

APPENDIX A

Legislation

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A. SUMMARY OF ENVIRONMENTAL LEGISLATION

This Appendix presents a summary of the key environmental regulatory requirements that will apply to the Mariner Area Development as well as the policy, legal, and administrative framework within which this EIA is carried out.

A.1 General

Regulatory Body	Legislation	Summary of Requirements
Maritime and Coastguard Agency (MCA)	MARPOL 73/78	<p>The MARPOL Convention is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes and covers pollution by oil, chemicals, harmful substances in packaged form, sewage and garbage. The MCA has regulatory authority over those aspects of the offshore oil and gas industry that fall under the MARPOL Convention 73/78, including machinery space discharge, sewage discharges and garbage at sea. The Convention currently includes six technical Annexes:</p> <ul style="list-style-type: none"> • Annex I Regulations for the Prevention of Pollution by Oil (entered into force 2 October 1983) • Annex II Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk (entered into force 2 October 1983) • Annex III Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form (entered into force 1 July 1992) • Annex IV Prevention of Pollution by Sewage from Ships (entered into force 27 September 2003) • Annex V Prevention of Pollution by Garbage from Ships (entered into force 31 December 1988) • Annex VI Prevention of Air Pollution from Ships (entered into force 19 May 2005)

A.2 Atmospheric emissions

Regulatory Body	Legislation	Summary of Requirements
MCA	MARPOL 73/78 Annex VI the Prevention of Air Pollution from Ships	<p>Annex VI is concerned with the control of emissions of ozone depleting substances, NO_x, SO_x, and VOCs and require ships (including platforms and drilling rigs) to be issued with an International Air Pollution Certificate following survey.</p> <p>This annex set limits on sulphur oxide and nitrogen oxide emissions from ship exhausts as well as particulate matter and prohibit deliberate emissions of ozone depleting substances.</p> <p>Emissions arising directly from the exploration, exploitation and associated offshore processing of seabed mineral resources are exempt from Annex VI, including the following:</p> <ul style="list-style-type: none"> • emissions resulting from flaring, burning of cuttings, muds, well clean-up emissions and well testing; • release of gases entrained in drilling fluids and cuttings; • emissions from treatment, handling and storage of reservoir hydrocarbons; and • emissions from diesel engines solely dedicated to the exploitation of seabed mineral resources.
DECC	Petroleum Act 1998 The Petroleum (Current Model Clauses) Order 1999	The objective of this Act is to conserve gas, as a finite energy resource, by avoiding unnecessary wastage during the production of hydrocarbons in the UKCS. The actual Model Clause may vary depending on when the Block Licence was granted, but in recent licences flaring is covered by Paragraph 3 of Model Clause 21, and this states that the Licensee shall not flare any gas from the licensed area or use gas for gas lift except with written consent. If intending to flare gas during the operational phase of the field, flare consent will need to be obtained.
DECC	The Energy Act 1976	This Act is mostly used for issue of vent consents, although it also covers some flaring which has not been permitted under licence model clauses. The VOC emissions from offshore loading are covered by the Vent Consent requirements under the Energy Act 1976.
	The National Emission Ceilings Regulations 2002	These regulations transpose EC Directive on national emission ceilings for certain atmospheric pollutants 2001/81/EC into UK law and set national ceilings and a requirement for the development of a reduction programme for SO _x , NO _x and VOCs and set out the UK government commitment for achieving a reduction of atmospheric emissions by 2010 and thereafter not to exceed the amounts specified in the Schedule of that pollutant.

A.2 Atmospheric emissions (continued)

Regulatory Body	Legislation	Summary of Requirements
	<p>The Merchant Shipping (Prevention of Air Pollution from Ships) Regulations 2008 (as amended 2010)</p>	<p>These regulations implement Annex VI of MARPOL (the International Convention for the Prevention of Pollution from Ships 73/78) in the UK.</p> <p>The 2010 Amendments primarily implement provisions concerning the sulphur content of marine fuels contained in Council Directive 1999/32/EC. The Directive sets maximum sulphur content for fuel including heavy fuel oil and gas oil including marine fuel.</p>
	<p>Climate Change Act 2008 Climate Change (Scotland) Act 2009</p>	<p>The Act sets up a framework for the UK to achieve its long-term goals of reducing greenhouse gas emissions and to ensure actions are taken towards adapting to the impact of climate change. The Act enables a number of elements, including amongst others; setting medium and long-term emissions reduction targets in statute, introduction of a system of carbon budgeting which constrains the total amount of emissions in a given time period, a new reporting framework for annual reporting of the UK's greenhouse gas emissions, creation of an independent advisory body (the Committee on Climate Change). As a result of the Act and the 2009 Order, the current legally-binding targets for the net UK carbon account are: 34% reduction by 2020 and 80% reduction by 2050, against a 1990 baseline.</p>

A.2 Atmospheric emissions (continued)

