence in conjunction with geophysical and/or desk based information. The archaeological contractor will advise the Developer Contact of any implications of the occurrence for the historic environment and on any further actions that might be required.

On completion of the work to which the protocol applies the archaeological contractor will prepare a report to RWE npower that can be submitted to Cadw and CPAT.

Discoveries Flow Chart



DISCOVERIES ON THE SEABED

Tell the EIC

If an anomaly is identified by the forward looking obstacle avoidance sonar (if used), or if the towing cable tensiometer indicates that an object or structure has been encountered on the seabed, the Plough/ROV Superintendent shall inform the Master and the EIC.

If an anomaly is identified on the forward looking sonar on the plough (if used), the route will be deviated around the obstruction, in line with normal practise and the location of the anomaly identified and reported to the EIC.

If an anomaly is identified by a change in the tension it is understood that any impact will already have occurred and no deviation is possible. However, the change in tension should be brought to the attention of the EIC so that advice can be sought and any requirements for further investigation determined.

ACTIONS BY THE MASTER AND EIC

The Master or the EIC shall note the occurrence as soon as possible in the vessel's log together with the time and seabed position. The log entry should include a close approximation of the original position of the anomaly on the seabed. Additionally, the area shall be tagged or noted within navigational software.

The Site Representative shall compile a preliminary record of the occurrence. A sample form for this is presented in **Appendix VIII**.

The EIC shall inform the Developer Contact of the occurrence as soon as possible and pass on all available information, including a copy of the Preliminary Record and copies of any other records that have been made.

RHYL FLATS OFFSHORE WIND FARM

PROTOCOL FOR REPORTING DISCOVERIES OF ARCHAEOLOGICAL INTEREST

DRAFT

INTRODUCTION

The Protocol has been designed to deal with discoveries made on the seabed during cable installation. A series of actions is defined for such cases. All actions will result from remote sensing as no material is recovered to the surface in the course of cable installation operations.

The Protocol anticipates discoveries being made by Staff (Plough/ROV Superintendent), who report to a Site Representative (Onboard Engineer in Chief) on their vessel, who then reports to the Developer Contact. The Developer Contact will liase with the archaeological contractor and RWE npower Project manager. The archaeological contractor will ultimately prepare a report on the protocol suitable for submission to the Cadw and CPAT.

TERMS AND ROLES

The Developer Contact will be advised by the archaeological contractor on all matters concerning cultural heritage.

On the vessel the person responsible for reporting anomalies will be the Onboard Engineer in Chief (EIC) in liaison with the vessel Captain. Anomalies will be brought to the attention of the EIC by the ROV/Plough Superintendent.

The archaeological contractor is to provide specialist advice and technical support services relating to the mitigation of the impacts of the scheme on the historic environment.

The Developer shall draw the attention of all relevant staff to the potential for archaeological material to be found in the course of installation and inform them of the possible importance of such finds.

Copies of this Protocol will be available onboard the installation vessel.

OPERATIONAL ACTIVITIES

The action of laying the Rhyl Flats Offshore Wind Farm submarine cables involves the use of Add details.

LEGAL IMPLICATIONS

It should be noted that if the wreck of an aircraft is encountered it is automatically protected as a protected place under the terms of the Protection of Military Remains Act (1986) and it is an offence to tamper with, damage, move or remove items.

APPENDIX VI: PROTOCOL FOR REPORTING FINDS OF ARCHAEOLOGICAL INTEREST

PURPOSE OF THE PROTOCOL

This document sets out the procedure for reporting discoveries of potential archaeological interest made during the course of installation work on the Rhyl Flats Offshore Wind Farm inter-array and submarine export cables.

The aim of the Protocol is to reduce any adverse effects of the development upon the historic environment by enabling people working on the project to report their finds in a manner that is both convenient to their every-day work and effective with regard to curatorial requirements.

The archaeological finds made by installation workers are important because they shed light on past human use of the landscape, sea and seabed. The information that such discoveries bring to light can help archaeologists to better understand what happened in times past, and therefore to better protect those aspects of our history that should be conserved on behalf of future generations.

CIRCUMSTANCES OF DISCOVERY

This Protocol addresses finds of archaeological interest made on the seabed, based on an assessment of the working practices involved in cable installation. These anomalies, such as resistance encountered during cable laying or contact on forward-looking sonar (if used), may indicate that an object or structure of archaeological interest has been encountered on the seabed.

SCOPE OF THE PROTOCOL

Note: Contact details, including all nominated contacts, of companies contracted by RWE npower to undertake the installation of the Rhyl Flats Offshore Wind Farm inter-array and submarine export cables will be circulated once contracts have been finalised.

It is understood that RWE npower will contract an individual or company to provide archaeological consultancy and to report as appropriate to RWE npower, Cadw and CPAT.

This protocol only applies to operations undertaken offshore.

MONITORING THE PROTOCOL

At the end of the installation phase the archaeological contractor shall submit a brief report on the implementation of the Protocol to RWE npower, RWE npower and CPAT. The report shall also include an account of areas from which no reports have been made during the course of the installation. If no anomalies are found the report may simply consist of short correspondence detailing that the protocol was implemented and nothing has come to light.

Level	Type	Objective	Sub-level	Character	Scope	Description
4	**Removal**	A record sufficient to enable analytical reconstruction and/or reinterpretation of the site, its components and its matrix.			A complete record of all elements of the site in the course of dismantling and/or excavation.	
5	**Intra-site**	A record that places the site in the context of its landscape and other comparable sites.			A complete record of all elements of the site, combined with selective recording of comparable sites and investigation of the surrounding area.	…

Note: these levels represent guidance formulated by Wessex Archaeology for use during the archaeological investigation of wreck sites. They are currently used by English Heritage, but have not been formally accepted as a standard means of grading archaeological work.

APPENDIX V: ARCHAEOLOGICAL WRECK RECORDING LEVELS

Level	Type	Objective	Sub-level	Character	Scope	Description
1	**Assessment**	A record sufficient to establish the presence, position and type of site.	1a	Indirect (desk-based)	A basic record based on documentary, cartographic or graphic sources, including photographic (incl. AP), geotechnical and geophysical surveys commissioned for purposes other than archaeology.	Documentary assessment / inventory of a site, compiled at the start of work on a site, and updated as work progresses.
			1b	Direct (field)	A basic record based on field observation, walkover survey, diving inspection etc., including surveys commissioned specifically for archaeological purposes.	Typically a 1-2 dive visit to the site (to assess a geophysical anomaly, etc.).
2	**Evaluation**	A record that provides sufficient data to establish the extent, character, date and importance of the site.	2a	Non-intrusive	A limited record based on investigations that might include light cleaning, probing and spot sampling, but without bulk removal of plant growth, soil, debris etc.	Typically a 2-4 dive visit to assess the site's archaeological potential, backed up by a sketch plan of the site with some key measurements included.
			2b	Intrusive	A limited record based on investigations including vigorous cleaning, test pits and/or trenches. May also include recovery (following recording) of elements at immediate risk, or disturbed by investigation.	Either an assessment of the buried remains present on a site; the recovery of surface artefacts; or cleaning to inform for example a 2a investigation.
3	**In situ**	A record that enables an archaeologist who has not seen the site to comprehend its components, layout and sequences.	3a	Diagnostic	A detailed record of selected elements of the site.	The first stage of a full record of the site. This would include a full measured sketch of the site and a database (or equivalent) entry for all surface artefacts.
			3b	Unexcavated	A detailed record of all elements of the site visible without excavation.	Full site plan (i.e. planning frame or equivalent accuracy) with individual object drawings, and full photo record (possibly including a mosaic).
			3c	Excavated	A detailed record of all elements of the site exposed by open excavation of part or whole of the site.	This may take the form of full or partial excavation of a site.

A Level 2 Archaeological Wreck Survey will involve in the order of two to four dives on each site by suitably experienced archaeologists. Recording will be conducted to a level whereby a statement can be made as to the date, character, extent and archaeological importance of the site. Typically this will include a sketch plan of the site supported by key measurements and accurate positional information. Significant diagnostic features will be recorded by photography backed up with written records and measurements. Limited documentary research may also be required to support the assessment of importance.

The archaeological results of any diver/ROV survey will be compiled in a report, which will also include a statement of the likely requirements (if any) for further archaeological work.

APPENDIX IV: ARCHAEOLOGICAL IMPUT INTO DIVER/ROV SURVEYS

Diver/ROV surveys may be undertaken primarily for archaeological purposes by an archaeological contractor. In such cases, planning for the survey should follow normal archaeological procedures.

Any diver/ROV surveys undertaken primarily for engineering, ecological or other non-archaeological purposes should include archaeological input at the planning stage so that archaeological considerations can be taken into account. Companies planning diver/ROV survey should, through their nominated point of contact, advise RWE npower that further survey is being planned.

This input will take the form of advice from an appropriately qualified marine archaeologist on measures to optimise archaeological results from the planned survey, including:

- Available details of sites and/or anomalies identified in the desk-based assessment;
- Archaeological potential of areas where no existing sites and/or anomalies are yet known;
- Type and level of diver/ROV positioning, voice recording and video/still recording;
- Clear guidance on the types of sites and finds that are to be reported and recorded.

Consideration should be given to having an archaeologist (or archaeological team) present during any diver or ROV surveys, either as an observer(s) or participating diver(s) to optimise archaeological results and thereby reduce the need for repeat survey.

REVIEW OF DATA COLLECTED BY DIVER/ROV SURVEYS

Following the completion of the diver/ROV survey all data, including video footage will be reviewed by an appropriately qualified archaeologist.

This review will identify any sites that are potentially of archaeological interest – typically this will involve the identification of vessel remains, rather than just stray artefacts. The report will identify those sites and/or geophysical anomalies that are of sufficient archaeological interest to warrant further investigation. It will also identify those sites that are no longer of archaeological interest, and hence may be removed from the list of Archaeological Exclusion Zones.

This phase of work will constitute a Level 1 Archaeological Wreck Record (see **Appendix V**).

ARCHAEOLOGICAL SITE ASSESSMENT

If the review of data collected by diver/ROV survey identifies any sites of archaeological interest that will be subject to impact during construction then a Level 2 Archaeological Wreck Survey (see **Appendix V**) will be required.

APPENDIX III: GEOTECHNICAL ASSESSMENT STAGES

Stage 1: Planning
Desk-based archaeological assessment of core logs generated by geotechnical contractors. This assessment will establish the likely presence of horizons of archaeological interest and broadly characterise them, as a basis for deciding what Stage 2 archaeological recording is required. The Stage 1 report will state the scale of Stage 2 work proposed.

Stage 2: Coring and Recording
Archaeological recording of selected retained or new cores. This will entail the splitting of the cores, with half of each core being cleaned and recorded. The Stage 2 report will state the results of the archaeological recording and will indicate whether any deposits that have the potential to contain palaeo-environmental information survive, and hence whether any Stage 3 work is warranted. The absence of any deposits containing palaeo-environmental potential (typically fine-grained sediments and/or peat) will mean that analysis will not continue beyond this stage.

Stage 3: Sampling and Assessment
Sub-samples will be taken from selected cores and assessed for palaeo-environmental material (pollen, diatoms and foraminifera). Assessment will comprise laboratory analysis of the samples to a level sufficient to enable the value of the palaeo-environmental material surviving within the cores to be identified. Sub-samples will also be taken and retained at this stage in case radiocarbon dating is required during Stage 4.

The Stage 3 report will set out the results of each laboratory assessment together with an outline of the archaeological implications of the combined results. It will indicate whether the data contained within the cores is sufficient to allow for an understanding of the archaeological, lived-in and studied landscape, and thus whether any Stage 4 work is warranted.

Stage 4: Analysis and Dating
Stage 4 comprises full analysis of any pollen, diatoms and/or foraminifera assessed during Stage 3. Stage 4 will typically be supported by radiocarbon dating of suitable sub-samples. Stage 4 will result in an account of the successive environments within the coring area, a model of environmental change over time, and an outline of the archaeological implications of the analysis.

If undertaken, Stage 4 should be reported as part of a final report covering all aspects of the palaeo-topography and prehistory of the area affected by the development. This may also include relevant elements data generated by the desk-based assessment, marine geotechnical coring and terrestrial watching brief (see Section 10).

Data sources with the potential for identifying archaeological remains are as follows:

- Sidescan survey may identify wrecks and other related debris of all periods that lie (at least in part) above the surface of the seabed;
- Magnetometer survey may identify wrecks and other related debris of all periods (though principally post-medieval and modern) on the surface of and under the seabed;
- Boomer and/or Chirp (hereafter termed seismic) survey may identify features and deposits that relate to the topography of an area prior to its burial and inundation during the prehistoric period, and buried objects such as wrecks (note: seismic data has to be calibrated with bathymetric data to enable the calculation of absolute heights);
- Bathymetry may be used to characterise wrecks and other related debris of all periods that lie (at least in part) on the surface of the seabed. The density of data generated by multibeam bathymetric surveys gives it a considerable advantage, in archaeological terms, over single beam bathymetry.

APPENDIX II: ARCHAEOLOGICAL IMPUT INTO FURTHER MARINE GEOPHYSICAL SURVEYS

This survey should be informed by such archaeological desk-based information as is available at the time of the survey. The specification of the survey (e.g. line spacing and equipment used) should be designed to ensure the adequate detection of archaeological material.

Surveys should be carried out to a single datum and co-ordinate system, such as WGS84 UTM. All survey data – including navigation (position, heading and velocity) – should be acquired digitally in industry-standard formats. Care should be taken to maintain the orientation and attitude of sensors on line. Track-plots should be corrected for layback (including catenary effects) and made available in digital (GIS) form.

Once the surveys have been processed to meet their primary objectives, the survey data – together with factual reports – should be made available in digital formats to the developer's archaeological contractor for archaeological analysis and interpretation.

Sidescan sonar survey should be carried out at frequency, range and gain settings capable of resolving all objects that are 0.5m and above throughout the survey area. Preferably, line spacing should be equal to or less than the effective range, and no more than 1.75x the effective range. Where the sites and anomalies listed in Section 3 above fall with or close to the scheme impacts they should be 'boxed' by at least two and preferably four lines along and across the principal axis of the anomaly. These lines should be offset so that the anomaly does not lie immediately beneath the fish, and run at optimal frequency and range settings for imaging the anomaly. For archaeological purposes, true sidescan is preferable to multibeam pseudo-sidescan. Sidescan sonar data should be made available in the form of raw, un-mosaiced files in a suitable proprietary format.

Magnetometer survey should be carried out using a caesium gas or equivalent system capable of resolving anomalies of 5 nanoTeslas and above. Lines can be run in conjunction with other sensors (i.e. on the same line spacings and orientations) but provision should be made to run additional lines and cross-lines across the sites and anomalies listed in Section 3 above. Magnetometer data should be made available as cleaned, de-spiked text (x,y,z) files for each line, including layback.

Sub-bottom survey should be carried out using a source capable of resolving internal structures to the full depth of anticipated scheme impacts within Quaternary deposits. Line and cross-line spacings and orientations should be sufficient to resolve the extents and characteristics of the principal Quaternary deposits. A single beam echosounder should be run in conjunction with the sub-bottom survey; the first reflector (seabed) should be levelled with reference to a tide gauge. Sub-bottom data should be made available in a suitable proprietary format.

Multibeam survey should be carried out using a system capable of achieving an effective cell/bin size better than 1m. Use of a beam-forming system is preferred. Where an anomaly of apparent archaeological potential is identified, an additional single slow pass should be carried out at the highest possible ping rate. Single beam and multibeam data should be made available as de-spiked and tidally-corrected text (x,y,z) files for each line, in addition to any gridded/rendered surfaces.

WA No.	Classification	Source	UTM E	UTM N	Dimensions	Magnetic Amplitude (nT)	Notes	Grading	WA Description
6102	Seafloor disturbance	SR54	457868	5915142	3.9 x 1.4 x no measured height		Irregular seabed	3	Debris, possibly boulder.
6103	Object with height	SR58	458088	5915535	1.2 x 0.7 x 0.2		Object	3	Debris, possibly boulder.
6104	Object with height	SR59	458132	5915199	2.3 x 0.8 x 0.4		Object	3	Debris, probable boulder.
6105	Object with height	SR63	458366	5915383	0.8 x 0.6 x 0.1		Object	3	Debris, possibly boulder.
6106	Object with height	SR64	458368	5915361	1.2 x 0.6 x 0.4		Object	3	Debris, possibly boulder.
6107	Object with height	SR65	458410	5915370	1.2 x 0.4 x 0.1		Object	3	Debris, possibly boulder.
6108	Object with height	SR66	458560	5915351	0.9 x 0.6 x 0.2		Object	3	Debris, possibly boulder.
6109	Object with height	SR68	458709	5915218	4.4 x 0.7 x 0.3		Object	3	Debris, possibly boulder.
6110	Object with height	SR70	458974	5915173	1.4 x 0.7 x 0.5		Object	3	Debris, possibly boulder.

WA No.	Classification	Source	UTM E	UTM N	Dimensions	Magnetic Amplitude (nT)	Notes	Grading	WA Description
6077	Object with height	SR14	456510	5915774	3.1 x 1.3 x 0.8		Object	3	Debris, possibly boulder.
6078	Object with height	SR15	456561	5915642	1.7 x 0.5 x 0.3		Object	3	Debris, probable boulder.
6079	Object with height	SR18	456667	5915657	1.5 x 1.4 x 0.7		Object	3	Debris, possibly boulder.
6080	Seafloor disturbance	SR19	456678	5915439	7.3 x 2.7 x no measured height		Irregular Seabed	3	Debris, probable boulder, with associated seafloor disturbance.
6081	Object with height	SR21	456791	5915427	3.9 x 0.3 x0.1		Object	3	Debris, probable boulder.
6082	Object with height	SR22	456805	5915549	1.2 x 0.6 x 0.3		Object	3	Debris, probable boulder.
6083	Object with height	SR23	456814	5914205	2.3 x 0.8 x 0.2		Object	4	Not seen
6084	Object with height	SR25	456954	5915778	3.2 x 1.2 x 0.2		Object	4	Not seen
6085	Seafloor disturbance	SR26	456972	5915211	4.1 x 2.1 x no measured height		Irregular Seabed	3	Debris, probable boulder.
6086	Object with height	SR27	456978	5915696	2.7 x 1.0 x x0.4		Object	3	Debris, probable boulder.
6087	Object with height	SR30	457128	5915630	4.2 x 0.5 x 0.3		Object	3	Debris, possibly boulder.
6088	Object with height	SR31	457135	5915735	3.0 x 0.3 x 0.2		Object	3	Debris, probable boulder.
6089	Object with height	SR32	457199	5915765	0.7 x 0.8 x 0.5		Object	3	Debris, probable boulder.
6090	Seafloor disturbance	SR35	457243	5915113	4.1 x 2.6 x no measured height		Irregular seabed	4	Not seen
6091	Object with height	SR36	457248	5915860	3.0 x 0.8 x 0.3		Object	3	Debris, possibly boulder.
6092	Object with height	SR39	457367	5915671	1.6 x 0.8 x 0.3		Object	3	Debris, possibly boulder.
6093	Object with height	SR40	457393	5915659	4.2 x 0.8 x 0.3		Object	3	Debris, possibly boulder.
6094	Object with height	SR45	457503	5915649	3.1 x 1.3 x 0.4		Object	3	Debris, possibly boulder.
6095	Object with height	SR46	457531	5915427	8.7 x 3.2 x 0.3		Object	3	Debris, probable boulder.
6096	Object with height	SR47	457623	5915326	4.3 x 0.9 x 0.5		Object	4	Not seen
6097	Object with height	SR48	457678	5914394	22.3 x 0.1 x 0.1		Possible cable or rope	3	Debris, probable cable/rope, caught on or attached to debris 6098.
6098	Object	SR49	457685	5914399	1.0 x 0.9 x 0.0		Object	2	Debris at end of 6097.
6099	Object with height	SR51	457837	5915203	2.3 x 0.6 x 0.1		Object	3	Debris, probable boulder.
6100	Object with height	SR52, SR53	457846	5915092	1.3 x 1.1 x 0.1		Object	3	Debris, possibly boulder. Possible scour.
6101	Object with height	SR53	457849	5915092	1.3 x 1.1 x 0.1		Object	4	Not seen

WA No.	Classification	Source	UTM E	UTM N	Dimensions	Magnetic Amplitude (nT)	Notes	Grading	WA Description
6056	Magnetic anomaly	RM11	462369	5906308		13.2	Steep gradient in continuously varying zone		
6057	Magnetic anomaly	RM12	462449	5906239		19	Possible dipole in continuously varying zone		
6058	Magnetic anomaly	RM13	462398	5906199		19.2	Possible dipole in continuously varying zone		
6059	Magnetic anomaly	RM14	462418	5906143		18.2	Steep gradient in continuously varying zone		
6060	Magnetic anomaly	RM15	462382	5906100		15.1	Possible asymmetric dipole in continuously varying zone		
6061	Magnetic anomaly	RM16	462749	5906277		20	Steep gradient/positive monopole in continuously varying zone		
6062	Magnetic anomaly	RM17	463031	5906318		19.6	Larger positive monopoles in continuously varying zone		
6063	Magnetic anomaly	RM2	458184	5911614		21	Dipole		
6064	Magnetic anomaly	RM3	458703	5910270		18	Dipole		
6065	Magnetic anomaly	RM30	462357	5906016		9.2	Dipole		
6066	Magnetic anomaly	RM33	463055	5906422		17.8	Dipole		
6067	Magnetic anomaly	RM34	463053	5906390		7.9	Negative monopole		
6068	Magnetic anomaly	RM35	463080	5906438		39.9	Positive monopole		
6069	Magnetic anomaly	RM7	461153	5907245		19.4	Dipole		
6070	Magnetic anomaly	RM8	461993	5906389		12	Steep gradient in continuously varying zone		
6071	Magnetic anomaly	RM9	462010	5906180		11.2	Steep gradient in continuously varying zone		
6072	Object with height	SR02	454313	5915903	2.2 x 0.7 x 0.4		Object	3	Debris, possibly boulder.
6073	Object with height	SR03	454594	5914901	2.8 x 0.1 x 0.1		Possible pipe	3	Dark reflector, stretched, no height. Not a pipe.
6074	Object with height	SR04	455302	5914967	2.9 x 0.9 x 0.2		Object	3	Dark reflector
6075	Object	SR05	456127	5914490	13.0 x 2.2 x no measured height		Possible fishing debris	4	Not seen
6076	Object	SR06	456162	5914287	10.5 x 3.7 x no measured height		Possible fishing debris	2	Debris