Regulatory Body	Legislation	Summary of Requirements
DECC	<p>Offshore Combustion Installations (Prevention and Control of Pollution) Regulations 2001 as amended by:</p> <ul style="list-style-type: none"> • Energy Act 2008 (Consequential Modifications) (Offshore Environmental Protection) Order 2010) • EU Emissions Trading Scheme (EU Directive 2003/87/EC) • UK Emissions Trading Scheme as amended • Offshore Combustion Installations (Prevention and Control of Pollution) (Amendment) Regulations 2007 • EC Directive 2010/75/EU (Industrial Emissions Directive) 	<p>These regulations implement Council Directive 96/61/EC concerning integrated pollution prevention and control (IPPC) in the context of offshore oil and gas combustion installations. The aim of IPPC is to consider environmental impacts holistically and to achieve a higher level of environmental protection. The Regulations apply only to combustion installations with a combined rated thermal input exceeding 50 MW(th) and a PPC Permit will be required in order to operate a qualifying offshore installation. The permit will be granted with conditions that include provisions based on best available techniques, emission limits, and monitoring requirements.</p> <p>The 2007 Amendment Regulations implement the amendments made to EC Directive 96/61 by the Public Participation Directive 2003/35/EC and bring in tighter requirements for public consultation as part of the permit application process.</p> <p>This Directive is now replaced by the Industrial Emissions Directive (EC Directive 2010/75/EU). However the new directive has not yet been implemented in the UK. The Industrial Emissions Directive came into force on 6 January 2011 and merges seven directives into one including the Integrated Pollution Prevention and Control (IPPC) Directive and Large Combustion Plant (LCP) Directive. The main thrust of the directive is to increase the use of "best available techniques" (BATs), an obligation to ensure that industrial operators use the most cost-effective techniques to achieve a high level of environmental protection. Member States have 2 years in which to implement the Directive into national legislation.</p>

A.2 Atmospheric emissions (continued)

Regulatory Body	Legislation	Summary of Requirements
DECC	The Fluorinated Greenhouse Gases Regulations 2009	The objective of these Regulations is to reduce the emissions of fluorinated gases including hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride as covered by the Kyoto Protocol. These gases have been developed to replace ozone depleting substances such as CFCs and HCFCs but are long-lived powerful greenhouse gases. The Regulations include requirements on the leakage detection and labelling requirements of systems such as refrigeration systems, air-conditioning units and heat pumps that use these gases. Fluorinated gases are also used for fire fighting offshore
	The Environmental Protection (Controls on Ozone Depleting Substances) Regulations 2011	The 2011 regulations revoke and replace the previous regulations. These Regulations make provision in the UK for EC Regulation 1005/2009 which controls the production, impact, export, placing on the market, recovery, recycling, reclamation and destruction of substances that deplete the ozone layer.
	Directive 2003/87/EC of the European Parliament and the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC.	The European Union Emissions Trading Scheme (EU ETS) is one of the primary drivers for reducing carbon dioxide emissions within the EU by introducing a cost element. A permit to emit greenhouse gases (at present only carbon dioxide) must be obtained for qualifying installations – for the upstream oil & gas industry, this applies to stationary installations with a combined rated thermal input of >20 MW(th) and flaring. In practice this generally means that production platforms will require a permit whereas mobile drilling units are at present exempt. The Regulations are being implemented in stages; Phase I has been implemented and Phase II is currently in operation. Phase III will be in force during 2013-2020.
	The Greenhouse Gas Emissions Trading Scheme Regulations 2005 (as amended 2007) The Carbon Accounting Regulations 2009	

A.2 Atmospheric emissions (continued)

Regulatory Body	Legislation	Summary of Requirements
DECC	<p>The Greenhouse Gas Emissions Data and National Implementation Measures Regulations 2009</p> <p>EU Decision 2011/278/EU on determining the transitional EU wide rules for the harmonised free allocation of emission allowances in accordance with Article 10a of the EU ETS Directive</p> <p>Commission Regulation (EU) No: 1210/2011 concerning the auctioning of EU ETS allowances</p> <p>Commission Regulation (EU) No: 1193/3011 concerning the establishment of a single Union wide EU ETS Registry</p>	<p>Allowances for existing operators under Phase III have been notified following an extensive data collection and benchmarking exercise. As of 30 June 2011, all other applicants will now need to apply through the New Entrants Reserve (NER). Installations that have entered under Phase I or Phase II will already have new allocations issued under Phase III.</p> <p>There are two phases to NER applications:</p> <ul style="list-style-type: none"> • Phase 1 - before "normal" operations - allocations based on independently verified emissions; and • Phase 2 - after start of "normal" operations - allocations based on average of two months of highest activity in a 90 day period after start of "normal" operations x 12. • Normal operations are defined as a continuous 90 day period of operating at a minimum of 40% of design capacity.