WA No.	Classification	Source	UTM E	UTM N	Dimensions	Magnetic Amplitude (nT)	Notes	Grading	WA Description
6025	Magnetic anomaly	MR30	458385	5913502		7.7			
6026	Object with height	R1	458258	5911563	0.5 x 0.2 x 0.2		Unidentified target	3	Debris, probable boulder.
6027	Object	R2	458592	5910495	25.0 x 10.0 x no measured height		Possible small wreck	1	Wreck. Broken up.
6028	Object with height	R3	458849	5910541	1.4 x 1.4 x 0.3		Possible tyre	2	Debris
6029	Object with height	RF04	456484	5915691	2.1 x 0.3 x 1.4		Object with shadow	4	Not seen
6030	Object with height	RF06	456439	5915456	2.2 x 0.3 x 1.5		Object with scour	4	Not seen
6031	Object with height	RF07	454428	5915659	2.9 x 0.2 x .09		Object with shadow	3	Debris, probable boulder.
6032	Object with height	RF08	456538	5915675	1.7 x 0.2 x 0.9		Object with shadow	4	Not seen
6033	Object with height	RF09	456726	5915980	3.9 x 0.6 x 1.8		Object with shadow	4	Not seen
6034	Object with height	RF15	456654	5915572	3.2 x 0.5 x 1.7		Object with shadow	3	Debris, possibly boulder.
6035	Object with height	RF18, SR25	456955	5915777	4.5 x 0.3 x 1.1		Object with shadow	3	Debris, probable boulder.
6036	Object with height	RF19	456835	5915343	2.9 x -0.1 x 0.9		Object low relief	4	Not seen
6037	Object with height	RF20	456937	5915536	3.7 x 0.4 x1.3		Object with scour	3	Debris, probable boulder.
6038	Object with height	RF21	457052	5915850	3.7 x 0.3 x 1.4		Object with shadow	4	Not seen
6039	Object with height	RF22	457046	5915745	1.9 x 0.5 x 1.1		Object with scour	4	Not seen
6040	Object with height	RF24	457047	5915345	3.1 x 0.2 x 1.1		Object low relief	3	Debris, probable boulder.
6041	Object with height	RF26	457223	5915528	2.5 x 0.2 x 1.1		Object with shadow	3	Debris, probable boulder.
6042	Object with height	RF28	457358	5915429	2.7 x 0 x 0.9		Object low relief	4	Not seen
6043	Object with height	RF29, SR35	457243	5915113	3.7 x 0.1 x 1		Object low relief	2	Debris.
6044	Object with height	RF31	457369	5915369	2.7 x 0.3 x 0.8		Object with scour	3	Debris, probable boulder.
6045	Object with height	RF32	455279	5915324	2.6 x 0 x 0.8		Object low relief	4	Not seen
6046	Object with height	RF35	457377	5914835	3.4 x 0.5 x 1.1		Object with shadow	4	Not seen
6047	Object with height	RF36	457402	5914827	1.2 x 0.4 x 1		Object with shadow	4	Not seen
6048	Object with height	RF37, SR47	457623	5915326	4.3 x 0.9 x 0.5		Object	3	Debris, possibly boulder.
6049	Object with height	RF42	455683	5914111	2.9 x 0 x 1.7		Object low relief	4	Not seen
6050	Object with height	RF47	457524	5913707	3.2 x 0 x 1.5		Object low relief	4	Not seen
6051	Object with height	RF48	457912	5913880	2.4 x 0 x 1.5		Object low relief	2	Debris, possibly boulder.
6052	Object	RF51	455642	5914226	13.7 x 0 x 0		Faint linear target	4	Not seen
6053	Linear	RF52	458226	5915105	34.4 x 0 x 0		Linear target – mag. Anomaly M71	4	Not seen
6054	Linear	RF54	456891	5913762	141.6 x 0 x 0		Very faint linear target	4	Not seen
6055	Magnetic anomaly	RM10	462337	5906365		13.2	Larger positive monopole in continuously varying zone		

WA No.	Classification	Source	UTM E	UTM N	Dimensions	Magnetic Amplitude (nT)	Notes	Grading	WA Description
6013	Object with height	RF38, SR50	457713	5915539	2.4 x 0.9 x 0.2		Object with scour detected in 2005 (2.7x0.4x1.2m). Redefined in 2006	3	Debris, probable boulder.
6014	Object with height	RF39, SR55, SR56	457955	5915437	8.5 x 0.8 x 0.2		Object with scour identified in 2005 (2.1x0.2x4.2m). Detected in 2006 as a sseafloor depression (7.0 x 5.4 x -0.5m) and an object with height.	3	Debris, possible boulder.
6015	Object with height	RF40, SR57	458071	5915301	3.0 x 0.6 x 0.4		Object with shadow	3	Debris, possible boulder.
6016	Object with height	RF44, SR62	458310	5915274	2.0 x 0.6 x 0.5		Object	3	Debris, probable boulder.
6017	Seafloor disturbance	RF33, SR41	457438	5915144	7.3 x 1.8 x no measured height		Irregular seabed	3	Debris, possible boulder, (0.6x0.5x0.3).
6018	Seafloor disturbance	RF34, SR43	457482	5915174	4.6 x 2.8 x no measured height		Irregular seabed	2	Debris (3.9x1.3x0.6m). Possibly 2 objects.
6018	Object with height	SR44	457482	5915173	1.1 x 0.5 x 0.2		Object	2	As above
6019	Magnetic anomaly	M71				9.4	Complex dipole – related to targets RF43 or RF52	2	Debris (3.0x1.0x1.9m) with scour. Smaller object behind (2.5x1.0x0.0m).
6019	Seafloor disturbance	SR61	458207	5915109	11.5 x 8.0 x no measured height		Irregular seabed	2	As above
6019	Object with height	RF43	458206	5915110	4.7 x 1.9 x 3		Large object with scour – mag. anomaly M71	2	As above
6019	Prominent object	SR60	458205	5915112	6.2 x 2.4 x 1.8		Prominent object	2	As above
6020	Object with height	SR67	458684	5915312	4.3 x 1.1 x 0.9		Object	3	Debris, possibly boulder. Possible scour.
6020	Linear	RF53	458680	5915310	13.9 x 0 x 0		Linear target	4	Not seen
6020	Object low relief	RF45	458680	5915311	5.2 x 0 x 1.6		Object low relief	4	Not seen
6021	Linear	3007	458326	5914810	7.00 x 2.00 x 0.42		Linear hard contact	4	Not seen
6022	Object with height	3008	455225	5914842	30.00 x 8.80 x 0.60		'boat' shaped contact, aligned NE/SW	4	Not seen
6023	Object	3013	456733	5914418	7.00 x 4.00 x unidentified		Isolated medium contact, on flat seabed	4	Not seen
6024	Magnetic anomaly	MR20	456427	5914375		26.7			

APPENDIX I: FULL GEOPHYSICAL ANOMALY LIST

WA No.	Classification	Source	UTM E	UTM N	Dimensions	Magnetic Amplitude (nT)	Notes	Grading	WA Description
6000	Object with height	RF03, RF05	454435	5915794	3.4 x 0.2 x 0.7		Object low relief	4	Not seen
6001	Linear	RF12, SR01	454258	5914713	5.6 x 0.5 x 0.1		Object with height detected in 2005 (2.3x0.2x1.2m) and described as a possible pipe in 2006	2	Debris. Not a pipe.
6002	Object with height	SR12	456488	5916077	3.2 x 0.5 x 0.3		Object identified in 2006	3	Debris, possibly boulder.
6003	Object with height	RF11, SR13	456505	5915380	8.4 x 1.0 x 0.0		Object with shadow identified in 2005 (3.4 x 0.2 x 0.9) and re-detected as a seafloor disturbance in 2006	3	Seafloor disturbance, natural in origin.
6004	Object with height	RF13, SR16	456570	5915430	6.6 x 1.4 x 0.0		Object with shadow identified in 2005 (1.7 x 0.2 x 0.8) and re-detected as a seafloor disturbance in 2006	3	Seafloor disturbance, natural in origin.
6005	Object with height	RF10, SR17	456580	5915639	4.1 x 2.0 x 0.6		Object low relief, surrounded by smaller objects	3	Debris, possibly boulder.
6006	Object with height	RF16, SR20	456721	5915703	4.7 x 0.4 x 0.6		Object with shadow	3	Debris, possibly boulder.
6007	Object with height	RF17, SR24	456850	5915681	4.3 x 1.1 x 0.8		Object with shadow (2.7 x 0.6 x 1.2m) identified in 2005. Redefined in 2006	3	Debris, probable boulder.
6008	Object with height	RF23, SR29	457128	5915681	1.4 x 1.0 x 0.9		Object with scour identified in 2005 (1.5 x 0.6 x 1.6m) redefined in 2006	3	Debris, probable boulder.
6009	Object with height	SR34, RF25	457235	5915667	1.7 x 1.6 x 0.9		Object with scour identified in 2005 (3.1x0.8x1.6m) redefined in 2006	3	Debris, possible boulder. Appears to be at one end of a coarser patch of sediment.
6010	Object with height	RF49, SR37	457287	5915574	4.9 x 0.8 x 0.3		Linear object (19.8x0.2m) identified in 2005. Redefined as an object with height in 2006	3	Debris, probable boulder.
6011	Object with height	RF30, SR42	457444	5915643	3.8 x 0.8 x 0.6		Object with shadow (2.7x0.5x1.4) identified in 2005. Redefined in 2006	3	Debris, possible boulder.
6012	Object with height	RF27, RF50, SR38	457293	5915509	2.4 x 1.5 x 0.6		Linear target (14.4x0.2x0.0m) and object with height (0.8x0.4x1.5 identified in 2005. Redefined as an object with height in 2006	3	Debris, probable boulder.

9.1.4. The response to reported finds is set out in the Protocol. At the end of the construction phase a report will be prepared on the results of the Protocol.

10. REPORTING AND ARCHIVING

10.1.1. As stated in each section above, each element of work will give rise to one or more reports. As indicated, upon completion of construction a final archaeological report will also be prepared to synthesise the results of the various investigations. The final archaeological report will address the following themes:

- Maritime sites and finds;
- Palaeo-geography and prehistoric archaeology.

10.1.2. If significant archaeological sites and finds are recorded then this final report will be preceded by an assessment report that establishes the value of the recorded archaeology and provides a costing for analysis, publication and archiving (including deposition of archive). Decisions regarding the level of publication required will be taken following consultation with Cadw and CPAT.

11. REFERENCES

Gifford / Centre for Applied Marine Sciences, 2006, 'Rhyl Flats Offshore Wind Farm: Report on Archaeological Assessment of Offshore Investigations', Unpublished report ref: 13291.R05.

Wessex Archaeology, 2002, 'Rhyl Flats Offshore Wind Farm Environmental Assessment: Technical Report Archaeology', Unpublished report ref 50081.03.

Wessex Archaeology Ltd, 2007, Historic Environment Guidance for the Offshore Renewable Energy Sector, Commissioned by COWRIE Ltd ref: ARCH-11-05, COWRIE

7.2. CABLE LAYING

7.2.1. Prior to able laying the cable lay routes will be subject to a Pre-run Grapple Survey. Stage 1 will involve a geophysical survey, which will be carried out in order to check for obstructions along the routes. The results of this survey will be inspected by an appropriately qualified archaeologist.

7.2.2. Stage 2, the grapple survey, will be undertaken in order to clear any obstructions. Grapple tines will penetrate the seabed to a maximum depth of 0.3m. The grapple width is 0.5m and 3 runs will be undertaken within each 10-15m wide corridor. An archaeologist will be on board the vessel during this work in order to monitor the works, plot any obstructions and inspect any debris brought to the surface by the grapple. Any archaeological issues that arise from this monitoring will be dealt with via consultation between RWE npower and Cadw and/or CPAT.

7.2.3. Stage 3, cable laying, will be undertaken by a plough or jetting tool. As all archaeological issues will have been resolved prior to this stage there will be no archaeological involvement during cable laying.

7.2.4. The results of this study will be reported to Cadw and CPAT.

8. INTER-TIDAL AND TERRESTRIAL WORKS

8.1.1. All archaeological work concerned with the intertidal and terrestrial elements of the scheme are covered by a separate method statement. That statement is reproduced as **Appendix IX** of this document for information only, it will be subject to separate curatorial approval and monitoring from the works detailed in this document.

9. FINDS REPORTING PROCEDURE

9.1. SCOPE

9.1.1. A Protocol for Reporting Finds of Archaeological Interest will address the reporting of finds of archaeological material, recovered from the intertidal and subtidal areas during the construction of the wind farms. A draft copy of the Protocol is included in **Appendix VI**, it will also be produced as a stand-alone document for use on-board the construction vessels.

9.1.2. The relevant staff on all construction vessels will be informed of the Protocol, details of the find types that may be of archaeological interest, and the potential importance of any archaeological material encountered.

9.1.3. Provision will be made by the RWE npower, in accordance with the Protocol, for the prompt reporting/recording of archaeological remains encountered, or suspected during works to Cadw and CPAT. If the find is ‘wreck’ within the meaning of the Merchant Shipping Act (1996) then a report will also be made to the Receiver of Wreck. If the find is ‘treasure’ within the meaning of the Treasure Act (1996) then a report will also be made to the Coroner.

5.4. PLANNING FURTHER GEOPHYSICAL SURVEYS

5.4.1. A further geophysical survey is planned following construction of the wind farm. The specification for this survey will be planned with reference to the guidelines for survey as set out in *Historic Environment Guidance for the Offshore Renewable Energy* Sector (WA 2007). This guidance is set out in **Appendix II**.

5.4.2. The data from this survey will be subject to archaeological analysis in order to assess the effectiveness of the Exclusion Zones, and any changes to sedimentation regimes that may result from the construction. This assessment will be as per section 5.3 above.

6. MARINE GEOTECHNICAL SURVEY

6.1. INTRODUCTION

6.1.1. Analysis of borehole and vibrocore samples can enable the recovery of archaeological data relating to submerged terrestrial prehistoric archaeology within offshore areas.

6.1.2. Geotechnical data collected for this project has been archaeologically assessed (Gifford / Centre for Applied Marine Sciences 2006), and no archaeologically important deposits were identified. A copy of this report has been forwarded to Cadw.

6.1.3. No further geotechnical work is planned. Should further geotechnical work become necessary then this will be subject to consultation between RWE npower, Cadw and CPAT in order to determine whether archaeological recording is required. A typical methodology for the archaeological assessment of geotechnical data is outlined in **Appendix III**.

7. DIVER/ROV OBSTRUCTION SURVEYS

7.1. INTRODUCTION

7.1.1. Archaeological diver and/or ROV surveys are principally employed in order to gather archaeological data concerning wreck sites and geophysical anomalies. This data may be used to enhance the archaeological record, or to alter (enlarge, reduce, move or remove) existing Exclusion Zones.

7.1.2. The only circumstances whereby diver/ROV surveys may be required for archaeological purposes are: where it is not possible to protect an archaeological site through the implementation of an Archaeological Exclusion Zone; or where visual clarification is sought in order to alter an Archaeological Exclusion Zone.

7.1.3. No diver or ROV survey data was assessed during the desk-based assessment phase of the project, and it is understood that no surveys are planned for those areas subject to Construction Exclusion Zones. Should these plans change then the archaeological requirements will be agreed following consultation with Cadw and CPAT. Outline archaeological requirements are presented in **Appendices IV** and **V**.

4.6. EXCLUSION ZONES THAT LIE OUTSIDE THE SCHEME FOOTPRINT

4.6.1. Section 4.2.2 above lists 6 sites that lie outside of the scheme footprint, but which will also be subject to Exclusion Zones, including the Designated Wreck *Resurgam*. These exclusion zones will also be monitored by the Vessel Co-ordinators.

5. MARINE GEOPHYSICAL SURVEY

5.1. INTRODUCTION

5.1.1. The analysis of geophysical data enables the recovery of archaeological data concerning both submerged prehistoric landscapes and wrecks or wreck-related features. This data may be used to enhance the archaeological record, or to alter (enlarge, reduce, move or remove) existing Exclusion Zones.

5.1.2. An assessment of the geophysical survey reports produced by Osiris (Osiris 2006a and 2006b) was conducted by WA during the production of this report. The results of this assessment are presented in Section 4, the pre-existing anomaly list of 110 sites is presented in **Appendix I**. Following this WA analysed the raw data in order to refine the archaeological identification of the anomalies. This revised list has provided the basis of the Exclusion Zones detailed in Section 4 above.

5.2. UNDERTAKING FURTHER GEOPHYSICAL SURVEYS

5.2.1. If there is a requirement to modify (alter or remove) an Archaeological Exclusion Zones a suitably experienced archaeologist will be contracted on a consultancy basis to be present during the collection of any further geophysical data. The archaeologist will advise on the suitability for archaeological purposes of the data being acquired, and will be able to propose minor changes to the survey method, settings, etc. in order to optimise archaeological results.

5.3. ARCHAEOLOGICAL INTERPRETATION OF FURTHER GEOPHYSICAL DATA

5.3.1. The survey data will be submitted for review by an appropriately qualified archaeologist. If any further items of interest are identified Cadw and CPAT will be consulted prior to any changes to the Exclusion Zones.

5.3.2. Data collected during the planned sidescan sonar, bathymetry and magnetometer pre-survey will be analysed by a suitably experienced archaeologist. Archaeological interpretation of the available data will include:

- Examination of sidescan, magnetometer and, if available multibeam and seismic data for areas within the vicinity of known wreck sites and previously identified geophysical anomalies;
- Examination of sidescan, magnetometer and, if available multibeam and seismic data within areas that will be subject to scheme impacts in order to identify any as yet unknown wreck remains.

5.3.3. The results of the archaeological analysis of geophysical survey data will be reported to Cadw and CPAT.

4.3. ESTABLISHING NEW EXCLUSION ZONES

4.3.1. If new finds of archaeological importance come to light during the course of construction they may be subject to the implementation of additional Exclusion Zones.

4.3.2. Cadw and CPAT will be consulted on the need for, and the design (position, extent) and implementation of any new Exclusion Zones.

4.4. ALTERING EXCLUSION ZONES

4.4.1. Exclusion Zones may be altered (enlarged, reduced, moved or removed) as a result of further data assessment and a range of measures up to and including archaeological field evaluation. Further data assessment may include a formal archaeological analysis of the existing raw geophysical data (as collected by Osiris) covering those areas that are subject to Provisional Exclusion Zones. Archaeological field evaluation may include suitable high-resolution marine geophysical survey, and/or survey by diver/ROV (see Sections 4 and 6).

4.4.2. The alteration of Exclusion Zones will only be undertaken following consultation with Cadw and CPAT. Following alteration, a new plan giving details of the Exclusion Zones will be drawn up and issued to each nominated point of contact.

4.5. MONITORING OF EXCLUSION ZONES

4.5.1. Development related activities shall not be undertaken within an Exclusion zone. If activities are shown to have been undertaken within any zone, the construction contractor responsible will ensure that the consenting authority is aware of the incident and seek archaeological advice from the archaeological curatorial authority. A monitoring programme will check the integrity of the Archaeological Exclusion Zones to determine if they have been affected by the development associated with the project.

4.5.2. The monitoring programme employed for the duration of this project is to report on the integrity and validity of the Exclusion Zones and to include recommendations regarding amendment of the extent, removal and/or creation of new zones.

4.5.3. Npower have appointed SeaRoc Marine to produce a Vessel Co-ordination Plan, and to act as Vessel Co-ordinators during the project. The archaeological exclusion zones have been included in the vessel coordination plan. Through the plan, the co-ordinates of the exclusion zones will be issued to all vessels. All vessels will be fitted with GPS transponders and will be monitored 24 hours a day, 7 days per week on a GIS system by the vessel coordinator based in Mostyn, this will show the exclusion zones. The vessel coordinator will be responsible for monitoring vessel movements will be able to contact vessels at any time.

4.5.4. On completion of the construction phase, a report will be compiled on the effectiveness of the Exclusion Zones and any alterations to them.

WA No.	Classification	Source	UTM E	UTM N	Dimensions	Magnetic Amplitude (nT)	WA Description	Grade
6019	Magnetic anomaly	M71				9.4	Debris (3.0x1.0x1.9m) with scour. Smaller object behind (2.5x1.0x0.0m).	2
	Seafloor disturbance	SR61	458207	5915109	11.5 x 8.0 x no measured height			
	Object with height	RF43	458206	5915110	4.7 x 1.9 x 3			
	Prominent object	SR60	458205	5915112	6.2 x 2.4 x 1.8			
6028	Object with height	R3	458849	5910541	1.4 x 1.4 x 0.3		Debris	2
6043	Object with height	RF29, SR35	457243	5915113	3.7 x 0.1 x 1		Debris.	2
6051	Object with height	RF48	457912	5913880	2.4 x 0 x 1.5		Debris, possibly boulder.	2
6076	Object	SR06	456162	5914287	10.5 x 3.7 x no measured height		Debris	2
6098	Object	SR49	457685	5914399	1.0 x 0.9 x 0.0		Debris at end of 6097.	2

4.2.2. In addition to the above list the following known wrecks and obstructions, which do not lie within the development footprint, will also be subject to Archaeological Exclusion Zones:

WA No.	Classification	Source	UTM E	UTM N	Description	Grade
2002	Wreck	UKHO 7506	460621	5910191	Wreck of the *Guardian Angle* that sank in 1885. Reported to UKHO in 1926, but not located during searches in 1970 and 1988.	1
2003	Wreck	UKHO 7414	453636	5911726	Wreck of the SS *Penrhos* that hit a mine and sank in 1942 whilst carrying stone chippings. 4 people were killed.	1
2004	Wreck	UKHO 7510	460811	5911827	Wreck of the *Four Brothers*, a schooner that foundered in 1923 whilst under tow. A plank was recovered from this position.	1
2005	Aircraft	UKHO 8270	461906	5913733	Divers report the fuselage of an Avro Anson bomber, and that the engines are missing.	1
2006	Protected Wreck	UKHO 8119	462760	5917366	Wreck of the *Resurgam*, an early steam-powered submarine built and lost in 1880. The wreck is protected under the Protection of Wrecks Act (1973).	1
2010	Wreck / obstruction	UKHO 8143	459543	5906155	Unknown. May be a wreck or an obstruction.	1

4.2.3. All exclusion zone and areas of raised archaeological potential not subject to exclusion zones are illustrated in **Figure 1**.

4.2.4. These Exclusion Zones will apply to construction works, vessel mooring and any other activities that may disturb the seabed during the installation of the wind farm. The locations, extent and conditions applicable to the Exclusion Zones will be made available to all relevant parties.

3.1.2. All wrecks and geophysical anomalies were compiled into a consolidated gazetteer, which was then filtered to remove any sites or anomalies for which the descriptions given clearly indicated an origin that was not of archaeological interest. Further to this anomalies and sites that were physically close were grouped together. Sites and anomalies that lay outside of an area formed by the scheme footprint and a 100m buffer zone were excluded from the final list. There were no previously known wrecks within the development area, however 110 geophysical anomalies that might potentially relate to archaeology lay within the footprint of the development.

3.1.3. These 110 anomalies were then subject to further analysis. WA conducted an archaeological assessment of the raw geophysical data in order to refine the anomaly descriptions and interpretation. As a result of this analysis only nine sidescan anomalies/anomaly groups retained sufficient potential to warrant direct mitigation.

3.1.4. Although their geophysical signature suggests that they are probably natural, the remaining anomalies are listed in **Appendix I** and have been illustrated in **Figure 1** as areas of slightly raised archaeological potential. Exclusion zones are not proposed for these sites.

4. ARCHAEOLOGICAL EXCLUSION ZONES

4.1. INTRODUCTION

4.1.1. Exclusion Zones will be the principle means used to preserve *in situ* any features or deposits of potential or known archaeological interest. All of the Exclusion Zones listed in this document are based on information available at the time of the compilation of the desk-based assessment and the WA analysis of the Osiris geophysical data. They may be subject to change if further information becomes available (see section 3.4 below).

4.1.2. The Exclusion Zones outlined below are fixed, however provision is made below for their alteration, following appropriate archaeological investigation and consultation, should this become necessary before or during construction.