A.3 Environmental Impact Assessment

Regulatory Body	Legislation	Summary of Requirements
	<p>Council Directive on the Assessment of the Effects of Certain Public and Private Activities on the Environment - 85/337/EEC (the EIA Directive) as amended by Directives 97/11/EC, 2003/35/EC and 2009/31/EC.</p> <p>EC Directive 2012/92/EU on the assessment of the effects of certain public and private projects on the environment</p>	<p>The EIA Directive (85/337/EEC) has been in force since 1985 and applies to a wide range of defined public and private projects, which are defined in Annexes I and II:</p> <ul style="list-style-type: none"> • Annex 1: all projects listed in Annex I are considered as having significant effects on the environment and require a mandatory EIA. Typical projects include, for example: <ul style="list-style-type: none"> • Extraction of petroleum and natural gas for commercial purposes where the amount extracted exceeds 500 tonnes/day in the case of petroleum and 500,000 cubic metres/day in the case of gas. • Pipelines with a diameter of more than 800 mm and a length of more than 40 km: <ul style="list-style-type: none"> ○ for the transport of gas, oil, chemicals; ○ for the transport of carbon dioxide (CO₂) streams for the purposes of geological storage, including associated booster stations. • Installations for storage of petroleum, petrochemical, or chemical products with a capacity of 200,000 tonnes or more. • Annex 2: EIA is discretionary with the national authorities decide whether an EIA is needed. This is done by the "screening procedure", which determines the effects of projects on the basis of thresholds/criteria or a case by case examination. <p>The EC Directive 2012/92/EU revokes the 85/337/EEC and the 97/11/EC Directives and amends the 2003/35/EC directive. The 2012/92/EU lists two classes of project to which the Directive applies: Annex 1 Projects for which environmental assessment (EA) is mandatory; and Annex 2 projects for which EA is discretionary. Under 2012/92/EU, oil and gas developments are listed as Annex 1 projects.</p>

A.3 Environmental Impact Assessment (continued)

Regulatory Body	Legislation	Summary of Requirements
DECC	The Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999 (as amended 2007)	<p>These Regulations implement the EIA Directive with regard to the offshore oil and gas industry. The Regulations require an environmental impact assessment (EIA) and the associated public consultation document (Environmental Statement (ES)) to be submitted for certain projects, these are:</p> <ul style="list-style-type: none"> • Developments which will produce 500 tonnes (approximately 3,750 barrels) or more per day of oil or 500,000 cubic metres or more per day of gas (not including well testing). • Pipelines of 800 mm diameter and 40 kilometres or more in length. <p>Other activities are subject to a discretionary process where either an ES or a PON15 (seeking a Direction that an ES is not required) needs to be submitted. Typically this discretionary approval covers:</p> <ul style="list-style-type: none"> • The drilling of all wells • Developments, either stand-alone or incremental, producing less than 500 tonnes of oil per day or 500,000 cubic metres of gas per day • Construction of pipelines of less than 800 mm diameter and 40 kilometres in length

A.3 Environmental Impact Assessment (continued)

Regulatory Body	Legislation	Summary of Requirements
DECC	Environmental Approval for Revised Production Consents under PPD (Revised)	<p>The EC Directive 2012/92/EU on the assessment of the effects of certain public and private projects on the environment forced an amendment of the EIA regulations. An ES may now also be required for a modification to a project or revision to production consent, unless the modification or revision decreases production, has no change on production levels or increases production only by a small amount. Prior to applying to EDU (Energy Development Unit) to request a consent revision or renewal that involves an increase in the production level, the applicant should assess the proposed increase against the EIA thresholds (*), as follows:</p> <ul style="list-style-type: none"> • If the average requested annual rate of production represents an increase of greater than 500 tonnes of oil per day or 500,000 cubic metres of gas per day, an EIA Direction or ES will be required • If the increase in production does not exceed the base year i.e. the first year of the consent in subsequent years then an EIA Direction or ES will not be required. • If the increase is for an increase in the base year production then an EIA Direction or ES will be required. • If the increase in subsequent years exceeds production in the base year, an EIA Direction or ES will be required <p>Revised guidance relating to Environmental Submissions was issued by DECC on the 21st of July 2011 highlighted changes that have been made to relevant regulations following the Gulf of Mexico incident.</p> <p>The guidance highlighted the fact that EIAs must include a detailed assessment of the potential environmental impact of a hydrocarbon release, broadly based on OPEP (Oil Pollution Emergency Plan) requirements but including significant additional information to the mitigation measures in place to prevent and the potential environmental impacts of the release.</p>
	OSPAR Recommendation 2010/5 on assessments of environmental impact in relation to threatened and/or declining species and habitats	<p>The purpose of this Recommendation is to support the protection and conservation of species and habitats on the OSPAR List of threatened and/or declining species and habitats, through assessments of environmental impacts of human activities. When assessments of environmental impacts of human activities that may affect the marine environment of the OSPAR (Oslo and Paris Conventions) maritime area are prepared, Contracting Parties should ensure they take account of the relevant species and habitats on the OSPAR List of threatened and/or declining species and habitats (OSPAR Agreement 2008/6).</p>