4.2. LOCATION AND EXTENT OF EXCLUSION ZONES

4.2.1. Archaeological Exclusion Zones with a radius of 50m will be implemented around the following sites:

WA No.	Classification	Source	UTM E	UTM N	Dimensions	Magnetic Amplitude (nT)	WA Description	Grade
6027	Object	R2	458592	5910495	25.0 x 10.0 x no measured height		Wreck. Broken up.	1
6001	Linear	RF12, SR01	454258	5914713	5.6 x 0.5 x 0.1		Debris. Not a pipe.	2
6018	Seafloor disturbance	RF34, SR43	457482	5915174	4.6 x 2.8 x no measured height		Debris (3.9x1.3x0.6m). Possibly 2 objects.	2
	Object with height	SR44	457482	5915173	1.1 x 0.5 x 0.2			

a) The protection of known archaeological and shipwreck remains as identified in the submitted Environmental Statement; and
b) The recording and, if necessary, protection of any archaeological and shipwreck remains discovered during the construction of the generation station.

1.3.3. Curatorial responsibility for the sub-tidal aspects of the proposed project (outside of the jurisdiction of the local planning authority) resides with Cadw. Curatiorial responsibility for any aspect of the proposed project that occurs within the jurisdiction of the local planning authority should be referred to Mark Walters of Clwyd Powys Archaeological Trust (CPAT) Curatorial Section.

2. IMPLEMENTATION

2.1.1. The responsibility for implementing this protocol rests with the Construction Companies and RWE npower.

2.1.2. RWE npower will ensure that project personnel are aware of archaeological communication requirements and the appointment of onboard vessel representatives as required.

2.1.3. RWE npower will provide an archaeology communication plan. Typically this will include details of each nominated contact, and of any subsequent changes. The initial draft of the plan will be copied to Cadw and CPAT to enable confirmation of appropriate contacts within these organisations.

2.1.4. The Construction Companies will ensure that project personnel are aware of this WSI, the associated exclusion zones in force and the Finds Reporting Protocol.

2.1.5. Vessel movements will be co-ordinated by means of a vessel co-ordination plan. This will enable the movements of all vessels to be controlled and monitored.

2.1.6. RWE npower or any archaeological body that they may appoint to manage the implementation of the protocol will seek curatorial advice from Cadw and the CPAT.

2.1.7. All data obtained from the inter-tidal areas will be compiled in a format suitable for submission of Monument, Event and Source records for entry into the CPAT Sites and Monuments Record (SMR). All appropriate data pertaining to the historic environment obtained for the sub-tidal area of the proposed development will be compiled in a format suitable for transmission to the Royal Commission on the Ancient and Historical Monuments of Wales: National Monuments Record of Wales (NMRW).

3. KNOWN AND POTENTIAL ARCHAEOLOGY

3.1.1. A list of sites was been generated following the analysis of data presented within the DBA (WA 2002) and from a series of survey reports produced by Osiris (Osiris 2006a and 2006b), hereafter referred to as the ‘Osiris reports’.

RHYL FLATS
OFFSHORE WIND FARM

ARCHAEOLOGICAL WRITTEN SCHEME OF INVESTIGATION

Ref: 64870.08

1. INTRODUCTION

1.1. PROJECT BACKGROUND

1.1.1. Wessex Archaeology (WA) was commissioned by RWE npower to prepare an archaeological Written Scheme of Investigation (WSI) for the construction, use and de-commissioning phases of the Rhyl Flats offshore wind farm. The main development area lies at Rhyl Flats, approximately 8km north of Abergele and 10km north-west of Rhyl, on the North Wales coast. It is linked to the coast by cable routes that continue in-shore, connecting to the grid inland of Abergele (**Figure 1**).

1.2. DEVELOPMENT PROPOSAL

1.2.1. The wind farm will consist of 25 turbines, each rated for a maximum power output of between 2.5MW and 5MW, with 3.6MW being the most likely configuration. The turbines will be located approximately 10km northwest of Rhyl in water depths of 3m to 12m, with 10m of tide.

1.2.2. The scheme elements are as follows:

- 25 wind turbines;
- Subsea cables between the turbines;
- Subsea cables from the wind farm to the shore;
- The cable landfall;
- One meteorological mast (already existing);
- An electrical substation (onshore); and
- Onshore grid connections to the existing electricity grid.

1.3. SCOPE

1.3.1. The WSI is based on recommendations made in the *Rhyl Flats Offshore Wind Farm Environmental Assessment: Technical Report Archaeology* (WA 2002). This report is hereafter referred to as the 'desk-based assessment' (DBA).

1.3.2. This WSI is being implemented as part of a programme of mitigation works outlined in the Environmental Statement. The wind farm scheme is subject to a Section 36 Consent (under the Electricity Act 1989), issued by the DTI and dated 12th December 2002. Condition 8 of the Consent states:

8) The commencement of the Development shall not take place until there has been submitted to and approved in writing by the Secretary of State detailed schemes for each of the following:

Figures

RHYL FLATS
OFFSHORE WIND FARM

ARCHAEOLOGICAL WRITTEN SCHEME OF INVESTIGATION

Ref: 64870.08

Contents

RHYL FLATS
OFFSHORE WIND FARM

ARCHAEOLOGICAL WRITTEN SCHEME OF INVESTIGATION

Prepared by:

Wessex Archaeology
Portway House
Old Sarum Park
Salisbury
WILTSHIRE
SP4 6EB

Prepared for:

RWE npower
Windmill Hill Business Park
Whitehill Way
Swindon
SN5 6PB

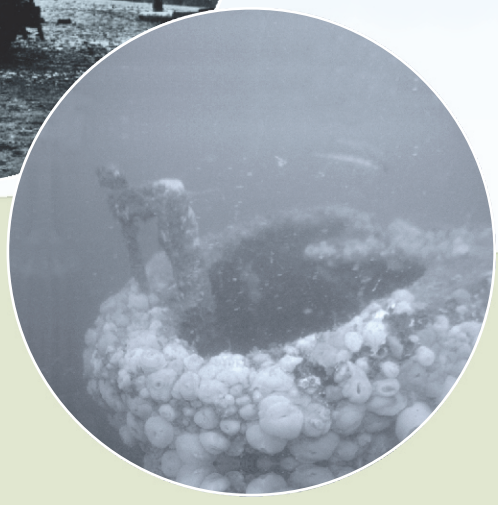
February 2008

Ref: 64870.08

Wessex Archaeology

Rhyl Flats Offshore Wind Farm

Archaeological Written Scheme of Investigation



Ref: 64870.08

February 2008

6. Rhyl Flats Offshore Wind Farm Ltd

Archaeological Written Scheme of Investigation

Attachment 4

Recovery Procedure no.:
Recovery Procedure related to Dropped Object Report no.:

Recovery Method:

The following is completed and attached:

☐ Dive Plan amendments needed
- if the existing Dive Plan covers the dive needed to find the object and to hook-on then no amendments are needed.

☐ Lifting Procedure
- specifying crane, lifting equipment, hook-on-points on the dropped object, work zone and approval of lifting supervisor

☐ Risk Assessment
- taking into account all additional hazards identified in the recovery operation.

Recovery Procedure produced by:

Signature and date

Recovery Procedure approved by:

Signature and date

Issued to the Employer (date):

Employer's comments:

MTHøjgaard

Rhyl Flats Offshore Wind Farm
Dropped Object Register
Rev. 0 Date: 28.11.2007

Attachment 3

Dropped Object Register				
#	Dropped Object	Size	Location	Dropped Object Report #

Attachment 2

Dropped Object Report

Dropped Object Report no:

Description of the Dropped Object *(please provide a sketch if possible)*:
Description:

Dimensions: *sketch provided (Y/N)?:*
Weight:

Location of the Dropped Object:

Any relations to other reports *(e.g. incident/accident reports)*?
if yes, please specify:

Does the Object float (Y/N)?

Why the object was dropped:

Actions to prevent similar incident:

Shall the Dropped Object be recovered (Y/N)?
Reason:

Further actions?

Signature and date

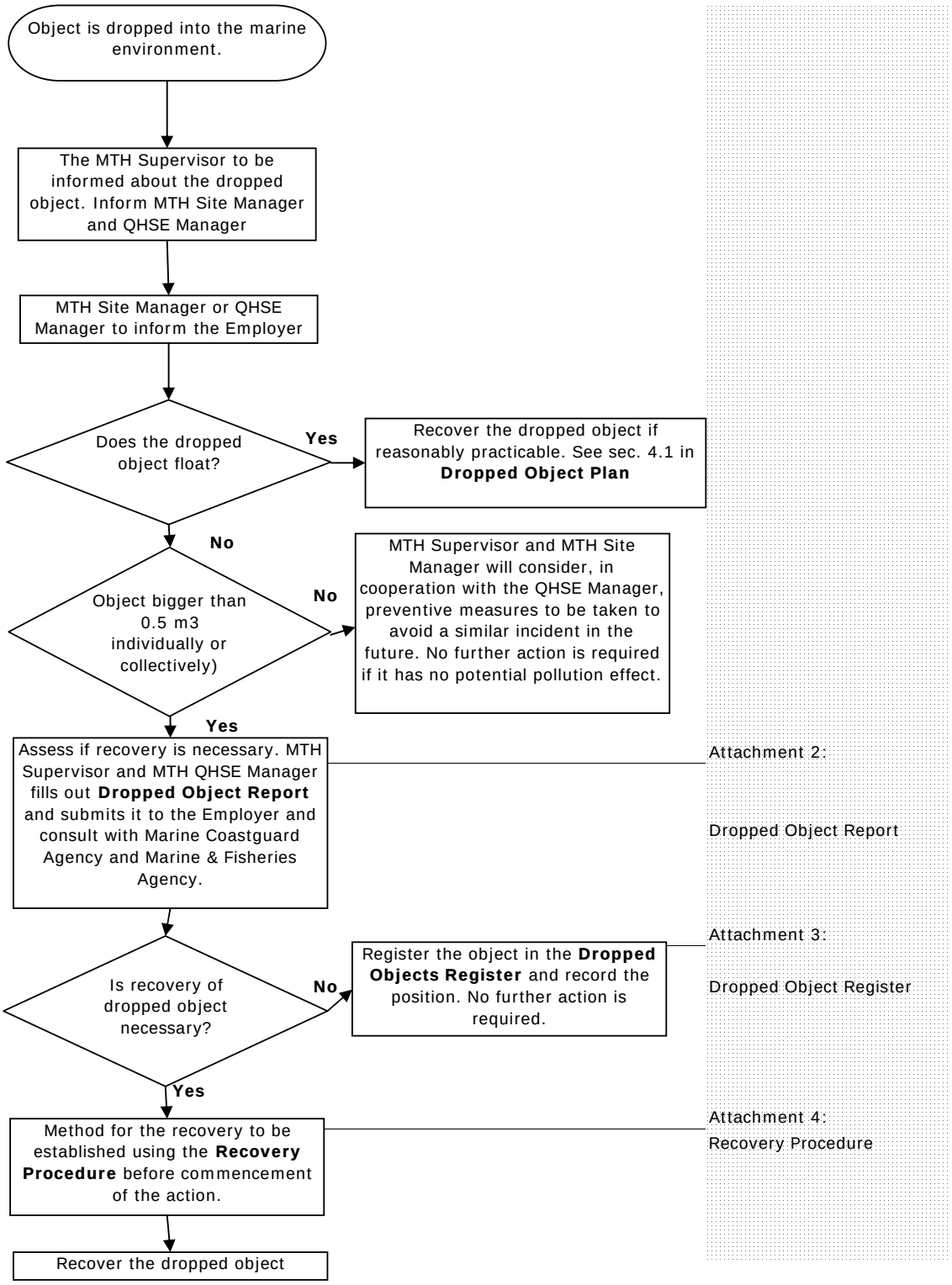
Employer's comments:

Signature and date

Attachment 1

Rhyl Flats Offshore Wind Farm
Dropped Object Flow Chart
Rev. 2 Date: 11.04.2008

Dropped Object Flowchart



The MTH Supervisor and MTH Site Manager shall consider, in cooperation with the MTH QHSE Manager, which additional preventive measures to be implemented to avoid similar incidents in the future.

If several objects are dropped at the same time which are individually smaller than 0.5 m^3 but together exceed 0.5 m^3, an assessment would be carried out as to whether the recovery of the objects is necessary. If it is necessary to recover the objects, the procedure described below shall be followed.

If the object is bigger than approximately 0.5 m^3 a Dropped Object Report (Attachment 2) shall be completed and issued to the Employer, and filed on Site until completion of the Works.

In case it is decided that the object shall not be recovered, the dropped object shall be noted in the Dropped Object Register (Attachment 3) and filed for further use.

If decided that the dropped object must be recovered it shall not be listed in the Dropped Object Register, but the procedure described below shall be followed.

5 Recovery of a Dropped Object

Before starting the recovery of a dropped object a Recovery Procedure has to be made (see Attachment 4).

This is to make sure that the recovery action takes every aspect of the operation into consideration. The Recovery Procedure must be jointly produced by the Diving Supervisor, Lifting Supervisor and MTH Supervisor and approved by either MTH QHSE Manager or another Safety Representative.

Before commencement of the operation the Recovery Procedure shall be sent to the Employer or the Employer's Representative for any comments. A deadline for comments shall be given to make sure the operation could be undertaken when the right equipment is available.
If the time frame for comments is short, the Employer shall be contacted via the telephone.

When comments are incorporated, or if no comments are received, the recovery action shall commence.

6 Health and Safety

All personnel shall wear hard hats in order to avoid personal injuries/accidents if an object is dropped from distances likely to cause such.

When working at height special attention shall be paid to preventing objects from being dropped on to the deck or into the marine environment. Tools and other equipments are to be secured and not left loose when working at height.

7 Attachments

Attachment 1: Dropped Object Flowchart
Attachment 2: Dropped Object Report
Attachment 3: Dropped Object Register (not for recovered objects)
Attachment 4: Recovery Procedure

3 Primary Sources and Preventive Measures

The primary sources of dropping objects into the marine environment are:

- Vessels in adverse weather and transit
- Tools and material dropped during installation works
- Waste lost overboard
- Working at heights

When all vessels are in transit, including in periods with adverse weather conditions, all containers, tools and materials will be properly stored away and sea fastened to reduce the risk of anything falling into the water.

Lifting plans are prepared prior to the commencement of the Works to identify the necessary lifting equipment and hook-on points. Regular checks will be made to ensure the working order of the used equipment. Trained and skilled personnel (Lifting Supervisor and Riggers) will perform the works.

Waste on the installation vessel will be disposed in accordance with the Waste Management System. If waste is light, (papers, plastics etc) then care will be taken to prevent it from being blown overboard. During the secondary works all waste shall be collected and brought to the port.

During the Site Induction, all personnel will receive information about the procedures regarding waste management and dropped objects.

4 Dropping an Object

For the procedures of how to react in the event that an object is dropped, refer to the attached Dropped Object Flowchart (Attachment 1).

In all cases when an object is dropped into the sea or onto the deck of the installation vessel the MTH Supervisor must be informed about the incident. The MTH Site Manager and QHSE Manager shall be informed of the dropped object by the MTH Supervisor as soon as possible.

4.1 Floating Objects

If a floating object is dropped into the sea it shall be recovered, if it is reasonably practicable to do so. The composition and amount of the object(s) dropped shall be compared to the time and costs of the recovery operation.

Considerable amounts are defined as:

- Approximately $2m^2$ or 0.5 m^3 of naturally degradable materials (food remnants, paper, untreated wood etc).
- Approximately $1m^2$ 0.5 m^3 of non-degradable materials (plastic, low density metals etc) or treated wood.

Regardless of the fact that the object could be recovered or not, an evaluation shall be carried out on how to prevent similar occurrences.

4.2 Non-floating Objects

If the dropped object is less than approximately 0.5 m^3 no remedial actions shall be taken, since the significance of the object is evaluated to be too small to have any impact on the environment. If the same object is considered to be toxic to the environment e.g. oil or paint containers, then recovery of the object shall be considered.

1 Introduction

This Dropped Objects Plan describes the work to be carried out in case an object drops into the marine environment during the Rhyl Flats Offshore Wind Farm Project.

The Plan includes procedures for:

- Reporting any Dropped Object (only for non-floating objects larger than app. (0.5 x 0.5 x 0.5) m^3
- Registering Dropped Objects (only for non recovered objects)
- Recovering Dropped Objects
- Health and Safety issues

Reporting procedures for objects which are dropped onto the deck of the installation vessel will be covered in the Construction Health and Safety Plan (doc no. 260702 – HS – 1.4).

1.1 Abbreviations and Definitions

CDM	Construction (Design & Management) Regulations 2007
Employer	Rhyl Flats Wind Farm Limited
MTH	MT Højgaard a/s (The Contractor)
QHSE	Quality, Health, Safety and Environment

2 Demands

2.1 Standards / Code of practice:

The Works are, among other things, planned and carried out according to:

- Health and Safety at Work Act 1974
- CDM Regulations 2007
- Management of Health and Safety at Work Regulations 1999
- Diving at Work (Commercial diving) Regulations 1997
- Lifting Operations and Lifting Equipment Regulations (LOLER) 1998

2.2 General Responsibilities

Position	Responsibility	Reports to
QHSE Manager	Check/audit that Dropped Object Reports, Dropped Object Register and Recovery Procedures are prepared and used, and preventive measures are implemented. Check that Recovery Procedures are according to HSE laws and regulations.	Project Manager
Site Manager	Overall responsibility for Recovery Actions is performed. Implementation of the preventive measures	Project Manager
MTH Supervisor	Fill in Dropped Object Reports, Dropped Object Register and Recovery Procedures. Coordinate action of the Recovery Action. Identify and implement preventive measures.	Site Manager
Subcontractor Supervisor/Foreman	Inform MTH Supervisor of dropped object. Assist MTH Supervisor in making the Recovery Procedures and Recovery Actions.	Site Manager and MTH Supervisor
Everybody else	Inform MTH Supervisor, Supervisors/Foreman of dropped object.	Subcontractor Supervisor/foreman

TABLE OF CONTENTS

Distribution List

Number	Function Title	Company	Name
1	Project Manager	MTH	Jesper Byberg
2	Assisting Project Manager	MTH	Susanne Kjær
3	Site Manager	MTH	Aage Poulsen
4	Design and Interface Manager	MTH	Arne Jacobsen
5	Engineering Manager	MTH	Stig Skytte Rasmussen
6	Steel Fabrication Supervisor	MTH	Ib Ingemann Andersen
7	Installation Supervisor	MTH	Jørgen Pedersen
8	Installation Supervisor	MTH	Jonas Sørensen
9	Installation Supervisor	MTH	Hans Pedersen
10	Secondary Works Supervisor	MTH	Henrik Hansen
11	Onshore Works Supervisor	MTH	Per Andersson
12	Onshore Works Supervisor	MTH	Arne Hansen
13	QHSE Manager	MTH	Chidubem Uchendu
14	QHSE Manager	MTH	Katrine Sonnichsen
15	Foundations Construction Manager	Employer	Julian Garnsey
16	Project Manager	Employer	Gareth Penhale
17	Environmental Manager	Employer	Hugh Morris / Jamie May
18	CDM Coordinator	CDMC	Chris Usher
19	Project Manager of:		
	1- Menck		Martin Ros
	2- Peter Madsen Rederi		Tony Millward
	3- SMIT/Svanen		Harald Stol / Marcel van Bergen
	4- Densit		Anders Moeller
	5- Dutch Drilling Company		Arnoud Kamp

Revision	Prepared	Reviewed	Approved	Date
2	**CUU**	**BOST**	**BOST**	**11.04.2008**
1	**CUU**	**ARAF**	**BOST**	**21.01.2008**
0	**CUU**	**AKRI**	**AKRI**	**28.11.2007**

DROPPED OBJECTS PLAN

Document no.: 260702 – DOP - 1.3.1
Revision: 2
Date: 11.04.2008
Author: CUU

5. MT HØjgaard A/S

Dropped Object Plan

Attachment 4

Emergency Contacts

Employer		
Foundation Construction Manager - **Julian Garnsey**	Phone:	+44 7795353603
Environmental Manager - **Hugh Morris**	Phone:	+44 7989492697
Marine Coordinator - **Lee Cornwall**	Phone:	+44 7825558303
Site Manager -	Phone:	
Offshore Client Representative - **Richard Parkinson**	Phone:	+44 7966570364
	Emergency Number:	+44 1745561426
CDM Coordinator		
CDM Coordiantor - **Alan Chivers**	Phone:	+44 7867792114
H & S Supervisor - **Paul Hocking**	Phone:	+44 7795112331
HSE		
For Incident Reporting	Phone:	+44 8453009923
Local Wrexham Office	Phone:	+44 1978316000
MAIB (For Incident Reporting)	Phone:	+44 2380232527
Coast Guard Authority		
Rescue Co-ordiantion Center Manager - **Jim Paton**	Phone:	+44 1407767951
Duty Watch Manager (emergency & out of hours contact)	Phone:	+44 1407765624
MTH		
MTH Project Director - **Bente Østerbye**	Phone:	+45 2270 9667
MTH Project Manager -	Phone:	
MTH Assistant Project Manager - **Amr Arafa**	Phone:	+45 2270 9692
MTH Site Manager -	Phone:	
MTH QHSE Manager - **Chidubem Uchendu**	Phone:	+45 2270 9770
MTH Supervisor -	Phone:	
MTH Supervisor -	Phone:	
MTH Supervisor -	Phone:	
MTH Work Vessel Sub-Contractor - **Paul Walsh**	Phone:	+44 7718505934
Principal Contractor Consultant - **Kenneth Roberts**	Phone:	+44 1502500332
Port Authority		
Port Of Mostyn	Phone:	+44 7836739363
Duty Manager	Phone:	
Habour Master	Phone:	+44(0)1745560335
Radio Of Coast Guards	VHF	ch. 16
Coastguard - Liverpool Area office	Phone:	+44 (0) 1519313341
Emergency Services onshore	Phone:	999
HM Coastguard - Helicopter response	Phone:	+44 (0) 1519316600
Principal Harbour and Maritime Officer - **Tony Mead**	Phone:	+44 (0) 1492596253
Coasters		
	Phone:	
	Sat:	
	Phone:	
	Sat:	
Installation Vessel - Svanen (Ballast Nedam)		
Vessel Master	Phone:	+31 630857191
Project Manager - Marcel van Bergen	Phone:	+31 646005252
Technical Manager	Phone:	+31 622433155
	Phone:	+31 302853055
Tug Boat	Phone:	
	Phone:	
	Phone:	
Man Crew Vessel	Phone:	
Menck	Phone:	
Martin Ros	Phone:	+49 16097847562
Densit		
Martin Larsen	Phone:	
Anders Moller	Phone:	+45 9816 7011
Drilling		
Arnoud Kamp	Phone:	+31 182634625
Surveyor	Phone:	

Contact details of ship's owner/operator/agent:
Name and port of registry of any other ship involved:
Number of people hurt in the incident (names, adresses and gender)(If any people were hurt the reporting procedures described in the Construction Health & Safety Plan shall be followed):
Actions being taken:
Other:
Date and time of next report:

Attachment 3

Environmental Incident Report Form

Ship name:	Call sign:		Flag:
Official No:		IMO No:	
Name of Master or person in charge			
Length:	Breadth:	Draft:	Type:
Date and time of incident:			
Position of incident:			
Bound from:		Bound to:	
Course:		Speed:	
Intended track:		VDR make and model:	
Part of ship where accident occured:			
Communication channels monitored:			
Type and quantity of bunkers on board:			
Wind speed and direction:		Swell direction and height:	
Other weather conditions:			
Brief details of incident (including sequence of events leading to incident, extent of damage and whether incident caused pollution or hazard to navigation. If a pollution incident has occured, provide details of the properties of the pollutant as shown on its Material Safety Data Sheet carried on board):			

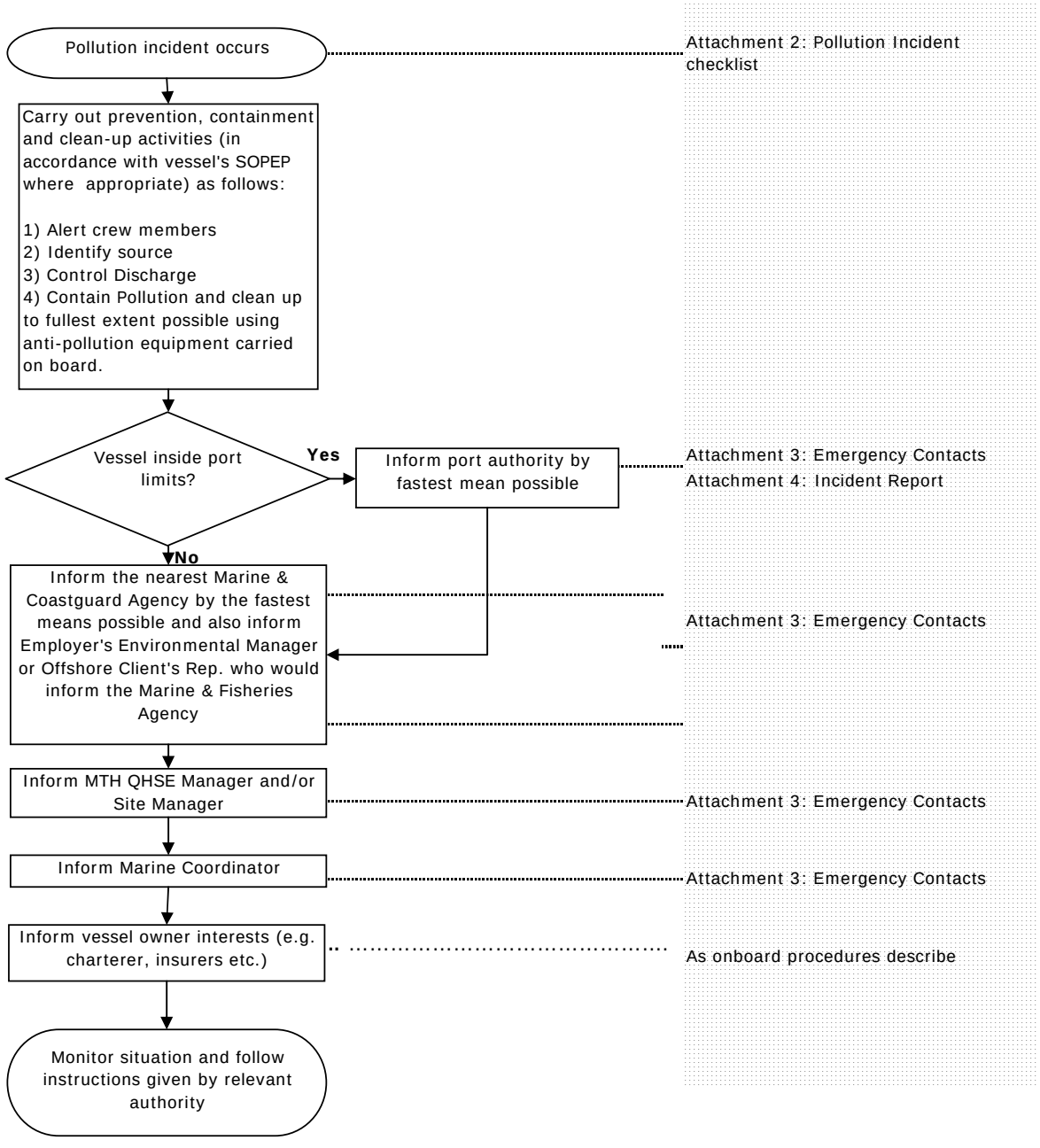
Attachment 2

Pollution Incident Checklist

- ☐ Crew members alerted and mustered
- ☐ Source of pollution identified
- ☐ Release of pollutant controlled and contained if possible
- ☐ Anti- pollution equipment in use to clean up pollution to fullest extent possible
- ☐ Relevant port authority informed (where applicable)
- ☐ Nearest coastal state informed (always)
- ☐ MTH QHSE Manager or MTH Site Manager informed
- ☐ Employer Representative or Work Vessel Controller informed
- ☐ Marine Coordinator Informed
- ☐ Vessel owner interests informed (e.g. charterers, insurers etc.)
- ☐ Monitor the Vessel communications channel(s) of relevant authority

Attachment 1

Pollution Incident Flowchart



		couplings fail on hydraulic hammer or pile gripper over marine environment Maximum possible spillage: 9000 l (hydraulic hammer) 600 l (pile gripper)	hydraulic system above sea causing such a quantity is considered low
Lubricating Oil and Hydraulic Oil (storage)	Vessel to vessel collision	Worst case scenario will be a collision between the two vessels with the largest lubricating oil/ hydraulic oil tanks (or oil drums) rupturing into the sea. Approximate possible spillage: 17000 l (Installation Vessel) 500 l (TB)	The likelihood is considered very low
	Vessel to structure collision or stranding/ grounding	Worst case scenario will be a rupture of the storage tank(s) of the vessel with the largest capacity into the sea Approximate possible spillage: 17000 l (Installation Vessel) 500 l (TB)	The likelihood is considered low
Grout	During grouting of foundation	Worst case scenario is either leaking or blow-out of grout skirt during grouting. Monitoring of operation will be conducted during whole operation. Maximum possible spillage: 1.500 l	The likelihood is considered low
Garbage	Accidental discharge	Worst case scenario is in high wind conditions where stowage or lashing is inadequate.	The likelihood is considered low

6 Attachments

Attachment 1: Pollution Incident Flowchart
Attachment 2: Pollution Incident Checklist
Attachment 3: Pollution Incident Report Form
Attachment 4: Emergency Contacts

This assessment is made for ports and other authorities to assess the potential environmental consequences which could result from the Works involved in the Foundation installation.

The following must be taken into account when evaluating the potential consequences:

- The Installation Vessel shall not enter any UK ports but shall stay in the UK territorial waters during the installation phase (unless going to port of refuge).
- All structures and materials shall be transported from Hoboken (Belgium) by coasters to the Port of Mostyn and loading onto the quay side.
- A Transport Barge shall transport the TPs and towed to the Installation Vessel
- The MPs shall be floated to the Installation Vessel
- Bunkering of the Installation Vessel will be done offshore.

The assessment of the pollution consequences is shown below.

Potential pollutants	Potential causes	Potential consequence	Likelihood
Fuel Oil **(Vessel bunkers)**	Vessel to vessel collision	Worst case scenario will be a collision between the tug and the installation vessel causing ruptures of their fuel bunkers into the sea Approximate possible spillage: 88 m^3 (coaster) 150 m^3 (Installation Vessel) 5 m^3 (TB)	The likelihood of both fuel bunkers being ruptured is considered very low
	Vessel to structure collision	Worst case scenario will be a collision between the installation vessel and a foundation causing a rupture of the fuel bunker into the sea Approximate possible spillage: 150 m^3 (Installation Vessel) 5m^3 (TB)	The likelihood is considered low
	Vessel stranding/ grounding	Worst case scenario will be a stranding / grounding of the largest vessel causing a rupture of the fuel bunker into the sea (tug) Approximate possible spillage: 88 m^3 (coaster) 150 m^3 (Installation Vessel) 5 m^3 (TB)	The likelihood of the vessel stranding is considered very low The likelihood of any other vessel stranding is considered low
Hydraulic Oil	Failure of plant or equipment	Worst case scenario will be where hydraulic hoses or	The likelihood of failure of the

Depending on where or from where works are done two types of offshore sites are defined. One Site for works carried out from the Installation Vessel; one Site for works carried out on the foundations without the Installation Vessel present (secondary / finishing works).

The following actions will be performed at the Offshore Site:

- Vessel movements
- Placing and piling of foundation structure
- Grouting
- Secondary Works (including Rock Dumping)
- Drilling (if required)

Outside the Offshore Site the following actions are to be performed: the movements of vessels and transfer of personnel and loading of MPs/TPs from the coaster to the Port of Mostyn. Reloading TPs onto a Transport Barge, towing the barge and the MPs floating to the Installation Vessel.

It is intended that the number of vessels, present on the offshore site at a time, is kept to a minimum. The expected vessels entering the site are as follows:

- The Installation Vessel
- Transport Barge
- 2 - 3 tug boats
- Crew/ Service boat
- 2 Rock Dump Vessels

Pollution of the marine environment can occur from the substances and incidents described in the table below.

Potential Pollutants	
Fuel Oil (Vessel bunkers)	In case of an incident leading to a ruptured bunker tank (collision with other vessels or foundation structure, stranding etc.)
Hydraulic Oil	In case of bursting hoses or failing couplings from plant or equipment
Lubricating Oil and Hydraulic Oil (storage)	In case of an incident leading to a ruptured lubricating or hydraulic oil bunker/drum causing the oil to flow into the marine environment
Grout	In case of blow-out of grout packer.
Garbage	In case of accidental discharge of garbage into the marine environment
Paint (for repair works)	In case of accidental discharge of paint into the marine environment

The coasters shall enter the Port of Mostyn to be offloaded onto the quay side; subsequently they will return to Hoboken to be reloaded.
Crew/service boats shall be transporting crew and minor supplies from Mostyn to the Offshore Site.

The location of an incident decides who shall have the primary responsibility for responding to the pollution incident. In the case of Rhyl Flats Offshore Wind Farm the following authorities are involved:

- Port of Mostyn (for incidents occurring in the Port)
- Maritime and Coastguard Agency (for incidents occurring in UK territorial waters)

5 Assessment of Potential Consequences

MTH is responsible for informing the Employer when a pollution incident occurs and issuing an Environmental Incident Report, Attachment 4.

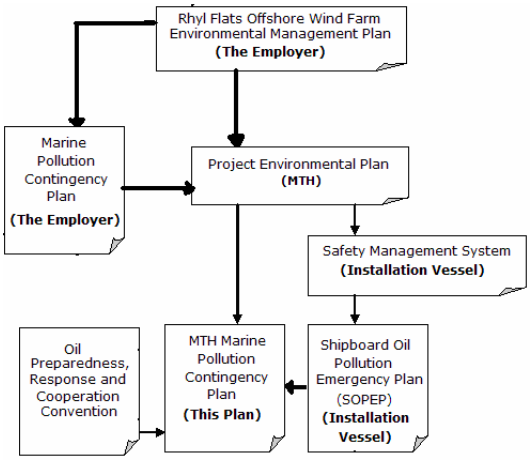
In case the pollution is caused by issues related to the responsibilities of the Vessel Masters onboard the Installation Vessel or other vessels involved in the Works they shall be responsible for issuing an Incident Report and reporting to MTH while MTH shall report to the Employer.

The Vessel Master is responsible for initiating actions to reduce the impact of pollution incidents.

When taking action in accordance to this plan, Vessel Masters must ensure that chemical dispersants or other spill treatment product (e.g. loose sorbents) are not used at any time, except in accordance with specific instructions from the relevant authority for the area in question.

To make this as easily accessible as possible a flowchart and a checklist has been generated to assist in making the right decisions. See Attachment 1 and 2.

The relationship between the Plans can be visualized in the schematic below. This plan shall not replace or adjust anything on the other plans, but shall complement the plans by giving detailed project specific information.



3.1 Onshore Works

Port Of Mostyn:
The MTH Supervisor shall inform the Port Authority and MTH Management about any incidents. MTH shall inform the Employer accordingly.
During operational hours the Port Manager or Harbour Master shall be contacted. After operational hours the Duty Manager shall be the point of contact. See Emergency Contact, Attachment 3 for details.

4 Pollution Risks

In performing the Works the following types of vessels shall be used:

- The Installation Vessel: Installation of the foundations. It is not intended that the Installation Vessel will enter any UK ports during the installation phase (unless a port of refuge is needed).
- 1 Transport Barge:
- PMR's Vessel:
- Coaster: Transport of the foundations from Hoboken in Belgium to the Port of Mostyn.
- Smaller vessels: Crew transfer and service. The Port Of Mostyn shall be used as a base for crew transfer and service boat.

1 Introduction

This Marine Pollution Contingency Plan covers the environmental risks and the relevant authorities to contact in case of an emergency relating to MT Højgaard's Works for the Rhyl Flats Offshore Wind Farm Project.

Installation of the 25 WTG foundations is planned to take place from April 1 2008 to July 31, 2008.

The purpose of this Marine Pollution Contingency Plan is to ensure that incidents likely to cause Marine Pollution are avoided and if any occurs, it shall be properly dealt with to ensure that the right measures are taken to minimize its effect.

1.1 Abbreviations and Definitions

Employer	Rhyl Flats Wind Farm Limited
FEPA	Food and Environmental Protection Act 1985
Installation Vessel	Svanen
MAIB	Marine Accident Investigation Branch
MCA	Maritime and Coastguard Agency
MTH	MT Højgaard a/s (The Contractor)
QHSE	Quality, Health, Safety and Environment
SMS	Safety Management System
SOPEP	Shipboards Oil Pollution Emergency Plan
TB	Transport Barge

2 Overview

This Plan shall be put in place in accordance with the Oil Preparedness, Response, and Cooperation Convention.

This plan works in conjunction with the following plans:

- Employer's Project Environmental Management Plan
- Employer's Marine Pollution Contingency Plan
- Project Environmental Management Plan (doc no.: 260702 – EN – 1.3 - 2)
- Safety Management System (on installation vessel)
- Shipboards Oil Pollution Emergency Plan (SOPEP) (doc no.: 260702 – SOP – 1.3.2.1)

This plan shall be issued to, and used by, all vessels working for or with MTH during the installation works.

It covers the procedure for dealing with a pollution incident, and guides the relevant personnel (Vessel Master, Supervisor or Manager) through the various actions and decisions.

All subcontractors working on the Site shall produce a Pollution Risk Assessment and have these approved by MTH before commencement of work. The information shall be based on the type of pollution and maximum impact on the marine environment.

3 Responsibilities

The Vessel Masters on the Installation Vessel and PMR's Vessel are responsible for reporting environmental incidents and near miss to the Maritime and Coastguard Agency (MCA) as well as Marine Accident Investigation Branch (MAIB) whereas the Employer is responsible for reporting to the regulatory bodies with responsibilities for FEPA and Planning Consents.

TABLE OF CONTENTS

Distribution List

Number	Function Title	Company	Name
1	Project Manager	MTH	Jesper Byberg
2	Assisting Project Manager	MTH	Susanne Kjær
3	Site Manager	MTH	Aage Poulsen
4	Design and Interface Manager	MTH	Arne Jacobsen
5	Engineering Manager	MTH	Stig Skytte Rasmussen
6	Steel Fabrication Supervisor	MTH	Ib Ingemann Andersen
7	Installation Supervisor	MTH	Jørgen Pedersen
8	Installation Supervisor	MTH	Jonas Sørensen
9	Installation Supervisor	MTH	Hans Pedersen
10	Secondary Works Supervisor	MTH	Henrik Hansen
11	Onshore Works Supervisor	MTH	Per Andersson
12	Onshore Works Supervisor	MTH	Arne Hansen
13	QHSE Manager	MTH	Chidubem Uchendu
14	QHSE Manager	MTH	Katrine Sonnichsen
15	Foundations Construction Manager	Employer	Julian Garnsey
16	Project Manager	Employer	Gareth Penhale
17	Environmental Manager	Employer	Hugh Morris / Jamie May
18	CDM Coordinator	CDMC	Chris Usher
19	Project Manager of:		
	1- Rambøll		Henrik Carstens
	2- SIF		Bart Overbeek
	3- Smulders		Ivo Smeets
	4- AH Bolte		Arne Hougaard
	5- Menck		Martin Ros
	6- Peter Madsen Rederi		Tony Millward
	7- Osiris		Andy McLeay
	8- Ballast Nedam (Svanen)		Marcel van Bergen
	9- Densit		Anders Moeller
	10- Port Dredging		John Jones
	11- Landsyd		Mogens Lang Nielsen
	12- Dutch Drilling Company		Arnoud Kamp

Revision	Prepared	Reviewed	Approved	Date
3	**CUU**	**BOST**	**BOST**	**11.04.2008**
2	**CUU**	**ARAF**	**BOST**	**05.02.2008**
1	**CUU**	**ARAF**	**BOST**	**21.01.2008**
0	**CUU**	**AKRI**	**AKRI**	**28.11.2007**

MARINE POLLUTION CONTINGENCY PLAN

Document no.: 260702 – MPCP - 1.3.2
Revision: 3
Date: 11.04.2008
Author: CUU

4. MT HØjgaard A/S

Marine Pollution Contingency Plan

11 Operational Control - Waste Generation and Disposal

This Operational Control covers issues relating to waste generated during the Installation Phase.

Possible wastes to be generated would be:

- grout bags
- used oil, oil rags, oil absorbing materials
- domestic waste (paper, package materials, etc)

11.1 Potential Impacts

If waste is not disposed properly it may have an impact on the marine environment and constitute a hazard to other sea and coastal users.

Onboard the Installation Vessel, the vessel's Waste Management System shall be used for proper waste handling. All waste created offshore shall be collected and segregated into the suitable containers and brought to land.

Wastes from smaller vessels and secondary works vessels performed from a land-based office shall, while offshore, be collected in big bags and disposed using the Waste Management System of the Port of Mostyn.

11.2 List of Key Considerations - Waste Generation and Disposal

Key Consideration	Responsibility	Frequency of Action
Waste water to be collected on board the vessels as required.	Vessel Master(s)	Confirmation required prior to commencement
Installation Vessel's Waste Management Plan to be present.	Vessel Master(s)	Prior to commencement
Port Waste Management Plan to be present and permission to use the system to be arranged.	Site Manager/ QHSE Manager	Prior to commencement
Personnel to receive Waste Management training.	Vessel Master(s)/ QHSE Manager	During Induction Course for all personnel
Waste onboard the installation vessels shall be segregated in suitable containers and stored in appropriately defined areas according to Waste Management Plan.	All personnel	Continuous segregation of waste throughout project life
Neither untreated wastewater nor waste to be discharged into sea.	Vessel Master(s)/ Site Manager	Throughout project life

12 Attachments

1 Marine Pollution Contingency Plan (MPCP)
2 Dropped Objects Plan
3 Near Miss Form

All vessels' names shall be clearly marked on the hull or superstructure.	Vessel Master(s)	Confirmation required prior to commencement
All ancillary equipments, temporary structures deployed/deposited during the course of the works shall be removed, as soon as they are no longer required, to prevent interference with other legitimate users of the sea.	Site Manager	Installation phase
Incomplete structures shall have temporary lightings through a battery powered by solar cell.	Site Manager	Installation phase

10 Operational Control - Noise and Vibration

This Operational Control covers issues relating to noise and vibration during the Installation Phase.

10.1 Potential Impacts

The following operations are considered to cause high noise levels at Wind Farm Area and onshore:

- Piling
- Drilling, if required

This may disturb sea mammals and the onshore residents depending on the wind direction and the weather conditions.

The noise on the installation vessel shall be handled in the Construction Risk Assessments.

If drilling is required, the same noise limits and actions as for piling shall apply.

10.2 List of Key Considerations - Noise and Vibration

Key Consideration	Responsibility	Frequency of Action
All activities shall fulfil obligations under the Contract Agreement.	Project Manager	Assessment of activities prior to commencement to ensure compliance
Noise limitations during installation: The day time (0700-2200 hours) sound pressure level shall not exceed 45 dB L_{Aeq} (60min) at Rhos-on-sea or llanddulas or Kinmel Bay (under neutral weather conditions) The night time (2200-0700 hours) sound pressure level shall not exceed 40 dB $L_{Aeq\ (}$60min) at Rhos-on-sea or llanddulas or Kinmel Bay (under neutral weather conditions)	Site Manager	Installation phase
Adopt the Marine Mammal Monitoring & Mitigation measures which are required by the Employer's Work Instruction including soft start procedures, visual and acoustic monitoring	Site Manager / Vessel Master	Installation phase

All construction materials to be securely fastened to prevent overboard loss – to be covered in method statement for sea fastening.	Vessel Master(s)	Check prior to installation commencement Inspection prior to each transfer of foundations
Remove all debris and temporary structures placed below Main High Water Spring (MHWS) on completion of the works.	Supervisor	Confirmation required post installation
Co-operate with Employer and their consultants to enable any monitoring of suspended sediments which is required.	Vessel Master(s)	As Required
Observe the archaeological exclusion zones, which shall be plotted on the Navigation Packages of each Vessel. Co-operate with Employer and their consultants to report any archaeological observations.	Vessel Master(s)	As Required

9 Operational Control - Other Sea Users

This Operational Control covers issues relating to interactions with other sea users during the installation phase (reference is made to the Employer's Vessel Co-ordination Plan). Anticipated other sea users would be:

- Fishing boats
- Pleasure crafts
- Transport vessels
- Others

9.1 Potential Impacts

9.1.1 Collisions

There is a hazard of other sea-users colliding with either the foundations or the installation vessel(s) during the installation phase, with very high risk of having an adverse effect on the environment.

9.2 List of Key Considerations - Other Sea Users

Key Consideration	Responsibility	Frequency of Action
Notice to Mariners prior to works commencing. To include: • Start date • Expected vessel routes from the local service ports to the Site	Project Manager/ Site Manager	10 days prior to commencing installation, and then as required
All communication on the VHF working frequencies shall be in the English language.	Vessel Master(s)	Confirmation required prior to commencement
A safety zone shall be established in consultation with Maritime & Coastguard Agency	Project Manager	Prior to commencement

8 Operational Control - Seabed Impacts

This Operational Control covers potential seabed impacts likely to occur during the installation works. The actions contained herein seek, as far as is reasonably practicable, to minimize the scale and extent of impacts.

8.1 Potential Impacts

8.1.1 Installation Vessel

The Svanen is a floating crane and has no spud legs so there shall not be an immediate, localised impact upon the seabed due to jack – up.

8.1.2 Pile Driving and Drilling

Pile driving shall have an immediate impact upon the seabed, but are considered minimal. Drill cuttings can be left on the sea-bed within the area of the wind farm, because water shall be used during drilling, in accordance with the Contract Agreement.

8.1.3 Dropped Objects

Dropped objects may prove hazardous to other sea users and affect the sea bed. Should any object drop, an assessment shall be made of the nature as well as the size (according to the Dropped Objects Plan) when deciding whether the Dropped Objects Plan shall be initiated.

8.1.4 Suspended Sediments

The Installation activities shall cause some of the sediments to be suspended in the water phase and this could cause some inconvenience to the marine habitats around. This is however not going to be so much problem since the sediments would settle after a few minutes or hours. No monitoring shall be required.

8.1.5 Archaeological Exclusion Zones

Archaeological Exclusion Zones shall be observed and no construction activity shall take place within these zones. No vehicle may moor in these zones as well. The positions shall be plotted on the Navigation Packages of the vessels involved in the Works. If any further geo-physical, geo-technical, ROV or diver investigation is required the specification shall be discussed with the archaeological contractor. Archaeological findings shall also be reported in accordance with 'Protocol for Reporting Findings of Archaeological Interest' Appendix VI of Archaeological Written Scheme of Investigation (WSI).