A.4 Access to Environmental Information and Public Participation

Regulatory Body	Legislation	Summary of Requirements
DECC	<p>Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC</p> <p>The Environmental Information (Scotland) Regulations 2004</p>	<p>This Directive transposes the first pillar of the Aarhus convention on access to information into EU legislation. This Directive requires all public authorities to provide members of the public with access to environmental information, and to actively disseminate the environmental information they hold. The information must be provided to any person at their request, without them having to prove an interest and at the latest within two months of the request being made. The Directive is implemented in Scotland by The Environmental Information (Scotland) Regulations 2004.</p>
	Public Participation Directive (PPD) 2003/35/EC	<p>Provides for public participation in the preparation of environmental plans, programmes and projects with significant environmental impacts. See section on environmental impact assessment.</p>

A.5 Conservation and Biodiversity

Regulatory Body	Legislation	Summary of Requirements
DECC, JNCC, SNH, DEFRA	The Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 as amended (2010)	<p>These Regulations make provision for implementing the Birds Directive and Habitats Directive in relation to marine areas where the United Kingdom has jurisdiction beyond its territorial sea. The Regulations make provision for the selection, registration and notification of sites in the offshore marine area (European Offshore Marine Sites) and for the management of these sites. Competent authorities are required to ensure that steps are taken to avoid the disturbance of species and deterioration of habitat in respect of the offshore marine sites and that any significant effects are considered before authorisation of certain plans or projects. Provisions are also in place for issuing of European Protected Species (EPC) licences for certain activities and for undertaking monitoring and surveillance of offshore marine sites. The 2010 Amendment Regulations make various insertions for new enactments (e.g. new Birds Directive) and also devolve certain powers to Scottish Ministers. Most recent amendments to the 2007 and 2010 regulations are:</p> <ul style="list-style-type: none"> • The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2011 • The Conservation of Habitats and Species (Amendment) Regulations 2011.
	The Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001 as amended 2007	<p>Secretary of State set out these Regulations to consider whether a “Habitats Regulatory Assessment” should be undertaken prior to granting a licence under the Petroleum Act 1998. Habitats Regulatory Assessment is the formal assessment by the Competent Authority of the impacts of a plan or project on the integrity of (a) Natura 2000 site(s). Habitats Regulatory Assessment is a process separate from the EIA requirements, but which should run alongside and concurrently with the EIA requirements. The 2007 amendments also extend this requirement to all UK waters. These regulations implement European Directives for the protection of habitats and species in relation to oil and gas activities carried out in whole or in part on the UKCS. In particular these are the Council Directive 92/43 on the conservation of natural habitats, wild fauna and flora and Council Directive 79/409 on the conservation of wild birds. The 2007 amendments extend the requirements to all UK waters.</p>

A.5 Conservation and Biodiversity (continued)

Regulatory Body	Legislation	Summary of Requirements
	<p>Marine and Coastal Access Act 2009</p> <p>Marine (Scotland) Act 2010</p> <p>Marine Licensing (Exempted Activities) (Scottish Inshore and Offshore Regions) Amendment Order 2012</p>	<p>These two Acts introduce a framework for the development of a new planning system for the marine area and ensure greater protection for the marine environment and biodiversity. However, oil and gas activities are generally exempted from the Act(s) since an environmental regime/regulator is already in place under DECC. The Act(s) will apply to a number of activities e.g: removal of materials from the seabed (including structures), deposit of materials during decommissioning, disturbance of the seabed, use of explosives and installation of certain types of cables. DECC will retain responsibility for offshore installation enforcement activities, and the Marine Management Organisation & Devolved Authorities will take responsibility for "at sea" enforcement of oil and gas activities.</p> <p>The Amendment Order details a number of activities exempt from the requirement for a MCAA licence.</p>

A.6 Emergency response

Regulatory Body	Legislation	Summary of Requirements
DECC	The Offshore Installations (Emergency Pollution Control) Regulations 2002	These Regulations entered into force in July 2002 and implement the recommendations from Lord Donaldson's review of "Salvage and Intervention and their Command and Control" insofar as they relate to the oil and gas industry. The Regulations give the Representative of the Secretary of State for Energy and Climate Change (SOSREP) powers to intervene in the event of an incident involving an offshore installation where there is, or may be, a risk of significant pollution, or where an operator is failing or has failed to implement effective control and preventative operations.
	The Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005 (as amended 2011)	Under these Regulations, it is an offence to make an unlawful release of oil, i.e. a release of oil other than in accordance with the permit granted under these Regulations for oily discharges (e.g. produced water etc.). However, it will be a defence to prove that the contravention arose because of something that could not have been reasonably prevented, or that it was due to something done as a matter of urgency for the purposes of securing the safety of any person. PON 1 reporting.