8.2 List of Key Considerations - Seabed Impacts

Key Consideration	Responsibility	Frequency of Action
Vessel movement and pile handling operations only to be performed under acceptable sea states in order to reduce the likelihood of dropped objects (refer to applicable method statements).	Vessel Master(s)/ Supervisor	Prior to operation commencement
Any suspicion of loss of objects should be dealt with in accordance with "Dropped Objects Plan".	Site Manager/ Vessel Master(s)	As Required

7.2 List of Key Considerations - Control for Spillage

Key Consideration	Responsibility	Frequency of Action
No substances listed in Schedule 1 of Statutory Instrument 1978 No. 209 shall be used	Project Manager/ QHSE Manager	Prior to project commencement / confirmation required
All chemicals used in the construction works are selected from the List of Notified Chemical assessed for use by the offshore oil and gas industry under the Offshore Chemical Regulations 2002	Project Manager/ QHSE Manager	Prior to project commencement / confirmation required
Grouting material is of low toxicity – environmentally inert.	Project Manager/ QHSE Manager	Prior to project commencement / confirmation required
Suitable precautions is taken to prevent accidental release of wet grout in to the marine environment	Supervisor/ Design Manager	Toolbox talk prior to start of grouting operations on importance of containment and safe handling. One leak test of grout seal prior to the first grout operation
Vessel Master(s) (and Relief personnel) to be competent in the application of the SOPEP and the MPCP.	Vessel Master(s)	Prior to project commencement
Conduct SOPEP drills and exercises to maintain personnel awareness.	Vessel Master(s)	According to the Vessel's plan
In case of spill mobilize appropriate response immediately as per SOPEP and MPCP. Report any environmental incident to MTH, the Employer and the appropriate Authorities on the Emergency Contact list and MPCP.	Site Manager/ Vessel Master(s)/ QHSE Manager	As Required
Assessment of spill cleanup equipment on board each vessel to ensure adequacy for dealing with any spill events.	Vessel Master(s)/ QHSE Manager	Prior to commencement and monthly inspection
Visual inspection of diesel bunkering hoses before and after use, including couplings, to ensure integrity.	Vessel Master(s)	Each bunkering operation
Visual monitoring of diesel bunkering hoses throughout bunkering operations by a Designated Watch.	Vessel Master(s)	Each bunkering operation
Ensure deck areas are kept clean and free from oil and chemical contamination.	Vessel Master(s) All personnel	Regular visual check
All excess chemicals not used are to be returned to shore for storage or disposal by a licensed waste disposal contractor.	Site Manager / Supervisor/ Vessel Master(s)	Following project completion
The subcontractor(s) involved shall be expected to maintain a balance of inventory of material.	Vessel Master(s)	Regular visual check
The subcontractor(s) involved shall also be expected to provide adequate bunding for oil storage (110% of storage capacity).	Vessel Master(s)	Prior to project commencement

-At the site office, located at or adjacent to the works -On board each vessel	Vessel Master(s)	Upon the appointment of vessels /transport managers and upon subsequent revision
Personnel awareness of the potential environmental effects of their activities	QHSE Manager	Toolbox talks. Ongoing active presence.
Ensure that the correct information regarding storage, use and eventual disposal of all project deliverables is communicated to personnel	Supervisor	Prior to project commencement, with toolbox talk reminder and regular inspections of storage areas
Deal with only reputable, registered and checked waste carriers.	Site Manager/ Vessel Master(s)	Checked prior to use
Carry out regular environmental audits of all aspects of the project	QHSE Manager / Site Manager	Regular audit of varying issues.
Ensure that all the works are carried out in accordance with method statements	Supervisor/ Vessel Master(s)	Ongoing throughout the project/ As required when changes to schedules and Method Statements are made
To be responsible for the following on each vessel (first point of contact) :- • Archaeological reporting • Waste Management reporting • Spills and other environmental incidents	Vessel Master(s)	At the beginning of the works.
Provide copies of Coastal Protection Act Section 34 Consent to all subcontractor organization	QHSE Manager	Before commencement

7 Operational Control - Spillage

This Operational Control covers accidental spillage to the marine environment during the installation phase. The actions contained herein seek, as far as reasonably practicable, to control and minimize spillage from the involved vessels and work activities. In case a spillage occurs, the procedures of MPCP and Shipboards Oil Pollution Emergency Plan (SOPEP) shall be followed and reports issued to the Employer (and Authorities if required).

7.1 Potential Impacts

7.1.1 Hydraulic oil spills from equipment

Hydraulic oil spills from broken hydraulic hoses can occur from either independent machines or vessel machinery. The type of hydraulic oil and volume of the maximum potential spill shall be assessed in the MPCP. It is envisaged that any spill which may occur shall be on the deck of the vessel and shall be cleaned up with the vessel's spill kits.

Equipment used above sea water, which could cause spillage into the marine environment, shall be listed in the MPCP with data of oil type and max discharge volume.

7.1.2 Oil spills from vessels

Oil spills could occur as a result of bunker tank overflows, transfer hose or hull leakages, and vessel collisions. This could have a great impact upon the marine environment and shall be treated according to MPCP.

7.1.3 Chemical spills

Other chemical used offshore are foreseen to be paint for repair works and grout. The impact of the paint on the environment shall not be harmful and aim at using only environmentally inert substances.

- Audit results and actions
- Description of measures taken
- Environmental incidents / near misses
- Number of Toolbox Talks completed
- Number of Dropped Objects

5 Operational Control of Environmental Aspects

In order to ensure that environmental aspects are evaluated and integrated the following Operational Control Lists have been developed. Responsibilities and actions are identified and shall be brought forward and included in the Operational Procedures.

Operational Control Lists have been conducted for the following:

- Environmental Management System
- Spillage
- Seabed Impacts
- Other Sea Users
- Noise and Vibration
- Waste Generation and Disposal

6 Operational Control - Environmental Management System

This Operational Control covers general environmental issues to be addressed during the design, manufacturing and installation works.

6.1 List of Key Considerations - Environmental Management System

Key Consideration	Responsibility	Frequency of Action
To work with designers and subcontractors to develop and implement environmental best practice throughout the project	Project Manager	As required when dealing with designers and subcontractors
Comply with all regulatory legislation at national and local level and with all mitigation plans which have been submitted to discharge Consent requirements and to comply with legal requirements, including the following Plans from the Employer:- • Suspended Sediment Monitoring Plan (if required) • Marine Mammal Observation Plan • Archaeological Written Scheme Of Investigation • Noise Monitoring Plan • Scour Protection Plan • Marine Pollution Contingency Plan • Vessel Co-ordination Plan • Timing of Works Arrangements	Project Manager	Ongoing throughout project
Design, operate and maintain all plant and equipment to the highest practicable standard as appropriate	Project Manager/ Site Manager/ Vessel Master(s)	Ongoing throughout project
Copies of the FEPA Licenses to be available at the following locations:	QHSE Manager	Upon receipt of License and subsequent revisions

the duration of the project. Subcontractors working on site and their documentations shall be included.

The basis of such inspections and audits shall be the Contract Agreement, this Environmental Plan and relevant legislations to ensure compliance. The Employer shall join in some of the inspections and audits as appropriate or carry out a separate system audit.

All inspections by MTH shall be recorded. Audits shall be carried out and reported to the Employer according to the Quality Plan (already sent to Employer). Remarks noted during inspections and audits shall be followed up and closed out by putting measures in place, within a few days, to ensure that any non conformance is corrected if possible or replaced.

4.6 Review and Update

Review and updating of the Environmental Management System shall be carried out if required based on results from inspections and audits as well as changes in methodology and/or equipment, revised legislation, etc.

4.7 Reporting

All Environmental incidents shall be reported through the Environmental Incident Report Form provided (attachment 3 of Marine Pollution Contingency Plan). Near misses shall be reported to the Employer through the form provided (see attachment 3).

Both environmental incidents and near misses shall be reported to the Employer within the next 24 hours.

An environmental incident includes any occurrence which causes a project vessel (installation vessels, PMR's Vessel, tugs or barges) or other equipment / construction activity to cause significant harm to the environment. A near miss is any event, other than an incident, which involves circumstances indicating an incident nearly occurred.

The Vessel Masters on the Installation Vessel and PMR's Vessel are responsible for reporting environmental incidents and near miss to the Maritime and Coastguard Agency (MCA) as well as Marine Accident Investigation Branch (MAIB) whereas the Employer is responsible for reporting to the regulatory bodies with responsibilities for FEPA and Planning Consents.

The Coast Guard Authority for the Rhyl Flats Project is;

Holyhead Maritime Rescue Co-ordination Centre
Western Region HM Coastguard
Prince of Wales Road
Holyhead
Anglesey
LL65 1ET

Contact:
Rescue Co-ordination Centre Manager – Jim Paton (+44 1407 767951, jim_paton@mcga.gov.uk)

Emergency & out of hours contact – Duty Watch Manager (+44 1407 765624)

Incidents or near misses that may have an impact on the marine environment and/or species shall be notified immediately to the Employer regardless of the origin of the cause. An incident/near miss report shall be completed and sent to the Employer within the next 24 hours at the latest.

Progress Reports shall be submitted to the Employer on a weekly and monthly basis. The following environmental issues shall also be included in the monthly Progress Report:

- Archaeological or geological findings

The Employer is responsible for Marine Mammals, Suspended Sediments and Archaeology but the Installation Vessel Subcontractor is responsible for providing nominated individual (most likely the Vessel Master) onboard the vessel who has responsibility for environment as well as being point of liaison for communication on Marine Mammals, Suspended Sediments and Archaeology. The nominated individual shall communicate through MTH to the Employer according to the flowchart (to be provided by the Employer).

4.2 Transfer of Environmental Information

Necessary information regarding environmental issues shall be transferred to the relevant personnel immediately.

All personnel working on site shall undergo an Induction Course before being permitted to work on the Site. The workers shall at the Induction Course be informed of the Project Specific Environmental Objectives, Key Considerations, Actions and Precautions, Key Responsibilities, importance of reporting the following to Vessel Master – Dropped objects, Archaeological findings and Marine mammal sightings. The Induction Course shall focus on everybody's responsibility in ensuring that these objectives are achieved and that everyone knows what actions to take if an environmental incident occurs.

Environmental subjects to be thoroughly discussed at the Induction Course are:

- MTH's Environmental Policy
- Key Considerations
- Prevention of spills
- Dealing with spills
- Spill kits and their use
- Storage and handling of hazardous materials, if any
- Minimizing waste
- Waste handling
- Marine Mammal warning system
- Locations of Emergency Contact list
- Employer's Marine Mammal Mitigation Procedures
- Employer's reporting procedures for Archaeological Exclusion Zones

Regular meetings such as Tool Box Talks, Progress Meetings, Subcontractors' Meetings and Internal Meetings shall have Environmental issues on the agenda as a standard item.

4.3 Environmental Management System Documentation

Environmental documentation shall be archived in the Rhyl Flats Project specific folder on the MTH system.

4.4 Subcontractors

Every subcontractor, especially the ones directly involved in the works in the UK, shall receive a copy of this plan and shall be expected to adhere strictly to the provisions therein. MTH shall monitor compliance. Other relevant Environmental issues or emergency situations shall be communicated to the subcontractors involved as soon as reasonably practicable either through the Schedule of Method Statements or directly. The Subcontractors directly involved in the works in the UK shall submit their plans to MTH for approval. These plans shall as well be passed on to the Employer for approval.

4.5 Inspection and Auditing

Regular environmental inspections and audits shall be carried out by MTH throughout the duration of the project. Audit schedules shall be made and the personnel involved shall be duly notified before it is conducted. Inspections, on the other hand, shall be carried out continuously throughout

3.3 Environmental Aspects for the Project

The environmental impact for the Foundation Works is considered of low significance. The duration of the installation phase is relative short, approximately four months in 2008. The number of equipment and personnel involved is small. No hazardous materials are assumed to be used. Thus, rather few environmental concerns are identified:

- Impact on seabirds, migratory fish and marine mammals from vibration, noise and accidentally spillage or leakage.
- Impacts upon other sea users; collision risk and dropped objects.
- Waste Management.
- Disturbance to onshore residents as a result of noise generation during piling.
- Impacts on seabed habitats and water quality through disturbance of seabed sediments.
- Loss and damage of archaeological remains.

These Environmental Aspects are described in details with actions and relevant precautions in the Operational Control Sections 5 to11.

3.4 Project Environmental Objectives

The MTH Project Specific Environmental Objectives for the Rhyl Flats Offshore Wind Farm Project are:

- Minimal noise impact on the surrounding environment including Rhos-on-Sea, Llanddulas or Kinmel Bay.
- High environmental moral among all involved in the Project.
- Fulfil environmental requirements in the Contract Agreement and UK Law.

MTH shall also comply with the Employers Environmental Objectives / Targets:

- Zero Environmental incidents which require reporting to the Regulator
- No objects left on seabed
- No consent violations
- Reporting of all minor spills
- Toolbox Talks: 100% completion of plan
- Inspection and Audit Plan: 100% completion of plan
- Satisfactory close out of Non Conformance Reports
- Environmental induction of all Project personnel
- Regular inspections and audits, frequency and scope determined on a risk assessed basis

4 Implementation, Monitoring & Review

4.1 Specific Environmental Responsibilities

The MTH QHSE Manager is responsible for:

- Implementation, maintenance and review of the Environmental Management System.
- Ensuring that personnel are aware of and fulfil environmental requirements.
- Performing Environmental related inspections and audits.
- Implementation of reporting system, in case of environmental incidents, to the Employer and relevant third parties.
- Providing support where and when necessary on Site.
- Providing relevant information to the Employer for their review.

Everyone involved in the project is responsible for ensuring a minimal environmental impact during the design, fabrication and installation works for the Rhyl Flats Offshore Wind Farm Project.

3.2 MT Højgaard's Environmental Policy

MTHøjgaard

4 July 2006

Environmental Policy

General

As Denmark's leading general contractor company, MT Højgaard a/s is intend on carry out its activities with focus on the environmental implications of the work processes. Compliance with valid legislation and other environmental requirements, especially our clients' requirements and expectations, is the basis for our environmental protection processes.

Objectives

We will ensure that our employees are constantly educated and updated to carry out the environmental tasks in a responsible way.

We will ensure that all environmental subjects are included in MT Højgaard's *Vidensystem* "Integrated Management System", according to the environmental standard ISO 14001: 2004.

We will endeavour to be provident regarding how our activities can influence the environment.

We will endeavour to uncover environmental factors and/or risks as early as possible, in order to make decisions based on relevant facts and implement the suitable measurements.

Responsibility and Assignments

The board of directors has the responsibility for the approval of the environmental protection policy and to ensure that this policy is accomplished and respected.

Business Development has the responsibility for the preparation and revision of the environmental protection policy.

The board of directors and the divisional directors must live up to the environmental protection policy. In liaison with *Health, Safety & Quality* the directors must ensure that the company's prime objective in respect of environmental protection is realised.

All relevant personnel must be aware of and live up to their responsibilities and duties in respect of the environmental protection policy. They are continually orientated on changes in the company's prime objective in respect of environmental protection.

Jens Bak-Nyhus

Executive Vice President

MT Højgaard a/s
Knud Højgaards Vej 9
DK-2860 Søborg
Tel +45 3954 4000
Fax +45 3954 4900
mail@mthojgaard.dk
www.mthojgaard.dk
CVR nr. 12 56 22 33

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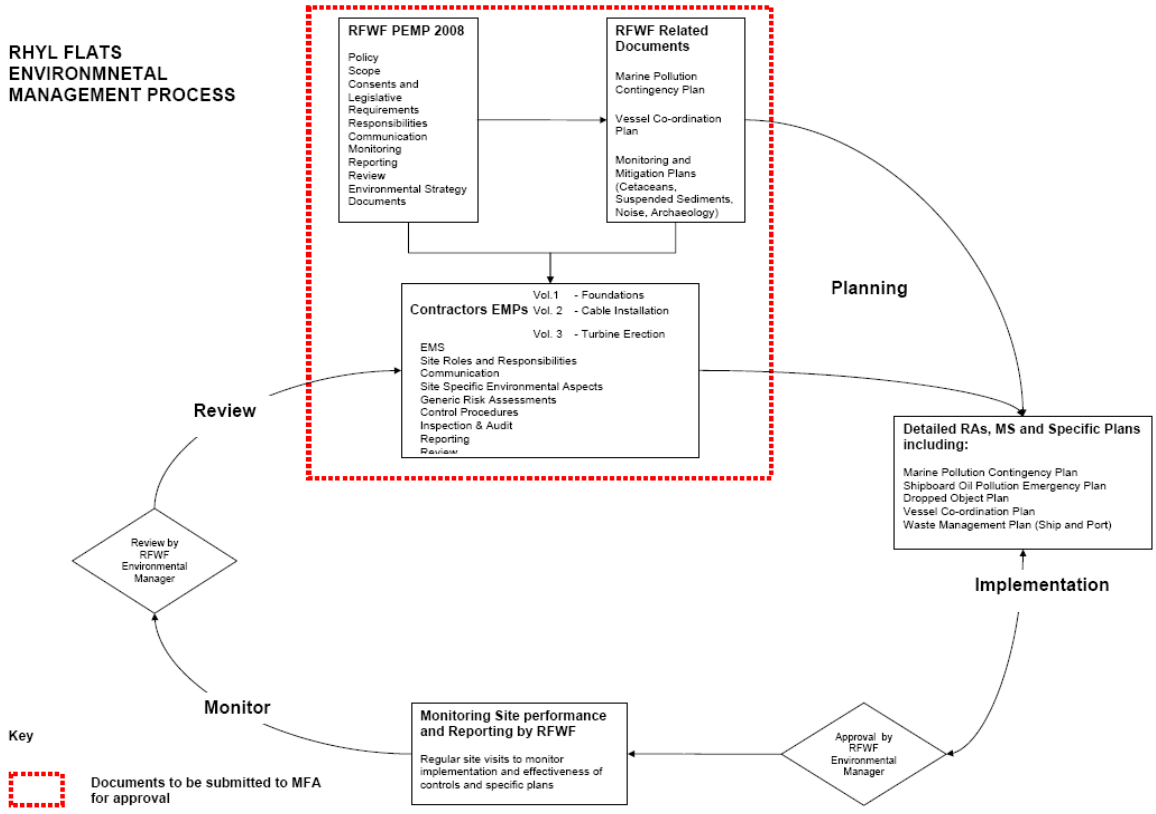
The table below provides an overview of the content in the different plans, procedures and actions to be made in case of an incident.

Marine Pollution Contingency Plan	Pollution Incident Flowchart Pollution Incident Checklist Emergency Contacts Pollution Incident Report	Will be placed at different locations on Site / the Installation Vessel / PMR's Vessel
Dropped Object Plan	Dropped Object Flowchart Dropped Object Report Dropped Object Register Recovery Procedure	Will be placed at different locations on Site / the Installation Vessel / PMR's Vessel
Operational Procedures	Emergency Procedures including the Operational Procedures / Method Statements	
Installation Vessel Emergency Response Plan	To be prepared by the Installation Vessel Subcontractor	Will be placed on the Installation Vessel
SOPEP	To be prepared by the Installation Vessel Subcontractor	Will be placed on the Installation Vessel
Waste Management Plan	Includes individual plans by the Installation Vessel Subcontractor & Port of Mostyn, which explains how waste materials generated during the cause of the project would be managed	Will be placed at the on Site Office / the Installation Vessel / PMR's Vessel

2.4 Document Relationships

For an overview of document relationships for the Rhyl Flats Offshore Wind Farm Project refer to the Project Management Plan (which has only the Contract Agreement superseding it).



Environmental issues and actions identified in this plan shall be included in the Operational Procedures and Method Statements. MTH and the Employer shall agree the schedule of Method Statements which will be submitted and when, allowing a minimum of four weeks review period.

3 Environmental Management System

3.1 General

The MTH Environmental Management System developed for the Rhyl Flats Offshore Wind Farm Project is based on MT Højgaard's internal Integrated Management System, the Contract Agreement and the Employer's Plans (Project Environmental Management Plan and Marine Pollution Contingency Plan).

Beside this Environmental Plan, the Emergency Management System consists of the following documents:

- Marine Pollution Contingency Plan (MPCP)
- Emergency Contacts (attachment to MPCP)
- Dropped Objects Plan
- Operational Procedures
- Installation Vessel Emergency Response Plan (provided by Installation Vessel)
- Shipboards Oil Pollution Emergency Plan (SOPEP) (provided by Installation Vessel)
- Waste Management Plan (Port of Mostyn & Installation Vessel)

2.1 Programme

The following represents the agreement made between the Employer and MT Højgaard:

Contract Commencement Date:	July 12, 2007
Phase 1 (Scour Protection – Filter Stones):	July 19, 2007 – August 12, 2007
Phase 2 (Installation of Foundations):	April 1, 2008 – July 31, 2008

2.2 Abbreviations and Definitions

COSHH	Control of Substance Hazardous to Health
Employer	Rhyl Flats Wind Farm Limited
EMS	Environmental Management System
FEPA	Food & Environmental Protection Act 1985
Installation Vessel	Svanen
MCA	Maritime and Coastguard Agency
MPCP	Marine Pollution Contingency Plan
MTH	MT Højgaard (the Contractor)
PMR	Peter Madsen Raderi A/S (Scour Protection Subcontractor)
QHSE	Quality, Health, Safety and Environment
SOPEP	Shipboard Oil Pollution Emergency Plan
TB	Transport Barge
The Contract Agreement	The signed agreement between the Employer and MTH
The Installation Phase	The period starting from the transport of the first foundation to the completion of the Works.