A.6 Emergency response (continued)

Regulatory Body	Legislation	Summary of Requirements
DECC	OSPAR Recommendation 2010/18 on the prevention of significant acute oil pollution from offshore drilling activities	<p>This recommendation came into force in September 2010 and establishes a process for assessing the relevance of the results of the US and EC reviews of the Macondo well incident with a view to taking additional action by the OSPAR Commission if needed and within the scope of the Convention.</p> <p>Under the recommendation, contracting parties are required to:</p> <ul style="list-style-type: none"> • As a precaution continue or, as a matter of urgency, start reviewing existing frameworks, including the permitting of drilling activities in extreme conditions; and continue to evaluate this on a case by case basis and prior to permitting; • Take extra care to apply all relevant learning from the Deepwater Horizon accident; • Report on this ongoing activity to OSPAR; and • Based on the reviews undertaken, contracting parties should individually and jointly, if needed, take further action within the scope of the OSPAR Convention.
	Merchant Shipping Act 1995	<p>The Merchant Shipping Act 1995 implements in the UK the OPRC Convention. The aim of the OPRC Convention is to increase the level of effective response to oil pollution incidents and to promote international co-operation to this end. The Convention applies to ships and offshore installations and requires operators to have in place Oil Pollution Emergency Plans (OPEP), which are approved by the body that is the National Competent Authority for the Convention.</p>
	The Merchant Shipping (Oil Pollution Preparedness, Response and Co-operation) Regulations 1998 (as amended 2001)	<p>The Merchant Shipping (Oil Pollution Preparedness, Response and Co-operation Convention) Regulations 1998 introduce into UK law the oil spill planning requirements and legal oil spill reporting requirements of the OPRC Convention.</p>

A.7 Environmental Liability

Regulatory Body	Legislation	Summary of Requirements
	<p>Directive 2004/35/CE of the European Parliament and the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage.</p>	<p>The Environmental Liability Directive enforces strict liability for prevention and remediation of environmental damage to 'biodiversity', water and land from specified activities and remediation of environmental damage for all other activities through fault or negligence.</p> <p>The EC has published a communication (the Communication) on "facing the challenge of the safety of offshore oil and gas activities".</p> <p>The European Commission is set to review the liability regime applicable to offshore petroleum activities and is:</p> <ul style="list-style-type: none"> • proposing amendments to the Environmental Liability Directive (2004/35/EC, as amended by Directive 2006/21/EC) so that it covers environmental damage to all marine waters (as defined in the Marine Strategy Framework Directive 2008/56/EC); • re-considering introducing a mandatory requirement for operators to provide financial security in the event that a major accident occurs; and • considering, in a guidance document interpreting existing legislation, the applicability of the Waste Framework Directive (2008/98/EC) to oil spills
SEPA, MS and SNH	<p>The Environmental Liability (Scotland) Regulations 2009 as amended 2011</p>	<p>These Regulations implement the EC Environmental Liability Directive in Scotland. The regulations oblige operators of certain activities to take preventative measures where there is an imminent threat of environmental damage, and to remediate any environmental damage caused by their activities.</p>

A.8 Chemicals, drainage and oily discharges

Regulatory Body	Legislation	Summary of Requirements
DECC, Marine Scotland, CEFAS	The Offshore Chemicals Regulations 2002 (as amended 2011)	<p>The Offshore Chemicals Regulations 2002 implement the OSPAR Decision (2000/2) and OSPAR Recommendations (2000/4 and 2000/5) introducing a Harmonised Mandatory Control System for the use and reduction of the discharge of offshore chemicals. The Regulations introduced a permit system for the use and discharge of chemicals offshore and include a requirement for site specific risk assessment. Chemicals used offshore must be notified through the Offshore Chemical Notification Scheme (OCNS) and chemicals are ranked by hazard quotient, using the CHARM model. Applications for permits are made via the submission of the relevant PON15 (i.e. chemicals for drilling: PON 15B; pipelines: PON 15C; production: PON 15D; decommissioning: PON 15E; and workovers and well interventions: PON 15F).</p> <p>Amendments in 2011 to the Offshore Chemicals Regulations and the Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2010. The principal aim is to make unlawful unintentional releases of chemicals and oil that arise through accidents / non-operational discharges by broadening accordingly the definitions of "offshore chemical" and "discharges" and incorporating a new concept of "release".</p>
	<p>Convention for the Protection of the Marine Environment of the North East Atlantic 1992 (OSPAR Convention)</p> <p>OSPAR Decision 2000/3 on the Use of Organic-Phase Drilling Fluids (OPF) and the Discharge of OPF-Contaminated Cuttings</p> <p>OSPAR Recommendation 2006/5 on a Management Regime for Offshore Cuttings Piles.</p>	<p>The OSPAR Convention (in particular Annex III) is the main driver for reductions in oily discharges to the North Sea. The UK as a contracting party to the Convention is therefore obliged to implement any Decisions and Recommendations made by the Commissions. Certain decisions made under the earlier Paris Convention also still stand.</p> <p>OSPAR Decision 2000/3 that came into effect on 16 January 2001 effectively eliminates the discharge of organic phase fluids (OPF) (oil based (OBF) or synthetic based (SBF) drilling fluids) or cuttings contaminated with these fluids. Use of OPF is still allowed provided total containment is operated. The use of diesel-oil-based drilling fluids is prohibited. The discharge of whole OPF to the sea is prohibited. The mixing of OPF with cuttings for the purpose of disposal is not acceptable. The discharge of cuttings contaminated with oil based fluids (OBF) (includes OBF and SBF) greater than 1% by weight on dry cuttings is prohibited. The use of OPF in the upper part of the well is prohibited. Exemptions may be granted by the national competent authority for geological or safety reasons.</p> <p>The discharge into the sea of cuttings contaminated with synthetic fluids will only be authorised in exceptional circumstances. Authorisations to be based on the application of BAT/BEP. Best Available Techniques described within the Decision include recycling, recovery and reuse of muds.</p> <p>The OSPAR 2006/5 Recommendation sets out measures to reduce pollution from oil or other chemicals from cuttings piles.</p>

A.8 Chemicals, drainage and oily discharges (continued)

Regulatory Body	Legislation	Summary of Requirements
DECC, Marine Scotland, CEFAS	The Merchant Shipping (Prevention of Oil Pollution) Regulations 1996 (as amended)	These Regulations give effect to Annex I of MARPOL 73/78 (prevention of oil pollution) in UK waters and have been amended by the Merchant Shipping (Implementation of Ship-Source Pollution Directive) Regulations 2009 described above. They address oily drainage from machinery spaces on vessels and installations. The North Sea is designated a “Special Area”, within which the limit for oil in discharged water from these sources is 15ppm. Vessels and installations are required to hold a valid UKOPP (UK Oil Pollution Prevention) or IOPP (International Oil Pollution Prevention Certificate). Vessels and drilling rigs are also required to hold a current, approved Shipboard Oil Pollution Emergency Plan (SOPEP) which is in accordance with guidelines issued by the Marine Environment Protection Committee of the International Maritime Organisation (IMO).
	Merchant Shipping Act 1995 International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78	Arrangements for Survey and Certification Part VI of the Merchant Shipping Act, 1995 makes provision for the prevention of pollution from ships. It implements in the UK the requirements of the International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78. MARPOL defines ships to include offshore installations and relevant provisions of MARPOL are applied to offshore installations. Annex 1 of MARPOL relates to prevention of oil pollution and has provisions for machinery space drainage that are applied to offshore platforms: Vessels of 400 GT or above (which includes FSU) are permitted to discharge processed water (i.e. Oily Drainage Water) from Machinery Space Drainage as long as the oil content without dilution, does not exceed 15 ppm of the oil in water.
	PARCOM Recommendation 86/1 of a 40 mg/l Emission Standard for Platforms	The PARCOM Recommendation 86/1 provision of a 40 mg/l performance standard for platforms is applicable, and remains in force for discharges of displacement water, drainage water and ballast water, which are not covered under MARPOL. The maximum concentration of dispersed oil must not exceed 100 mg/l at any time.
	The REACH Enforcement Regulations 2008	These enforce Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) which require chemical users to demonstrate the safe manufacture of chemicals and their safe use throughout the supply chain. Under REACH, the users of chemicals as well as their manufacturers and importers have a responsibility to ensure that the risks to both human health and the environment are adequately assessed.

A.8 Chemicals, drainage and oily discharges (continued)

Regulatory Body	Legislation	Summary of Requirements
<p>DECC, Marine Scotland, CEFAS</p>	<p>The Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005 (as amended 2011)</p>	<p>These Regulations replaced the Prevention of Oil Pollution Act 1971 ("POPA") and are a mechanism to continue implementation on the UKCS of OSPAR Recommendation 2001/1.</p> <p>Discharges of reservoir oil associated with drilling from a floating storage unit (FSU) must be covered by an OPPC Term Permit, whereas discharges from a production installation are covered by an OPPC Life Permit. Operators are required to regularly report actual oil discharge in order that adequate monitoring can be achieved.</p> <p>These regulations do not apply to those discharges regulated under the Offshore Chemicals Regulations 2002, the Merchant Shipping (Prevention of Oil Pollution) Regulations 1996 (as amended) or the Merchant Shipping (Prevention of Pollution by Sewage and Garbage from Ships) Regulations 2008.</p> <p>Amendments in 2011, via the Offshore Chemicals Regulations and the Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2010 introducing new concept of "release " and " offshore installation" which encompasses all pipelines .</p> <p>The concentration of dispersed oil in produced water discharges as averaged over a monthly period must not exceed 30 mg/l, whereas the maximum permitted concentration must not exceed 100 mg/l at any time. The quantity of dispersed oil in produced water discharged must not exceed 1 tonne in any 12 hour period.</p>

A.9 Territorial Waters

Regulatory Body	Legislation	Summary of Requirements
	Territorial Sea Act 1987 Territorial Waters Order	Defines the extent of the territorial sea adjacent to the British Islands.