2.3 Consents & Legislative Requirements

The environmental consents and requirements to adhere under the Contract Agreement are as follows:

- Consent under Section 36 of the Electricity Act 1989
- Consent under Coast Protection Act 1949
- Crown Estates Act 1961, Section 3
- Licence number 31640/07/1 under FEPA
- Crown Estates Lease Documents
- Environmental Statement

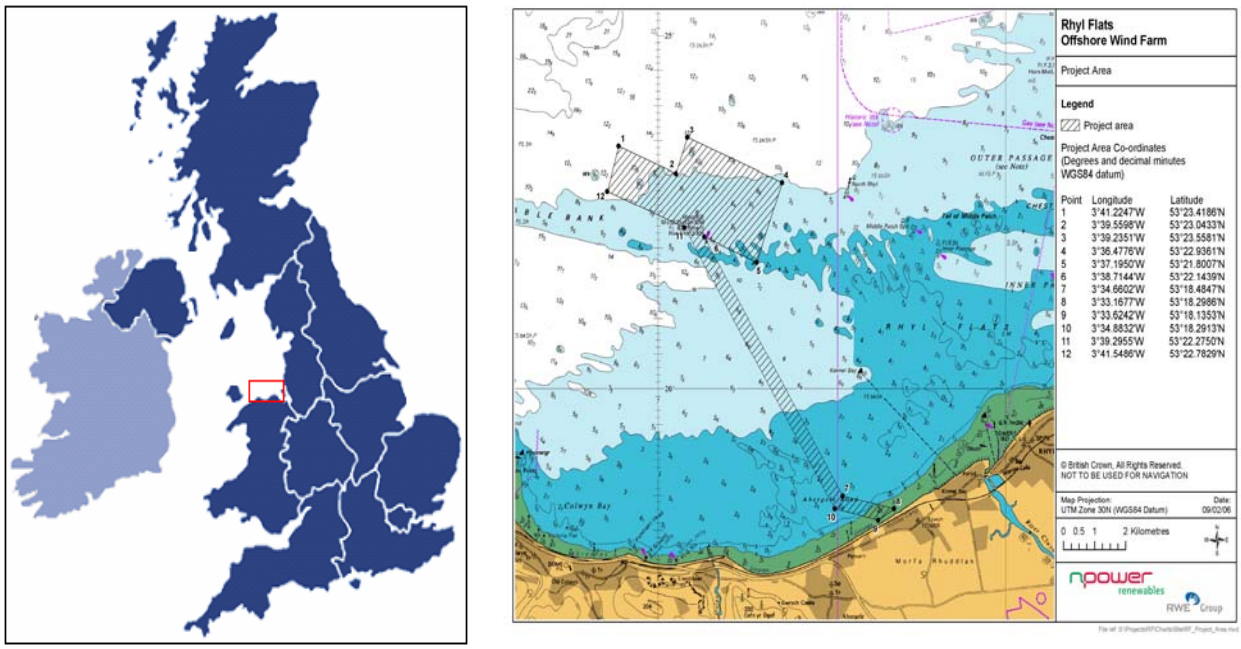
In addition to the above consents MT Højgaard will ensure that all works performed in the UK (including works performed by subcontractors working in the UK) comply with the UK Environmental Legislations, represented by the following acts and regulations:

- Environmental Protection (Duty of Care) Regulations 1991
- Environmental Protection Act 1990
- Food and Environmental Protection Act 1985
- Coastal Protection Act 1949
- MARPOL 73/78: Annex IV
- Merchant Shipping (Prevention of Pollution by Garbage) Regulations 1998
- Hazardous Waste Regulations 2005
- The Merchant Shipping (Prevention of Oil Pollution) Regulations 1996
- The Merchant Shipping (Reporting of Pollution Incidents) Regulations 1987
- The Offshore Chemicals Regulations 2002
- The Prevention of Oil Pollution Act 1971
- Offshore Petroleum Activities (Oil Pollution, Prevention and Control) Regulation 2005

1 Introduction

The Contract between Rhyl Flats Wind Farm Limited UK (otherwise called the Employer) and the contractor MT Højgaard (MTH) includes the Design, Fabrication and Installation of 25 foundations for Wind Turbine Generators (WTGs) for the Rhyl Flats Offshore Wind Farm (the Works).

Rhyl Flats Wind Farm Limited is currently advancing a programme aimed at developing alternative sources of renewable energy from wind in the offshore region of North Wales. This programme can potentially deliver up to 10% of the total electricity supply from renewable resources by 2010. Rhyl Flats, located approximately 10 km from the coast of North Wales, is planned to generate an approximate output of 90 MW.



Location of the Rhyl Flats Offshore Wind Farm

This Project Environmental Plan is the overall tool used to describe MT Højgaard's Environmental Management System to be used for the Rhyl Flats Offshore Wind Farm Project. It addresses the major environmental interactions that may arise during the project and states actions and precaution.

2 Project Description and Programme Details

The Rhyl Flats Offshore Wind Farm consists of 25 foundations. Each foundation consists of a steel monopile (MP), which is installed by driving (or a combination of driving and drilling) it to its target level using a hydraulic hammer (and a drill if required). A Transition Piece (TP) is installed on each MP and grouted. The TP carries all the accessories such as boat landing, platforms and anodes preassembled.

The installation works of the foundations shall be performed using the Installation Vessel. The works shall include heavy lifting operations, working at heights, working in confined spaces, diving operations and electrical works (on the navigational aids), all requiring high precision and safety moral among the workers.

TABLE OF CONTENT

Distribution List

Number	Function Title	Company	Name
1	Project Manager	MTH	Jesper Byberg
2	Assisting Project Manager	MTH	Susanne Kjær
3	Site Manager	MTH	Aage Poulsen
4	Design and Interface Manager	MTH	Arne Jacobsen
5	Engineering Manager	MTH	Stig Skytte Rasmussen
6	Steel Fabrication Supervisor	MTH	Ib Ingemann Andersen
7	Installation Supervisor	MTH	Jørgen Pedersen
8	Installation Supervisor	MTH	Jonas Sørensen
9	Installation Supervisor	MTH	Hans Pedersen
10	Secondary Works Supervisor	MTH	Henrik Hansen
11	Onshore Works Supervisor	MTH	Per Andersson
12	Onshore Works Supervisor	MTH	Arne Hansen
13	QHSE Manager	MTH	Chidubem Uchendu
14	QHSE Manager	MTH	Katrine Sonnichsen
15	Foundations Construction Manager	Employer	Julian Garnsey
16	Project Manager	Employer	Gareth Penhale
17	Environmental Manager	Employer	Hugh Morris / Jamie May
18	CDM Coordinator	CDMC	Chris Usher
19	Project Manager of:		
	1- Rambøll		Henrik Carstens
	2- SIF		Bart Overbeek
	3- Smulders		Ivo Smeets
	4- AH Bolte		Arne Hougaard
	5- Menck		Martin Ros
	6- Peter Madsen Rederi		Tony Millward
	7- Osiris		Andy McLeay
	8- Ballast Nedam (Svanen)		Marcel van Bergen
	9- Densit		Anders Moeller
	10- Port Dredging		John Jones
	11- Landsyd		Mogens Lang Nielsen
	12- Dutch Drilling Company		Arnoud Kamp

Revision	Prepared	Reviewed	Approved	Date
5	**CUU**	**BOST**	**BOST**	**11.04.2008**
4	**CUU**	**ARAF**	**BOST**	**11.02.2008**
3	**CUU**	**ARAF**	**BOST**	**05.02.2008**
2	**CUU**	**ARAF**	**BOST**	**28.01.2008**
1	**CUU**	**ARAF**	**BOST**	**21.01.2008**
0	**CUU**	**AKRI**	**AKRI**	**28.11.2007**

MTHøjgaard

PROJECT ENVIRONMENTAL MANAGEMENT PLAN

(Phase 2)

Document no.: 260702 – EN - 1.3 - 2
Revision: 5
Date: 11.04.2008
Author: CUU

3. MT HØjgaard A/S

Environmental Management Plan

WESSEX ARCHAEOLOGY LIMITED.
Head Office: Portway House, Old Sarum Park, Salisbury, Wiltshire SP4 6EB.
Tel: 01722 326867 Fax: 01722 337562 info@wessexarch.co.uk www.wessexarch.co.uk
London Office: Unit 113, The Chandlery, 50 Westminster Bridge Road, London SE1 7QY.
Tel: 020 7953 7494 Fax: 020 7953 7499 london-info@wessexarch.co.uk www.wessexarch.co.uk

7. Oceanteam Power and Umbilical Environmental Management Plan

OCEANTEAM POWER & UMBILICAL

npower renewables

PROJECT	*CLIENT REF NUMBER*
Rhyl Flats Offshore Wind Farm Cable Installation Contract	**MPC0116**

DOCUMENT TITLE

Project Environmental Management Plan

DOCUMENT REF. NR.	
J-06-4215-PL-005	

This is a Project Controlled Document and should be retained only by an authorized person. If this document was not specifically issued to its user, then the user must obtain a controlled copy from the Project Administrator.

A4	27-04-08	Client Comments Incorporated	JoT	BoM	JaD	EcB
A3	18-03-08	Client Comments Incorporated	JoT	BoM	JaD	EcB
A2	28-02-08	Client Comments Incorporated	JaV	BoM	JaD	EcB
A1	18-01-08	Issued for Review	DoL	BoM	JaD	EcB
Rev	**Date**	**Reason for issue**	**Prep**	**Check**	**QA**	**PM**

Document Revision History

Date	Amendment	Section	Page	Holder
18/03/08	Revisions to entire document	ALL	ALL	BoM
27 04 08	Client comments added	1.3	2	JoT
27 04 08	Changes to key dates	1.4	3	BoM
27 04 08	Client comments added	4.1	14	JoT
27 04 08	NPower contact details included	App 3	N/A	JoT
27 04 08	New Environ MV 46 MSDS added	App 4	N/A	JoT
It is the responsibility of the copy holder to remove and destroy superseded page(s) from this document, replace them with revised page(s) issued and sign as holder this record amendment sheet				

CONTENTS

Appendices

Illustrations

1. Introduction

1.1 General

Rhyl Flats Wind Farm Ltd will construct the Rhyl Flats Offshore Wind Farm located off the north coast of Wales, in the region of Colwyn Bay. The wind turbine generator (WTG) array of 25 wind turbines will be located some 8km offshore and will connect with the onshore export cables via three offshore export cables.

The inter turbine array cables connecting the 25 wind turbines are arranged in three strings which connect via three of the turbines to the shore by three export cables that terminate at a marine/terrestrial splice chamber located a short distance inland near the town of Towyn.

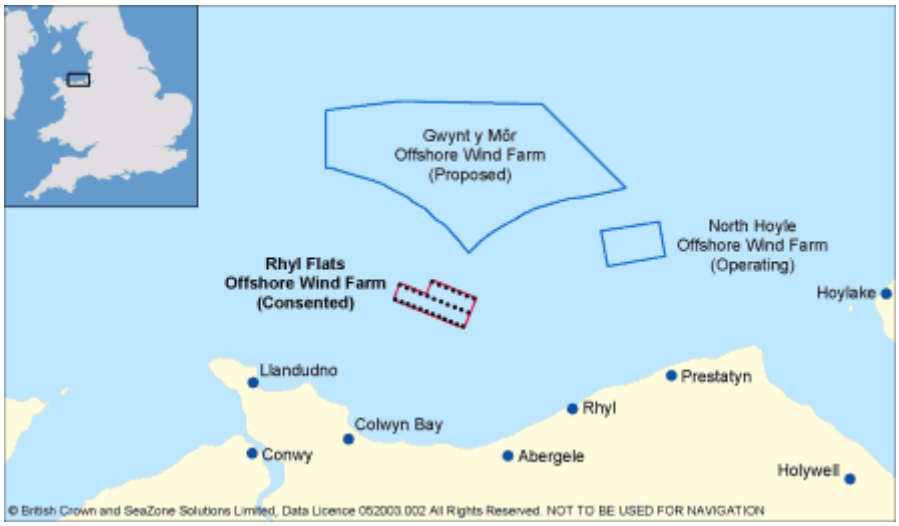


Figure 1. Rhyl Flats Offshore Wind Farm

1.2 Purpose of Document

The Project Environmental Management Plan (PEMP) is a project specific document which describes a series of responses and actions to the legislative and contractual environmental commitments throughout the Rhyl Flats project.

This PEMP also provides:

- A description of Roles and Responsibilities
- A list of relevant project documents
- A series of Risk Assessments included
- Contact details for OPU personnel responsible environmental management

1.3 Scope of Work

Oceanteam Power & Umbilical (OPU) has been awarded the contract by Rhyl Flats Wind Farm Ltd, for the supply of services for the installation and burial of the marine cables for the Wind Farm. This includes the three Export cables from the marine/terrestrial cable interface onshore to the wind farm location offshore and the 24 inter Array cables between the turbine generators. Additional works also include the installation and termination of all cables into pre-installed J-tubes and switchgear at each WTG foundation.

Oceanteam Power and Umbilical will employ a suitably equipped and manned marine spread and will lay and bury all of the cables utilising a mechanical cable plough.

For the burial of the cables adjacent to the foundation structures OPU will deploy a suitably equipped vessel which will use a high pressure water jetting method for the cable burial.

In the event of non burial of cable the installation of protection mattresses may be required. If mattresses are required to achieve cable burial, then applications for separate FEPA and CPA licences will be made by Client. Any mattresses required will be deployed utilising a mattresses deployment frame.

A tripod arrangement with sheave, looping the draw wire back to the installation vessel, will be used for the pull-in of the cables into the pre installed J-tubes on the wind turbine foundations.

The shore approach for the three export cables shall be buried up to the high water mark using a combination of excavator and plough/jetting tool. The cable will then be installed from the high-water mark through pre-installed high density polyethylene (HDPE) conduits installed below the surface, exiting into splice chambers already located at the beach near the town of Towyn. The marine export cables will be pulled through these conduits and connected to the onshore cables within the onshore splice chambers.

There are several stages to the offshore workscope, these can be defined as:

- Site visits and marine surveys.
- Desk Top Studies (including burial assessment).
- Pre-lay grapnel runs / Route Clearance.
- Loadout and Transport of Cables
- Mobilisations
- On-shore pull-in of export cables (Shore End)
- Lay and burial of Export and Array cables
- Installation of cables into monopile J-tubes
- Termination of Cables
- Testing
- Mattressing Operations
- Demobilisation of marine equipment
- Final Documentation

Further details of the overall project methodology can be found in OPU Document J-06-4215-PR-201.

1.4 Schedule

The key schedule dates are as follows;

- Cable Pick Up 13th June 2008
- Start of Marine Operations 29th June 2008
- Complete Installation Works 31st August 2008

A more detailed set of dates are available and can be found as part of OPU document J-06-4215-PL-008 – Baseline Project Plan.

1.5 Abbreviations

HDPE	High Density Polyethylene
HSE	Health Safety and Environment
OPU	Oceanteam Power & Umbilical Ltd
QHSE	Quality Health Safety and Environment
QA	Quality Assurance
QC	Quality Control
TBA	To Be Advised
TBC	To be confirmed
WTG	Wind Turbine

1.6 Definitions

Debris:	Waste material
Mobilisation:	All preparations before commencement of work including fit-out, production and approval of Project Quality Manual, allocation of personnel and equipment, input of route data in computer, etc.
Obstacle:	Natural or man-made object causing hindrance to cable installation or burial.
Cable:	Cable type and properties are described by Client in the Scope of Work.
Cable installation:	Lay, or simultaneous lay and burial, of (a) cable(s) together with associated activities (I Tube pull-ins, lay down and recovery etc.).

Cable Corridor:	The corridor is described by Client in the Contract Documents.
Cable Route:	The route, within the Cable Corridor, where the cables will be installed.
Ploughing:	The cutting of a trench in the seabed for the purpose of allowing a cable to be installed into the trench below the seabed surface
Weather:	Prevailing sea-state, current(s), swell and/or wind conditions.

1.7 References

- 64870.08 – RFOWF Archaeological Written Scheme Of Investigation
- RF/PEMP/Version 2.0 - RFOWF Project Environmental Management Plan
- RFOWF Marine Pollution Contingency Plan
- RFOWF Archaeological Communication Plan
- RFOWF Collision Risk Management Plan
- OPU HSF 034 Rev C1 - Environmental Incident Report Form
- OPU Doc. J-06-4215-PR-201 – High Level Engineering Methodology
- OPU Doc. J-06-4215-PL-003 – Burial Plan – Export Cables
- OPU Doc. J-06-4215-PL-004 – Burial Plan – Array Cables
- OPU Doc. J-06-4215-PL-008 – Baseline Project Plan
- OPU Doc. J-06-4215-PR-011 – Installation Procedure
- OPU Doc. J-06-4215-PL-018 – Fire and Evacuation Plan
- OPU Doc. J-06-4215-PL-019 – Emergency Contingency Plan
- OPU Doc. J-06-4215-PL-020 – Shipboard Oil Pollution Emergency Plan (SOPEP)
- OPU Doc. J-06-4215-PL-021 – Dropped Object Plan
- OPU Doc. J-06-4215-PL-022 – Waste Management Plan
- OPU Doc. J-06-4215-PL-025 – Marine Pollution Contingency Plan (MPCP)
- Vessel Co-ordination Plan (Bridging)

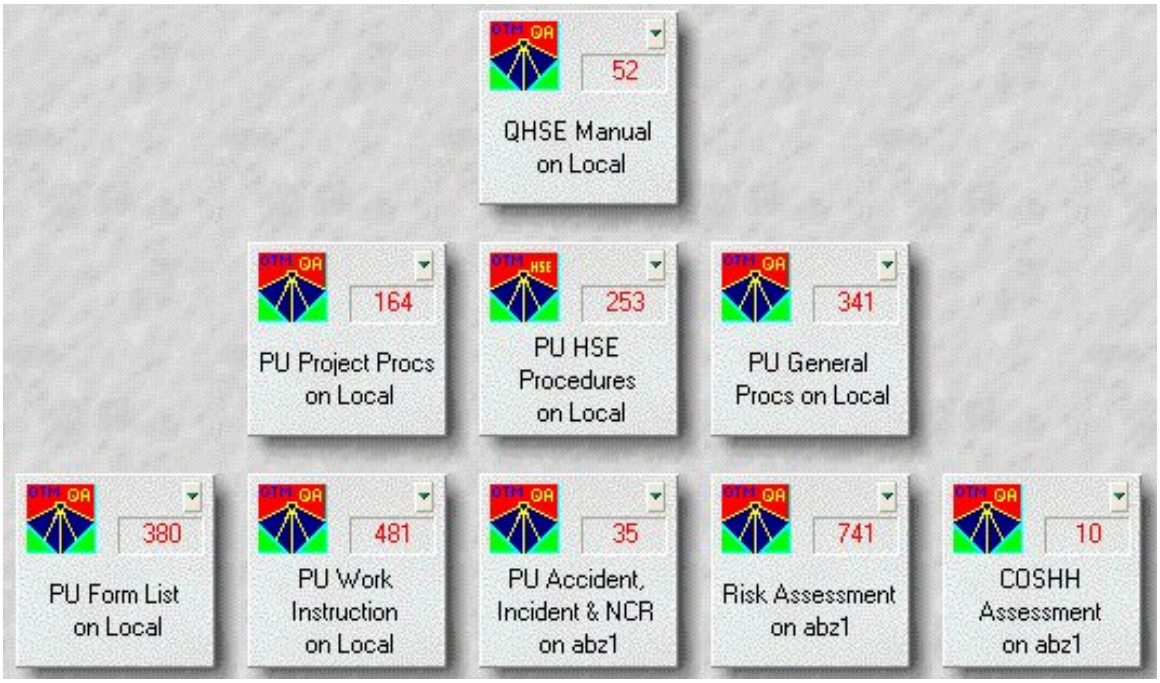
2. Management Systems

OPU Operate an integrated management system which is the controlling system for environmental management and all other sub categories.

The OPU system is electronic based (known as C-view) within a Lotus Notes system, with access through the company supplied computers, access is 24/7, worldwide. Only the latest versions of each procedure, documents etc are available from this system. All items can be printed or downloaded but are then "uncontrolled". This includes project operations from bid to close out, with minutes of meetings, action items, purchase orders all locked into the individual project.

C-view training is conducted for project management / supervision, duration is 2 days.

The 3 levels of documentation within the OPU management systems are graphically presented below;



When opened each database presents the contents of the procedures, forms, instructions etc.

Independent approvals of the system consist of third party audits by DNV in the form of surveillance audits on the operation of OPUs management systems.

2.1 Environmental Management System

The Environmental Management System for the Rhyl Flats Offshore Wind Farm Project is part of the OPU Integrated Management System and will operate in association with the RFOWFL Project Environmental Plan and related documents.

The process commences with the identification of all potential hazards during the initial post contract award design review. Having identified areas of sensitivity, and the required follow up actions to be taken, the details will be integrated in to the cable burial plans and route planning process, and subsequently will form part of the installation procedures.

Dissemination of the information will take the form of both formal, as in contained within the project procedures, and informal as with project meetings and tool box talks etc.

A comprehensive set of procedures will be available throughout the project, and the emergency response process and the incident reporting procedure will be displayed prominently throughout the vessel. For further details of incident reporting please refer to Section 4.

2.2 Company Environmental Policy

OPU's environmental policy is shown in Figure 2 below;

OCEANTEAM POWER & UMBILICAL

Health, Safety and Environmental Policy

Oceanteam Power and Umbilical ASA (OPU) is committed to the application of proactive management in the elimination of injuries, dangerous occurrences and harm to the environment in its efforts to provide a safe, healthy and progressive work environment for all employees and those who come in contact with our operations.

To achieve this OPU shall:

- Maintain a work environment that is safe, conducive to high levels of work performance, and in conformance with all OPU policies, standards and procedures
- Endeavour to prevent all injuries and work-related ill health and environmental damage, in the work place
- Continuously improve our environmental performance by protecting both people and the environment.
- Ensure that business decisions take proper account of environmental implications and comply with all legislative requirements pertaining to environmental issues as the minimum standard.
- Maintain our Management System in compliance with current legislation and apply where relevant, "best practice" methodology in preventing injury and environmental damage.
- Establish and maintain safe systems of work, throughout our operations
- Encourage all personnel through open communication and employee participation to identify all potential risks to the safety of personnel and our working environment and manage these risks effectively to prevent accidents and injuries to all employees, contractors and visitors.
- Develop commitment, responsibility and accountability to OPU HSE objectives and targets
- Identify and analyse all hazards to personnel, initiate corrective actions and verify their effectiveness
- Ensure that all facilities and projects are resourced, designed, engineered and maintained to satisfy legislative and OPU HSE requirements
- Continually develop safety-related and environmentally aware behaviour to reduce human error with respect to the job, the individual the team and the environment.

27/08/07

Hessel Halbesma
Chairman
Oceanteam Power and Umbilical ASA

HSE Policy Rev C5
Page 1 of 1

Figure 2. OPU Environmental Policy

2.3 Legislation & Consents

The following legislation and consents will be adhered to, OPU will ensure that all operations performed either directly by OPU or by one of its nominated sub contractors, will comply with the following:

- Environmental Protection Regulations 1991
- MARPOL 73/78
- Environmental Protection Act 1990
- Merchant Shipping Regulations 1998
- Merchant Shipping (Prevention of Oil Pollution) Regulations 1996
- Merchant Shipping (Reporting of Pollution Incidents) Regulations 1987
- Merchant Shipping (Prevention of Pollution by Garbage) Regulations 1998
- Prevention of Oil Pollution Act 1971
- The Coast Protection Act 1949, as amended by the Merchant Shipping Act 1988
- Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997
- Protection of Wrecks Act 1973
- The Hazardous Waste (England and Wales) Regulations 2005
- The Offshore Chemicals Regulations 2002
- Protection of Wrecks Act 1973
- Waste Management Licensing Regulations as amended 1994, 1995, 1996, 1997, 2002, 2003
- Landfill (England and Wales) Regulations 2002 as amended 2004, 2005
- Landfill (England and Wales) (Amendment) Regulations 2005 (SI 2005 No. 1640)
- Producer Responsibility Obligations (Waste Packaging) Regulations as amended
- The Packaging (Essential Requirements) Regulations 2003
- Landfill Tax Regulations 1996 and The landfill Tax (Amendment) Regulations 2004
- Waste Electrical and Electronic Equipment Directive 2006
- Transfrontier Shipment of Waste Regulations
- Town & County Planning Act 1990
- Consent under Section 36 of the Electricity Act 1989
- Crown Estates Act 1961, Section 3
- License number 31640/07/1 under FEPA
- Crown Estates Lease Documents
- Environmental Statement

2.4 Specific Environmental Impact

During the planning process for the project environmental and Archaeological details of the worksite were carefully reviewed and mitigation requirements identified, including route planning to avoid contact with sensitive areas.

Due to a series of planned and predictably well executed actions, monitoring of the environmental impact of the installation will allow changes to the physical and ecological environment caused by the construction and installation activities to be recorded. This will primarily be in areas where there is some uncertainty of the effects of the installation on the receiving environment.

The vessels will operate in compliance with the above legislation and subsea trenching equipment will utilise Environ 64, hydraulic oil with a very low environmental hazard impact (please refer to Appendix 3 for further details on Environ 64).

All hazardous materials utilised onboard the vessels will be identified during the project HIRA and control measures will be put in place.