A.10 Ballast water

Regulatory Body	Legislation	Summary of Requirements
MCA	International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM) – adopted 2004	Objective to prevent, minimise and ultimately eliminate the transfer of harmful aquatic organisms and pathogens through control and management of ships' ballast water and sediments. Helsinki and OSPAR Commissions General Guidance on the Voluntary Interim has set out an application of the D1 Ballast Water Exchange Standard. Under this regulation, all tankers > 150 GRT and all ships > 400 GRT in the UK are required to have in place United Kingdom Oil Pollution Prevention Certificate (UKOPP) or IOPP Certificate and Ballast Water Exchange Management plan. It is required all vessels entering the North East Atlantic to exchange the ballast water at least 200 nm from the nearest land and at least 200 metres deep.

A.11 Waste handling and disposal

Regulatory Body	Legislation	Summary of Requirements
	International Convention for the Prevention of Pollution from Ships (MARPOL) 1973 Annex V, as amended	Annex V: Prevention of pollution by garbage from ships (entered into force December 1998). Deals with the different types of garbage and specifies the distances from land and the manner in which they may be disposed of. The Annex also designates Special Areas (including the North Sea) where the disposal of any garbage is prohibited except food wastes. The dumping of plastics at sea is also prohibited by this Annex.
EA / SEPA	Environmental Protection Act 1990	This Act, and associated regulations, introduces a “Duty of Care” for all controlled wastes. Waste producers are required to ensure that wastes are identified, described and labelled accurately, kept securely and safely during storage, transferred only to authorised persons and that records of transfers (waste transfer notes) are maintained for a minimum of two years. Carriers and waste handling sites require licensing. This Act and associated Regulations brought into effect a system of regulation for “controlled waste”. Although the Act does not apply to offshore installations, it requires operators to ensure that offshore waste is handled and disposed of onshore in accordance with the “Duty of Care” introduced by the Act.
	Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives. The Waste (Scotland) Regulations 2011	The European Parliament introduced a new Directive, 2008/98/EC, on waste and repealing certain Directives. The Directive lays down measures to protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste and by reducing overall impacts of resource use and improving efficiency of such use. The 2011 Scotland Regulations make a number of amendments to a variety of Scottish waste legislation to transpose aspects of Directive 2008/98/EC on waste into Scottish law.
	The Environment Protection (Duty of Care) Regulations 1991	Under these Regulations any person who imports, produces, carries, keeps, treats or disposes of Controlled Waste has a duty to take all reasonable steps to ensure that their waste is handled lawfully and safely. Special/Hazardous Waste is a sub-category of Controlled Waste (see also Special Waste Regulations).

A.11 Waste handling and disposal (continued)

Regulatory Body	Legislation	Summary of Requirements
SEPA	The Controlled Waste Regulations 1992 (as amended)	This legislation does not strictly apply offshore. However, because the offshore disposal of garbage is prohibited then all wastes must be transferred to shore for disposal. Once onshore, the wastes must meet the requirements of onshore legislation when being disposed of. These regulations must therefore be considered offshore to allow onshore requirements to be met, for example the identification and appropriate documentation of these wastes. These regulations define household, industrial and commercial waste for waste management licensing purposes.
DECC	Food and Environment Protection Act 1985	A licence is required under FEPA for any waste disposal in the sea or under the seabed. However, the Deposits in the Sea (Exemptions) Order 1985 exempts from FEPA licensing the deposit on site or under the seabed of any chemicals and drill cuttings. However, export of cuttings to another field for re-injection will require a licence under FEPA.
	The Merchant Shipping (Implementation of Ship-Source Pollution Directive) Regulations 2009	These Regulations implement Directive 2005/35/EC of the European Parliament and of the Council of 7th September 2005 on ship-source pollution and on the introduction of penalties for infringements. The Directive aims to achieve better enforcement of the requirements of the International Convention for the Prevention of Pollution from Ships, 1973 (MARPOL 73), as modified by the Protocol of 1978 (MARPOL 73/78).
	The Merchant Shipping (Prevention of Pollution by Sewage and Garbage from Ships) Regulations 2008 (as amended 2010)	These Regulations implement the requirements of MARPOL 73/78 Annex IV in the UK. These regulations apply to vessels including fixed or floating platforms which operate in the marine environment and came into force on 01 February 2009. They lay out the requirements for sewage system surveys and certification and the requirements of sewage systems with an exception for fixed installations at a distance of more than 12 nautical miles from the nearest land. They also identify the requirements for a garbage management plan, garbage record books and prohibit the disposal of various types of garbage into the marine environment and define enforcement action. The 2010 Amendments correct drafting errors.

A.11 Waste handling and disposal (continued)

Regulatory Body	Legislation	Summary of Requirements
SEPA	The Special Waste Regulations 1996 as amended	<p>These Regulations make provision for handling special waste and for implementing Council Directive 91/689/EEC of 12 December 1991 on hazardous waste. The Regulations require controlled wastes that are also considered to be special wastes because of their hazardous properties, to be correctly documented, recorded and disposed of at an appropriately licensed site. Whilst strictly speaking the Regulations do not apply offshore, waste consignments must be compliant as soon as the waste is offloaded at an onshore facility. In Scotland, The Special Waste Amendment (Scotland) Regulations 2004 amend the Special Waste Regulations 1996. They implement the revised European hazardous waste list, (incorporated into the European Waste Catalogue). They introduced new consignment note, segregation, packaging and labelling requirements. In England and Wales the Special Waste Regulations 1996 were repealed by The Hazardous Waste (England and Wales) Regulations 2005.</p>
SEPA	The Waste Electrical and Electronic Equipment Regulations 2006 (as amended 2010)	<p>These Regulations transpose the requirements of the Waste Electrical and Electronic Equipment Directive (WEEE Directive 2002/96/EC) which came into force in January 2007. The Regulations define new responsibilities for users and producers of Electrical and Electronic Equipment depending on whether the equipment was purchased before or after 13/08/05.</p> <p>The 2010 Amendments modify various definitions and realign dates.</p>

A.12 Low specific activity (LSA) contaminated waste (sand, sludge and scale) and Radioactive waste

Regulatory Body	Legislation	Summary of Requirements
SEPA	<p>Radioactive Substances Act 1993</p> <p>The Environmental Permitting (England and Wales) Regulations 2010 in England and Wales</p> <p>The Radioactive Substances Act 1993 Amendment (Scotland) Regulations 2011</p>	<p>Onshore and offshore storage and disposal of naturally occurring radioactive materials (NORM) is regulated under the Radioactive Substances Act. Operators are required to hold, for each relevant installation, an Authorisation to store and dispose of radioactive waste such as low specific activity scale (LSA) which may be deposited in vessels and pipe-work. The authorisation specifies the route and methods of disposal. Records of disposal are required.</p> <p>The offshore use, storage and disposal of radioactive sources are regulated under the same legislation. A Registration Certificate is required to keep; transport and use sources and records must be kept. Additionally, different radionuclides have different activity thresholds over which the containing sources qualify as a High Activity Sealed Source (HASS). As of January 2008, and if applicable, HASS records must be reported to SEPA or the EA and maintenance of an inventory is required. The keeping, storage and disposal of radioactive waste requires authorisation.</p> <p>The Radioactive Substances Act 1993 has been superseded by the Environmental Permitting (England and Wales) Regulations 2010 in England and Wales but it has remained in place in Scotland. However, in Scotland there have also been consultations regarding a future exemptions regime under The Radioactive Substances Act 1993. These consultations have resulted in the Radioactive Substance Exemption (Scotland) Order 2011. This order will revoke and replace a series of exemption orders (in Scotland) made under the Radioactive Substances Act 1993 (“the Act”) and its predecessor (the Radioactive Substances Act 1960) in order to rationalise the current system of exemptions and bring it into line with the structure and terminology used in the Basic Safety Standards Directive.</p>

A.13 Licensing

Regulatory Body	Legislation	Summary of Requirements
DECC	<p>Petroleum Act, 1998 as amended</p> <p>The Petroleum Licensing (Exploration and Production) (Seaward and Landward Areas) Regulations 2004 (as amended 2006)</p> <p>The Petroleum Licensing (Production) (Seaward Areas) Regulations 2008</p>	<p>These Regulations consolidate with amendments the provisions of the Petroleum (Production) Regulations 1982 (as amended) in relation to (a) applications to the Secretary of State for petroleum production licences in respect of seaward areas and (b) applications to the Secretary of State for petroleum exploration licences in respect of seaward areas and landward areas below the low water line.</p> <p>This Act vests all rights to the nation's petroleum resources to the Crown and provides the basis for granting licences to explore for and produce oil and gas. Production licences grant exclusive rights to the holders to "search and bore for and get petroleum" in specific blocks. Licences generally contain a number of environmental restrictions and conditions.</p> <p>Under the terms of a Licence, licence holders require the authorisation of the Secretary of State prior to conducting activities such as installing equipment or drilling of wells in the licence area. Consent to flare or vent hydrocarbons is also required from DECC under the terms of the Model Clauses incorporated into Production Licences.</p> <p>Licence conditions will include environmental issues e.g. time constraints in sensitive areas. The model clauses of the licence require the licensee to appoint a fisheries liaison officer.</p>

A.14 Transboundary Impacts

Regulatory Body	Legislation	Summary of Requirements
DECC	<p>Convention on Environmental Impact Assessment in a Transboundary Context (Espoo, 1991)</p>	<p>The 1991 UNECE Convention on Environmental Impact Assessment in a Transboundary Context (the Espoo Convention) requires any country that has ratified the convention to consider the transboundary environmental effects of industrial projects and activities, including offshore hydrocarbon exploration and productions activities.</p> <p>The Convention requires that if the activity is found to cause a significant adverse transboundary impact then the party undertaking the activity shall, for the purpose of ensuring adequate and effective consultations, notify any potentially affected country as early as possible.</p>

A.15 Location of Structures

Regulatory Body	Legislation	Summary of Requirements
DECC	Coast Protection