The following environmental concerns are identified as remaining:

- Impact on seabirds, migratory fish and marine mammals from disturbance during lay operations, noise and accidentally spillage or leakage.
- Impacts upon other sea users; collision risk and dropped objects.
- Waste Management.
- Archaeological Impact

2.5 Project Objectives

The specific project environmental objectives are:

- To minimise the impact of OPU activities on the surrounding environment.
- To determine the risk to the environment and to take all reasonable measures to mitigate that risk.
- To plan, execute and report the results of the installation to a professional standard.
- To cooperate with all outside agencies and bodies in a reasonable manner.
- To conform with Clients consents for worksite.
- Accurately report and any environmental or archaeological incidents in a concise and timely fashion.

3. Communication and Reporting

Communication at all levels will be the responsibility of the Project Management team. The dissemination of environmental and other route sensitive information that has a relevance to the project scope of work, is a priority and will be given a high level of importance.

The communication process commences with the assessment of the geophysical data set, which is then analysed to form the basis of the operational procedures. The entire project team (including key sub contractors) will then be involved in the process of developing the procedures to their final status for submission. This process disseminates information and is underpinned by frequent project meetings and on site tool box talks.

The reporting of information and incidents is described in Section 4 of this document.

3.1 Environmental Roles and Responsibilities

Everyone involved in the project is responsible for ensuring a minimal environmental impact during the design, fabrication and installation works for the Rhyl Flats Offshore Wind Farm project.

The project management has prime responsibility for ensuring that all those involved in the project execute their environmental commitment as described above.

In support of this aim the QHSE manager is responsible for

- Implementation, maintenance and review of the Environmental Management System.
- Ensuring that personnel, are aware of and fulfill environmental requirements.
- Performance of Environmental related inspections and audits.
- Implementation of reporting system, in case of environmental incidents, to OPU and relevant third parties, including Rhyl Flats Windfarm Limited.
- Providing support where and when necessary on Site.

3.2 Interface Process

The Project Manager will identify as early as possible that interfaces between client, sub contractors and third parties exist to ensure that lines of communication and reporting are clear and that clear communication and awareness throughout the project is maintained. Emergency contact no's and reporting routines will be placed in prominent locations onboard all vessels:-.

- Names, roles and responsibilities of the key personnel (please refer to Appendix 3)
- The channels of communication to be used throughout the project for routine and emergency reporting.
- Reporting structure and the resolving of incidents.
- How the ships emergency procedures are integrated for the duration of the Project.
- How operations within an existing installation's safety zone will be controlled.
- The monitoring, audit and review procedures which will be undertaken throughout the operational phase of the Project

Throughout the project the Primary offshore contact will be the onboard Offshore Superintendent, and the primary onshore contact shall be the QHSE manager. The Offshore superintendent is responsible for incident and archaeological reporting and notifying crew of environmental requirements.

3.3 Documentation

All project documentation is controlled in accordance with OPU procedure QA03, this procedure details the overall system to be adopted by the project in relation to systematic management of documentation, and in particular the procedure governs the methods to be implemented to assign coding references, the use of front revision sheets, recording and distribution of documentation.

On commencement of the contract a Project specific Master Document Register will be developed, which will act as a living document and detail as a minimum the following areas:

- Document Title
- Document Number
- Revision Status
- Approval Status
- Issue Date

The master register will incorporate all documentation raised by the project and will include all documentation required from OPU and its sub-contractors.

3.4 Inspection and Audits

Periodic reviews are undertaken by the company HSE team. The process will be extended to the inclusion of sub contractors and suppliers. The results of all audits, visits and changes are published and will be made available to the client.

Periodic inspections and audits carried out during the operational phase of the project and at an offshore location will initially be reported via the Daily Progress Report (DPR) and as a standalone process via the OPU QHSE reporting process.

3.5 Review

The relevant project documentation including this document the Project Environmental Management Plan (PEMP) will be updated on completion of a review, to incorporate changes, if any, that have been discovered during the inspection and audit process.

The review process will continue through the life of the project.

3.6 Daily Progress Report

It is mandatory that the Daily Progress Report (DPR) is completed and reflects an accurate record of the performance of the operation. The log is to be signed by the Offshore Superintendent. The Client representative onboard will be invited to witness and sign the DPR. It is an essential that the daily reports reflect an accurate picture of the progress and that this forum is used to initially report on the environmental status and other relevant items.

The DPR will be transmitted by facsimile or emailed to the Project Manager of OPU. This report will be transmitted before 0900hrs to the offices of OPU and the client

Copies of the DPR will be stored onboard as part of the project filing system.

3.7 Additional Periodic Reporting

Monthly Environmental reports will be compiled based upon the information contained within the Daily Project Reports and any environmental/archaeological incident or near miss reports submitted during the period of interest.

3.8 Weather Reporting

The weather conditions in force will be entered into the DPR at 6 hourly intervals. The data shall include as a minimum:

- Sea State
- Wind Force and Direction

- Swell
- Significant Wave Height

3.9 Additional Information

Apart from specific work, information with regard to the installation progress it is requested that additional information which may be of assistance in assessing the impact of the works and any future operations will be logged as appropriate. This will include:

- Volume and type of shipping in area.
- Volume and type of fishing in area.
- Marine mammals sited
- Unusual seabed conditions
- Existence of buoys in area with positional information to be reported.
- Environmental conditions e.g. pollution, oceanographic fronts.
- Tidal rips and over falls.
- Visual features of note with potential information to be reported.

On board reporting procedures will be implemented which comprise as a minimum:

- Trenching Log
- Sonar Log
- Video Register
- Survey Data Log (Line/Dive Log)
- QC Logs

4. Incident Reporting

Marine incident reporting will initially be via the incident report form (OPU HSF 034 Rev C1) and the process described in the OPU Marine Pollution Contingency Plan.

In the event of an Environmental incident occurring the RFOWFL Site Engineer or Environmental Manager will be notified immediately

The incident reporting procedure will make reference, but not be limited to, the following documents;

- Marine Emergency Response Plan
- Installation Procedure
- Vessel Fire and Evacuation Plan
- Shipboard Oil Pollution Emergency Plan (SOPEP)
- Waste Management Plan
- Dropped Object Plan
- Marine Pollution Contingency Plan (MPCP)
- Archaeological Written Scheme Of Investigation

All of the above documents will be available via the OPU C-View integrated management system.

4.1 Environmental Incident Reporting

An environmental incident includes any occurrence which causes a project vessel (installation vessels, tugs or barges) to cause significant harm to the environment.

An environmental near miss is defined as any unforeseen occurrence which had potential to cause a project vessel (installation vessels, tugs or barges) to cause significant harm to the environment, but was avoided by intervention.

The Vessel Master on the cable lay barge is responsible for reporting environmental accidents or incidents to the Maritime and Coastguard Agency (MCA), whereas OPU are responsible for reporting to Marine Accident Investigation Branch (MAIB).

Near miss environmental incidents regarding FEPA licence conditions will be reported by RFOWF to both OPU the Clients Environmental managers. A summary of the environmental incidents/near misses will be included within the Daily Progress Report.

4.2 Archaeological Incident Reporting

Should any discoveries of archaeological interest occur OPU's Offshore Project Engineer will advise client immediately in accordance with Appendix VI of document 64870.08. A preliminary discovery report, included in Appendix VIII of document 64870.08, shall be completed and sent to the project archaeologist within the following 24 Hrs.

A summary of archaeological findings/incidents will be included in the Daily Progress Report.

5. Controls and Risk Assessments

In order to ensure that all aspects of risk and in particular risk to the environment is recorded, assessed and evaluated for action, a series of Operational Risk Assessments have been created to manage this process.

Operational Risk Assessments have been created under the following relevant headings;

- Environmental
- Marine
- Burial
- Archaeological

5.1 Risk Assessments

Specific risk assessments covering the following subjects are included in the appendices of this document.

- Environmental
- Marine
- Burial
- Archaeological

During the risk evaluation process, information on any unusual construction methods or special precautions required to control environmental and archaeological risk during installation of equipment will be identified and communicated. Any Residual Risks will be recorded in the Risk Assessment.

All Risk Assessments together with details of the Residual Risks shall be reported and recorded within project and company filing system

5.2 Environmental

Environmental mitigation steps taken can be found within the installation procedure methodology, SOPEP and Waste management documents, in addition to the environmental aspects found within the marine risk assessment and burial plans.

5.3 Marine

Marine Risk Assessments, which include environmental risk assessments specific to these tasks, can be found in Appendix 1.

5.4 Archaeological

Archaeological Risk Assessments can be found in Appendix 2.

It should be noted that the entire purpose of the burial assessment and burial plan and the development of the route position list during route planning, is to avoid contact with sensitive areas on the seabed, and locations that are likely to impede the progress of cable installation.

OPU consider that the avoidance of such areas is of primary importance and as such do not expect to encounter any artefacts, wrecks or archaeological anomalies on or in the seabed during its operations at site.

5.5 Burial

Burial Risk Assessments, which include environmental risk assessments specific to these tasks, are conducted as part of the cable burial plans for both the export and array cables. These can be found within the appendices of the burial documents.

6. Supporting Documents

The following documents will be submitted prior to commencing operations at site:

- OPU Doc. J-06-4215-PR-201 – High Level Engineering Methodology
- OPU Doc. J-06-4215-PL-003 – Burial Plan – Export Cables
- OPU Doc. J-06-4215-PL-004 – Burial Plan – Array Cables
- OPU Doc. J-06-4215-PL-008 – Baseline Project Plan
- OPU Doc. J-06-4215-PR-011 – Installation Procedure
- OPU Doc. J-06-4215-PL-018 – Fire and Evacuation Plan
- OPU Doc. J-06-4215-PL-019 – Emergency Contingency Plan
- OPU Doc. J-06-4215-PL-020 – Shipboard Oil Pollution Emergency Plan (SOPEP)
- OPU Doc. J-06-4215-PL-021 – Dropped Object Plan
- OPU Doc. J-06-4215-PL-022 – Waste Management Plan
- OPU Doc. J-06-4215-PL-025 – Marine Pollution Contingency Plan (MPCP)
- Vessel Co-ordination Plan (Bridging)

Appendicies

Appendix 1. Marine Risk Assessments

Appendix 2. Archaeological Risk Assessments

Appendix 3. Key Personnel Contact Details

Appendix 4. Environ MV 46 - low environmental hazard hydraulic oil.

Appendix 1. Marine Risk Assessments

OCEANTEAM POWER & UMBILICAL	*Risk Assessments for:*	*Manual Name:* HSE Management	
	Rhyl Flats - Waste Management	*Document No.:* HSF 001	*Rev. No.:* C6
		Issue Date: 25/09/07	*Page No.:* 1 of 1
		Reviewed by:	*Approved by:*

S-**Severity of Consequences** **P-Probability** **R-Risk Measurement**

Hazard	Primary Assessment			Hazard Effect	Preventative & Protective Measures implemented to achieve Final Assessment*	Responsible Party	Final Assessment*		
	S	P	R				S	P	R
Introduction of waste products into the environment	4	4	8	**Contamination of environment, marine mammals and local flora and fauna.**	Implementation and adherence of waste management plan into the project documentation. Project team familiarisation with legislation and MCA recommended systems. Implementation of management controls and systems into vessel operating procedures. i.e bunded equipment, biological treatment equipment for waste products. Periodic QA and environmental audits and reviews of systems with adjustments as required. Ref QHSE plan Appendix 5 Figure 11 Attention to details when storing and transferring waste materials. Suitable container type for materials to be stored, written control procedures for re-fuelling, procedures for transfer of waste. Ref HSF 005 COSHH assessment form – appendix 5 figure 19 QHSE plan. Designated crew members handling waste products. Crew briefings prior to task commencement.	OPU project team and Offshore Manager and Barge Master offshore.	2	1	3

DATE…… **ASSESORS NAME……** **SIGNATURE……**

OCEANTEAM POWER & UMBILICAL	*Risk Assessments for:*	*Manual Name:* HSE Management	
	Rhyl Flats – Dropped Objects	*Document No.:* HSF 001	*Rev. No.:* C6
		Issue Date: 25/09/07	*Page No.:* 1 of 2
		Reviewed by:	*Approved by:*

S-**Severity of Consequences** **P-Probability** **R-Risk Measurement**

Hazard	Primary Assessment			Hazard Effect	Preventative & Protective Measures implemented to achieve Final Assessment*	Responsible Party	Final Assessment*		
	S	P	R				S	P	R
Object dropped to seabed during operations	4	4	8	**Direct or indirect hazard to environment.** **Immediate or long term threat to marine life or organisms.**	Correct selection of equipment. Correctly designed and calculated sea fastenings and equipment bunding. Established installation procedures and vessel routines. Experienced personnel. Emergency and contingency plans in place and disseminated to crew or regular basis. Consultation with MFA regarding any / each object dropped on site. Refer to Dropped object Plan for report forms to be used. Periodic QA and environmental audit to ensure systems and routines are checked and improved where possible.	OPU Project Management team Offshore Manager and all crew members offshore.	2	1	3

DATE…… **ASSESORS NAME……** **SIGNATURE……**

OCEANTEAM POWER & UMBILICAL	*Risk Assessments for:*	*Manual Name:* HSE Management	
	Rhyl Flats - Spillage	*Document No.:* HSF 001	*Rev. No.:* C6
		Issue Date: 25/09/07	*Page No.:* 1 of 1
		Reviewed by:	*Approved by:*

S-**Severity of Consequences** **P-Probability** **R-Risk Measurement**

Hazard	Primary Assessment			Hazard Effect	Preventative & Protective Measures implemented to achieve Final Assessment*	Responsible Party	Final Assessment*		
	S	P	R				S	P	R
Accidental Spillage from the vessel	5	3	8	**Contamination of the marine environment with detriment to organisms and marine life**	All vessels engaged in the works will have design included 'no discharge' systems and potential spillage areas are 'bunded' to prevent localised instances of seepage etc. Vessel Management Plans include the control of waste, liquids transfer and movement of personnel and equipment Implementation and awareness of documentation including the project MPCP and SOPEP, and required actions to be taken in the event of any spillage. Dissemination of information to crew via documentation management system, personnel briefings and regular project meetings. Audits and inspection process in place to improve systems and routines. Ref Fig 12 appendix 5 QHSE plan Crew familiarisation with emergency response process and reporting procedure, details of which to be prominently displayed throughout vessel.	OPU Project Management onshore & All OPU employees and their sub contractors offshore with ultimate responsibility being held by the OPU Offshore Manager	3	1	4

DATE…… **ASSESORS NAME……** **SIGNATURE……**

Appendix 2. Archaeological Risk Assessments

S-**Severity of Consequences** **P-Probability** **R-Risk Measurement**

Hazard	Primary Assessment			Hazard Effect	Preventative & Protective Measures implemented to achieve Final Assessment*	Responsible Party	Final Assessment*		
	S	P	R				S	P	R
Encounter with Archaeological Artefact	5	4	9	**Potential loss of important historical information or items.**	Initial assessment of geophysical data and subsequent data to plan a route that avoids contact with sensitive areas. Consultation and submission of data with project archaeological dept. Review of historical data from the site to better understand the likelihood of contacts. Route planning and burial plan to take into account all of above. Creation of installation procedures to ensure avoidance of sensitive areas. Online review of data (tow forces etc) to ensure that earliest possible identification of contact is made. Performing as per WSI. Clear procedures and crew briefing to ensure that immediate actions are understood and followed. Clear and well displayed action list and contact list in prominent position. Observation of established exclusion zones and provision of additional zones if / as required Dropped objects Report – Register and recovery plan docs – Appendix 5 QHSE plan fig 20,21,and 22	OPU Project Management and Offshore Manager.	2	1	3

DATE…… **ASSESORS NAME……** **SIGNATURE……**

OCEANTEAM POWER & UMBILICAL	*Risk Assessments for:*	*Manual Name:* HSE Management	
	Rhyl Flats – PLGR Archaeological Contact	*Document No.:* HSF 001	*Rev. No.:* C6
		Issue Date: 25/09/07	*Page No.:* 1 of 2
		Reviewed by:	*Approved by:*

S-**Severity of Consequences** **P-Probability** **R-Risk Measurement**

Hazard	Primary Assessment			Hazard Effect	Preventative & Protective Measures implemented to achieve Final Assessment*	Responsible Party	Final Assessment*		
	S	P	R				S	P	R
Contact with important archaeological items during route clearance operations.	4	4	8	**Loss or damage of historical or sensitive artefacts or information.**	Initial assessment of geophysical data and subsequent data to plan a route that avoids contact with sensitive areas. Review of historical data from the site to better understand the likelihood of contacts. Route planning and burial plan to take into account all of above. Creation of installation procedures to ensure avoidance of sensitive areas. Online review of data (tow forces etc) to ensure that earliest possible identification of contact is made. Clear procedures and crew briefing to ensure that immediate actions are understood and followed. Clear and well displayed action list and contact list in prominent position. Ref Fig 19 Appendix 5 QHSE plan Discoveries on seabed form. Careful identification of recovered items before disposal. Consultation with project archaeologist regarding clarification on object / photos etc. Dropped objects Report – Register and recovery plan docs – Appendix 5 QHSE plan fig 20,21,and 22	OPU Project Management OPU Offshore Manager and on line surveyors offshore.	2	1	3

Rhyl Flats – PLGR Archaeological Contact

DATE…… **ASSESORS NAME……** **SIGNATURE……**

Appendix 3. Key Personnel Contact Details

Position	Name	Location	Contact Details
Project Sponsor	John Mears	***Onshore*** OPU Aberdeen Office	Tel: +44 (0) 1224 288 777 Fax: +44 (0) 1224 288 778 Mobile: +44 (0) 7774 442256 Email: John.mears@oceanteam.net
Senior Project Manager	Eckhard Bruckschen	***Onshore*** OPU Aberdeen Office	Tel: +44 (0) 1224 288 777 Fax: +44 (0) 1224 288 778 Mobile: +44 (0) 7775 728 870 Email: Eckhard.bruckshen@oceanteam.net
Project Manager	Bob McLeod	***Onshore*** OPU Aberdeen Office	Tel: +44 (0) 1224 289 800 Fax: +44 (0) 1224 288 778 Mobile: +44 (0) 7831 517 702 Email: Bob.mcleod@oceanteam.net
Offshore Manager	George Oswald	***Offshore*** AMT Explorer	Tel: +44 (0) 1224 288 777 Fax: +44 (0) 1224 288 778 Mobile: +44 (0) 7713 642 694 Email: Managera.offshore@oceanteam.net
QHSE Manager	Jack Adair	***Onshore*** OPU Aberdeen Office	Tel: +44 (0) 1224 288 777 Fax: +44 (0) 1224 288 778 Mobile: +44 (0) 7738 569 496 Email: Jack.adair@oceanteam.net
Marine Operations Manager	Peter Lankester	***Onshore*** OPU Aberdeen Office	Tel: +44 (0) 1224 288 777 Fax: +44 (0) 1224 288 778 Mobile: +31 (0) 6204 154 28 Email: Peter.lankester@oceanteam.net
Barge Master	David McGrail	***Offshore*** AMT Explorer	Tel: +44 (0) 1224 288 777 Fax: +44 (0) 1224 288 778 Email: David.mcgrail@oceanteam.net
HSE Engineer	John Thomson	***Offshore*** AMT Explorer	Tel: +44 (0) 1224 288 777 Fax: +44 (0) 1224 288 778 Email: John.thomson@oceanteam.net
HSE Engineer	Ivor Mower	***Offshore*** AMT Explorer	Tel: +44 (0) 1224 288 777 Fax: +44 (0) 1224 288 778 Email: Ivor.mower@oceanteam.net
NPower Environmental Manager	Jamie May	***TBA***	Tel: +44 (0) 1793 896 120 Fax: +44 (0) Mobile: +44 (0) 7825 995 446

Position	Name	Location	Contact Details
			Email: Jamie.may@rwenpower.com
NPower Resident Engineer	John Davidson	***TBA***	Tel: +44 (0) 1428 728575 Fax: +44 (0) 1428 727122 Email: johnD@metoc.co.uk
NPower Vessel Coordinator	Lee Cornwall	***TBA***	Tel: Mobile: +44 (0) 07825 558 303 Email:
NPower Project Archaeologist	Steve Webster	***TBA***	Tel: Mobile: +44 (0) 07767 495 773 Email:

Appendix 4. Environ MV 46 - low environmental hazard hydraulic oil.

Conforms to EU Directive 91/155/EEC, as amended by 2001/58/EC - Europe

SAFETY DATA SHEET

ENVIRON* MV 32, 46

PETRO-CANADA

1. Identification of the substance/preparation and company/undertaking

Identification of the substance or preparation

Product name : ENVIRON* MV 32, 46

Use of the substance/preparation : ENVIRON* MV is designed as heavy duty hydraulic power transmission fluids for use in equipment, which must operate over a wide range of temperatures. Typically, ENVIRON* MV Oils are used in hydraulic systems, machine tools, hydraulic presses, rotary compressors, and centrifugal pumps.

Company/undertaking identification

Manufacturer : Petro-Canada Europe Lubricants
The Manor
Hasely Business Centre
Warwick, Warwickshire
CV35 7LS
United Kingdom
Tel: +44 (0) 2476-247294
Fax: +44 (0) 2476-247295

Supplier : Not available.

Emergency telephone number : Petro-Canada: (001) 403-296-3000
Canutec Transportation:
(001) 613-996-6666
Poison Control Centre: Consult local telephone directory for emergency number(s).

2. Composition/information on ingredients

Substance/preparation : Preparation

Within the present knowledge of the supplier, this product does not contain any hazardous ingredients in quantities requiring reporting in this section, in accordance with EU or national regulations.

3. Hazards identification

The preparation is not classified as dangerous according to Directive 1999/45/EC and its amendments.

Classification : Not classified.

See section 11 for more detailed information on health effects and symptoms.

4. First-aid measures

Inhalation : If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.

Ingestion : Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If potentially dangerous quantities of this material have been swallowed, call a physician immediately.

Skin contact : Wash skin thoroughly with soap and water or use recognised skin cleanser. Get medical attention if irritation occurs. Remove contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training.

See section 11 for more detailed information on health effects and symptoms.

5. Fire-fighting measures

Extinguishing media

Suitable : Use an extinguishing agent suitable for the surrounding fire.

Not suitable : None known.

Special exposure hazards : No specific hazard.

Continued on Next Page *Internet: www.petro-canada.ca/msds* *Page: 1/5*

5. Fire-fighting measures

Hazardous thermal decomposition products : Carbon oxides (CO, CO2), nitrogen oxides (NOx), sulphur oxides (SOx), sulphur compounds (H2S), smoke and irritating vapours as products of incomplete combustion.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Remark : Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

6. Accidental release measures

Personal precautions : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment.

Environmental precautions : Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Methods for cleaning up : If emergency personnel are unavailable, contain spilt material. For small spills, add absorbent (soil may be used in the absence of other suitable materials), scoop up material and place in a sealable, liquid-proof container for disposal. For large spills, dyke spilt material or otherwise contain material to ensure runoff does not reach a waterway. Place spilt material in an appropriate container for disposal.

7. Handling and storage

Handling : Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk. Evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/vapour/spray . Wear suitable protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles.

Storage : Keep container tightly closed. Store away from incompatible materials (see section 10). Keep container in a cool, well-ventilated area.

Packaging materials

Recommended : Use original container.

8. Exposure controls/personal protection

Ingredient name	Occupational exposure limits
Mixture of severely hydrotreated and hydrocracked base oil (petroleum).	**ACGIH TLV (United States). Notes: (oil mist)** TWA: 5 mg/m^3 8 hour(s). STEL: 10 mg/m^3 15 minute(s).

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to European Standard EN 689 for methods for the assessment of exposure by inhalation to chemical agents and national guidance documents for methods for the determination of hazardous substances.

Exposure controls

Occupational exposure controls : No special ventilation requirements. Good general ventilation should be sufficient to control worker exposure to airborne contaminants. If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
Recommended: organic vapour filter

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Recommended: neoprene, nitrile, polyvinyl alcohol (PVA), Viton.

Continued on Next Page

8. Exposure controls/personal protection

Eye protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts.

Skin protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. Physical and chemical properties

General information

Physical state : Viscous liquid.

Colour : Pale, straw-yellow.

Odour : Mild petroleum oil like.

Important health, safety and environmental information

pH : Not applicable

Flash point : Open cup: ≥220°C (>428°F) [Cleveland.]

Relative density : 0.8398 to 0.8434 kg/L @ 15°C (59°F)

Solubility : Insoluble in water.

Viscosity : **32:** 33.6 cSt @ 40°C (104°F), 6.5 cSt @ 100°C (212°F), VI=159; **46:** 44.4 cSt @ 40°C (104°F), 8.0 cSt @ 100°C (212°F), VI=156

Softening Point : Not available.

Dropping Point : Not available.

Penetration : Not available.

Pour Point : **32 & 46:** -45°C (-49°F)

10. Stability and reactivity

Stability : The product is stable.

Materials to avoid : Reactive with oxidising agents and acids.

Hazardous decomposition products : May release COx, H2S, methacrylate monomers, aldehydes, alkyl mercaptans, smoke and irritating vapours when heated to decomposition.

11. Toxicological information

Potential acute health effects

Inhalation : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Eye contact : No known significant effects or critical hazards.

Acute toxicity

Product/ingredient name	Test	Result	Route	Species
Mixture of severely hydrotreated and hydrocracked base oil (petroleum).	LD50	>5000 mg/kg	Oral	Rat
	LD50	>2000 mg/kg	Dermal	Rabbit
	LC50	>2500 mg/m^3 (4 hour(s))	Inhalation	Rat

Potential chronic health effects

Carcinogenicity : Not listed as carcinogenic by OSHA, NTP or IARC.

Mutagenicity : No known significant effects or critical hazards.

Reproductive toxicity : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Inhalation : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Continued on Next Page

11. Toxicological information

Skin : No known significant effects or critical hazards.

12. Ecological information

Ecotoxicity data

Product/ingredient name	Species	Period	Result

Other ecological information

Persistence/degradability

Product/ingredient name	BOD_5	COD	ThOD

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential

Mobility Not available.

Other adverse effects : No known significant effects or critical hazards.

13. Disposal considerations

Methods of disposal : The generation of waste should be avoided or minimised wherever possible. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements.

Hazardous waste : Within the present knowledge of the supplier, this product is not regarded as hazardous waste, as defined by EU Directive 91/689/EEC.

14. Transport information

International transport regulations

Regulatory information	UN number	Proper shipping name	Class	PG*	Label	Additional information
ADR/RID Class	Not available.	Not available.	Not available.	-		-
ADNR Class	Not available.	Not available.	Not available.	-		-
IMDG Class	Not available.	Not available.	Not available.	-		-
IATA Class	Not available.	Not available.	Not available.	-		-

PG* : Packing group

15. Regulatory information

EU regulations

Risk phrases : This product is not classified according to EU legislation.

Product use : Classification and labeling have been determined according to EU Directives 67/548/EEC and 1999/45/EC (including amendments) and take into account the intended product use.
- Consumer applications.

Other EU regulations

Additional warning phrases : Safety data sheet available for professional user on request.

International regulations

International lists

Canada inventory status : Listed

Continued on Next Page

15. Regulatory information

EC INVENTORY (EINECS/ELINCS) : Listed
TSCA 8(b) inventory : Listed

16. Other information

History

Date of printing : **5/17/2007.**
Date of issue : **3/21/2007.**
Date of previous issue : **5/6/2005.**
Version : **3**

Indicates information that has changed from previously issued version.

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8. Oceanteam Power and Umbilical

Marine Pollution Contingency Plan

9. Oceanteam Power and Umbilical

Dropped Object Plan

OCEANTEAM POWER & UMBILICAL

npower renewables

PROJECT	*CLIENT REF NUMBER*
Rhyl Flats Offshore Wind Farm **Cable Installation Contract**	**MPC0116**

DOCUMENT TITLE

Dropped Object Plan

DOCUMENT REF. NR.	
J-06-4215-PL-021	

A3	27/04/08	Inclusion of Comments	JoT	BoM	StD	EcB
A2	02/04/08	Final Issue	JoT	BoM	StD	EcB
A1	06/03/08	Issued for Review	IvM	BoM	StD	EcB
Rev	**Date**	**Reason For Issue**	**Prep**	**Check**	**QA**	**PM**

Document Revision History

Date	Amendment	Section	Page	Holder
02/04/08	Modification to Flow Diagram	App 1		JoT
27 04 08	Client comments added	4.2	8	JoT
27 04 08	Client comments added	App 1		JoT

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1. Introduction

1.1 General

Rhyl Flats Wind Farm Ltd will construct the Rhyl Flats Offshore Wind Farm located off the north coast of Wales, in the region of Colwyn Bay. The wind turbine generator (WTG) array of 25 wind turbines will be located some 8km offshore and will connect with the onshore export cables via three offshore export cables.

The inter turbine array cables connecting the 25 wind turbines are arranged in three strings which connect via three of the turbines to the shore by three export cables that terminate at a marine/terrestrial splice chamber located a short distance inland near the town of Towyn.

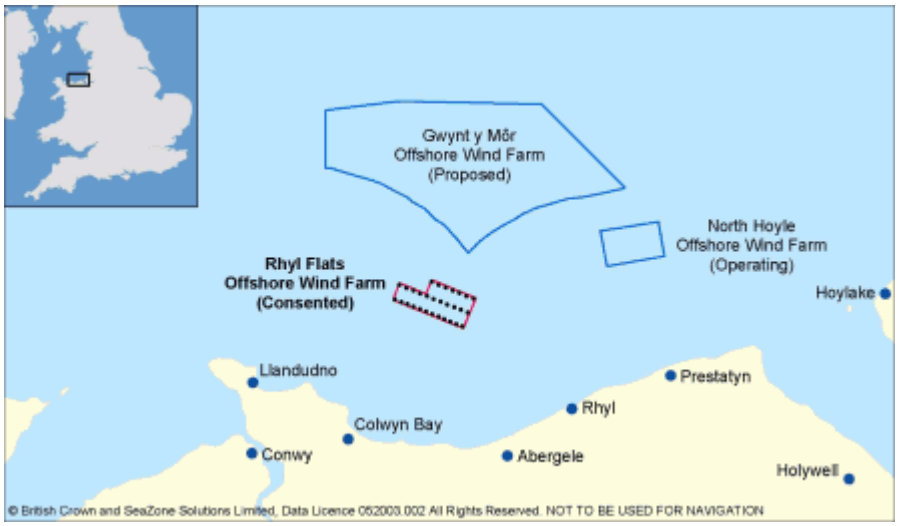


Figure 1. Rhyl Flats Offshore Wind Farm

1.2 Purpose of Document

The Dropped Object Plan is a project specific document which describes the procedure to be followed in the event of an object being dropped in the marine environment during the Rhyl Flats Offshore Wind Farm Project.

In particular this document outlines the reporting of dropped objects, the registration of un-recovered dropped objects, recovery of dropped objects and the health, safety and environmental implications of dropped objects

The reporting procedure for any objects dropped onto/from the deck of the AMT Explorer will be covered in the Dropped Objects Plan and the Project Environmental Management Plan.

1.3 Scope of Work

Oceanteam Power & Umbilical (OPU) has been awarded the contract by Rhyl Flats Wind Farm Ltd, for the supply of services for the installation and burial of the marine cables for the Wind Farm. This includes the three Export cables from the marine/terrestrial cable interface onshore to the wind farm location offshore and the 24 inter Array cables between the turbine generators. Additional works also include the installation and termination of all cables into pre-installed J-tubes and switchgear at each WTG foundation.

Oceanteam Power and Umbilical will employ a suitably equipped and manned marine spread and will lay and bury all of the cables utilising a mechanical cable plough.

For the burial of the cables adjacent to the foundation structures OPU will deploy a suitably equipped vessel which will use a high pressure water jetting method for the cable burial.

In the event of non-burial of cable the installation of protection mattresses may be required. Any mattresses required will be deployed utilising a mattresses deployment frame.

A tripod arrangement with sheave, looping the draw wire back to the installation vessel, will be used for the pull-in of the cables into the pre installed J-tubes on the wind turbine foundations.

The shore approach for the three export cables shall be buried up to the high water mark using a combination of excavator and plough/jetting tool. The cable will then be installed from the high-water mark through pre-installed high density polyethylene (HDPE) conduits installed below the surface, exiting into splice chambers already located at the beach near the town of Towyn. The marine export cables will be pulled through these conduits and connected to the onshore cables within the onshore splice chambers.

There are several stages to the offshore workscope; these can be defined as:

- Site visits and marine surveys.
- Desk Top Studies (including burial assessment).
- Pre-lay grapnel runs / Route Clearance.
- Loadout and Transport of Cables
- Mobilisations
- On-shore pull-in of export cables (Shore End)
- Lay and burial of Export and Array cables
- Installation of cables into monopile J-tubes
- Termination of Cables
- Testing
- Mattressing Operations
- Demobilisation of marine equipment
- Final Documentation

Further details of the overall project methodology can be found in OPU Document J-06-4215-PR-201.

1.4 Abbreviations

AHT	Anchor Handler Tug
CLB	Cable Lay Barge
DCS	Document Control Centre
DGPS	Differential Global Positioning System
GPS	Global Positioning System
HAT	Highest Astronomical Tide
HDPE	High Density Polyethylene
HDD	Horizontal Directional Drilling
HSE	Health Safety and Environment
kn	Knots (Nautical Mile per hour)
LAT	Lowest Astronomical Tide
MBR	Minimum Bend Radius
MSL	Mean Sea Level
MPV	Multi Purpose Vessel
MSDS	Material Safety Data Sheet
OPU	Oceanteam Power & Umbilical Ltd
OM	Offshore Manager
PLGR	Pre-Lay Grapnel Run
POM	Project Operations Manual
QHSE	Quality Health Safety and Environment
QA	Quality Assurance
QC	Quality Control
RTK	Real-Time Kinematic
TBA	To Be Advised
TBC	To be confirmed
TDM	Touch Down Monitoring
TRCF	Total Recordable Case Frequency
TSV	Trenching Support Vessel
USBL	Ultra Short Base Line
WOW	Waiting On Weather
WTG	Wind Turbine

1.5 Definitions

As-built (of Cable):	Position of the Cable in 3 dimensions (X, Y and Z values) that the cable has been determined by.
Chute:	See stinger.
Debris:	Waste material
Depth of Burial work:	Depth of the cable in relation to surrounding mean seabed level at the time when the cable has been installed.
Fit-out:	Preparation of a vessel/barge for cable installation/trenching.
Jettable/Buriable soil:	Soil conditions in which jetting or burial operations can be carried out whilst achieving the specified burial depth at a pre-determined rate of progress of 75 m/hour. In case the pre-determined rate of progress cannot be met due to soil resistance, obstacles in the soil/seabed or premature backfill of the trench, for the agreed period of time, the contractor may relax depth of burial specifications to the next pre-determined depth of burial, whereby the intended rate of progress can be met.
Mobilisation:	All preparations before commencement of work including fit-out, production and approval of Project Quality Manual, allocation of personnel and equipment, input of route data in computer, etc.
Obstacle:	Natural or man-made object causing hindrance to cable installation or burial.
Cable:	Cable type and properties are described by Client in the Scope of Work.
Cable crossing:	The crossing of the installed cable over an existing pipeline, cable, object or any body of water at a pre-determined angle. If the angle of crossing has not been pre-determined it is assumed that the crossing will be carried out using the shortest distance. (E.g.: a fairway will always be crossed perpendicular with respect to its axis).
Cable installation:	Lay, or simultaneous lay and burial, of (a) cable(s) together with associated activities (I Tube pull-ins, lay down and recovery etc.).
Cable Corridor:	The corridor is described by Client in the Contract Documents.

Cable Route:	The route, within the Cable Corridor, where the cables will be installed.
Cable specifications:	The physical properties and material specifications of the Cables supplied as defined in the scope of work.
Post-Lay Survey:	A survey carried out to determine the X, Y and Z properties of cables(s) after cable installation
Stinger:	Metal extension usually with a curvature from horizontal to vertical installed at the stern of the installation vessel/barge allowing cable(s) to depart the vessel without compromising their allowable bending radius.
Ploughing:	The cutting of a trench in the seabed for the purpose of allowing a cable to be installed into the trench below the seabed surface
Weather:	Prevailing sea-state, current(s), swell and/or wind conditions.

1.6 References

The following documents are referenced within this procedure;

- OPU Document J-06-4215-PR-201 – Engineering High Level Methodology
- OPU Document J-06-4215-MN-002 – QHSE Plan
- OPU Document J-06-4215-PL-005 – Project Environmental Management Plan
- Npower Document FEPA licence for removal of dropped objects from the seabed

2. Requirements

Oceanteam Power & Umbilical (OPU) recognises the importance of minimising the environmental impact associated with construction and commissioning of the RFOWF.

Therefore an ongoing process of environmental impact assessment will continue throughout the project.

All contractors are required to identify their individual impacts upon the environment and in particular the potential for dropped objects within the scope of this document. Detailed Risk

Assessments, Method Statements and Specific Plans are to be produced in relation to all aspects of works which are critical to the environment.

2.1 Standards & Codes of Practice

All works are to be carried out in line with current legislation and accepted industry standards (best practice)

- Health & Safety at Work etc Act 1974
- Construction (Design & Management) Regulations 2007
- Management of Health & Safety at Work Regulations 1999
- Lifting Operations & Lifting Equipment Regulations 1998
- Diving at Work (Commercial Diving) Regulations 1997
- Food and Environment Protection Act 1995
- Coast Protection Act 1949
- Merchant Shipping Act 1995

2.2 General Responsibilities

Position	Responsibility	Reports To
QHSE Manager	Checks / Audits dropped object reports, dropped object register and recovery procedures are prepared & used. Ensures that preventative measures are implemented. Check that the recovery procedures are compatible with current Legislation & HSE recommendations.	Project Manager
Barge Master	Overall responsibility for the recovery actions. Responsible for the implementation of the stated preventative measures	Project Manager
Offshore Manager	Complete the dropped object report,	Project Manager

Position	Responsibility	Reports To
	dropped object register and recovery procedures. Coordination of the action for recovery. Identification & implementation of preventative measures.	
RFOWFL Manager	RFOWFL shall notify MFA in the event of a dropped object being notified	MFA
Subcontractors/ supervisors/foreman	Inform Offshore Manager of dropped object. Assist Offshore Manager in making recovery procedures and recovery actions.	Offshore Manager
All other personnel	Inform their immediate supervisors of dropped objects	Subcontractor/ supervisors/foreman

3. Primary Sources of Dropped Objects & Preventative Measures

The following list is an indication of some of the reasons that dropped objects may occur, this list is not exhaustive.

- Vessels whilst in transit both from port to the work site and vice versa
- Vessels at sea during periods of adverse weather
- Objects dropped during the installation phase of operations
- Materials dropped during the installation phase of operations
- Waste lost overboard
- Objects dropped whilst working at height

All personnel will be required to wear the following level of PPE in order to reduce the possibility of injury: Hard Hat, Flame Retardant Coveralls, Safety Glasses, Gloves, safety Footwear.

During transit periods both to and from the work site, and in periods of adverse weather the Barge Master & Offshore Manager will ensure that the vessel has been suitably secured for the prevailing conditions. All containers, tools and ancillary items associated with the functioning of the vessel are to be securely stowed. All sea fastenings are to be in place to mitigate the risk of items falling overboard.

All lifting plans are to be prepared prior to the commencement of work to identify the appropriate lifting equipment for the task. Suitable and sufficient assessment of the rigging equipment shall be undertaken at regular intervals as deemed necessary by the Bosun. All personnel involved in the lifting operations shall be suitably qualified and experienced.

All domestic waste will be disposed of in accordance with the management of waste system.

Due care shall be taken to avoid lighter waste objects being blown overboard by the wind. All waste shall be stored onboard and disposed of by an authorised waste management company on arrival in port.

All personnel will be made aware of the environmental impact of dropped objects during the vessel induction process.

4. Dropped Objects

The attached flow chart (appendix 1) demonstrates the required reaction to the event.

In all cases when an object is dropped into the sea, or onto the deck of the vessel, the Offshore Manager must be informed. Episodes of dropped objects will be brought to the attention of the HSE Engineer as soon as reasonably practicable. A report of all incidents shall be reported to RFOWFL within 24hrs or as soon as practicable.

4.1 Floating Objects

Any object that is dropped into the sea that remains afloat shall be recovered as soon as reasonably practicable. An assessment shall be made as to the viability of recovery (time & cost) when compared the composition and quantity of the product.

In all cases of dropped objects an investigation shall be conducted in order to ascertain the root causation of the incident and necessary actions to be taken to avoid re-occurrence.

4.2 Non-floating Objects

RFOWL and the statutory regulator (MFA) in consultation with the Environmental manager will be the arbiter regarding the significance or not of any dropped object reported. A decision will then be made as to whether the object should / could be recovered, and an assessment of the proposed recovery method carried out. Physical obstructions on the sea bed may be considered a hazard to marine users, as well as having an impact on environmental issues.

If the object is deemed or known to be detrimental to the environment (by assessment or through MSDS information) then recovery shall be considered.

Episodes of dropped objects will be brought to the attention of the HSE Engineer as soon as reasonably practicable. In all cases of dropped objects an investigation shall be conducted in order to ascertain the root causation of the incident and necessary actions to be taken to avoid re-occurrence.

Dropped objects of $0.5m^3$ or larger, including any group of smaller objects which are collectively larger than $0.5m^3$, shall be recorded on the Dropped Object Report (appendix 2) all such reports shall be issued to the appropriate person in charge and filed on site.

Items not recovered shall be recorded on the Dropped Object Register, objects that are recovered are not to be entered onto the register.

5. Recovery of a Dropped Object

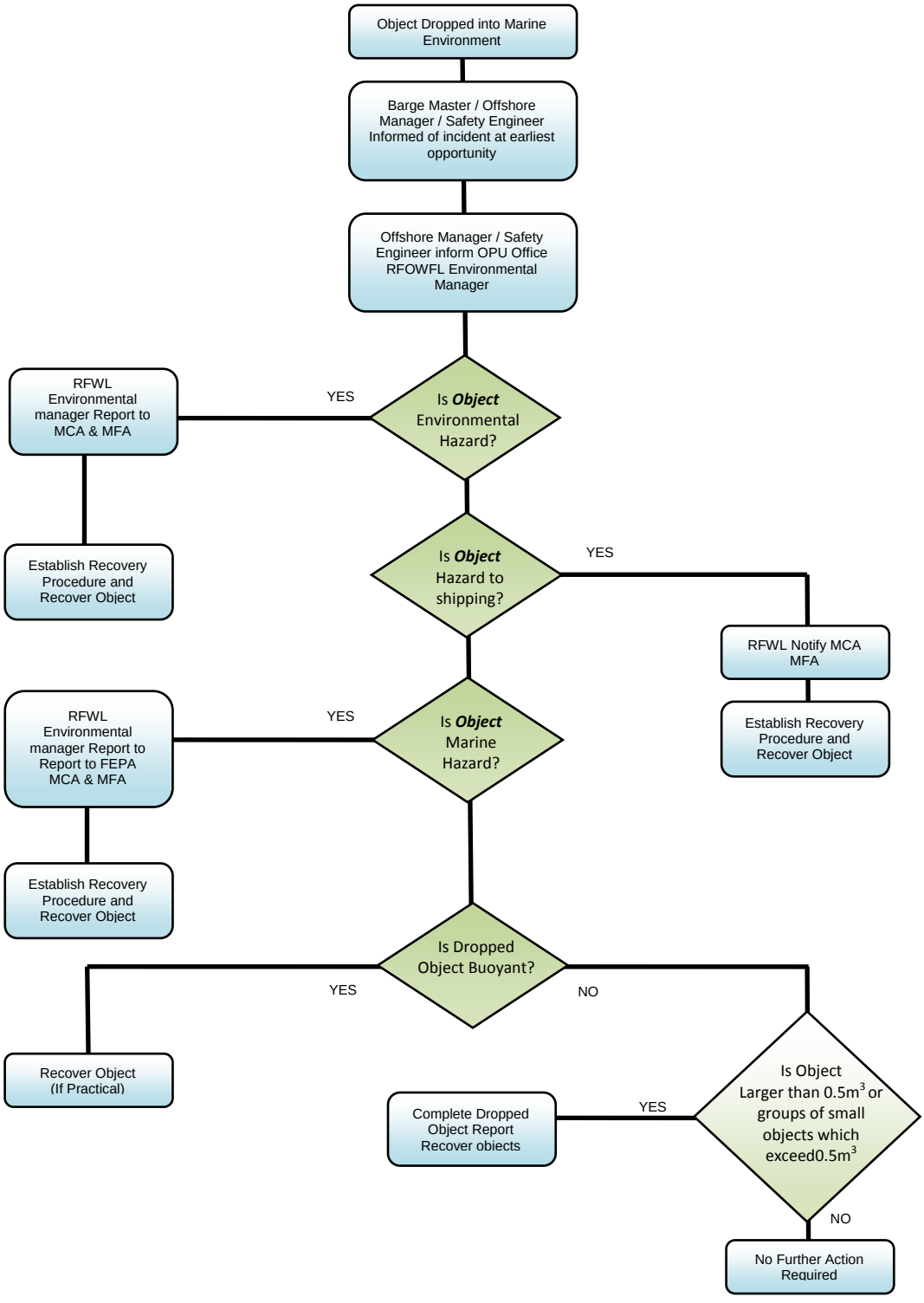
In order to ensure that the recovery process is suitable all disciplines involved in the recovery process must attend a formal documented meeting prior to recovery actions being undertaken.

The purpose of the meeting is to establish the most effective method of recovery, approval of the recovery plan (Appendix 4) shall be sought from the Offshore Manager or Safety Engineer.

Prior to commencement of recovery operations the agreed recovery procedure shall be sent to the employer for comment, within the specified deadline. Following comment or if the deadline has expired the recovery operation may commence.

Appendices

Appendix 1. Dropped Object Flowchart



Appendix 2. Dropped Object Report

Description of dropped object
Location of dropped object
Cross reference??
Buoyant / Non-buoyant object
Reason For Object being Dropped?
Preventative measures
Recovery Viable (Y/N) state reason for decision

Appendix 3. Dropped Object Register

DATE	TIME	DROPPED OBJECT	APPROX SIZE M / Cu M	LOCATION LAT / LONG	DROPPED FROM	SIGNED

Appendix 4. Dropped Object Recovery Plan

Recovery Method:
Supplemental Documentation: (risk assessments, lift plan, dive plan etc**)**
Recovery Plan Produced By: (signature & date)
Recovery Procedure Approved By: (signature & date)
Issue Date:
Employers Comments: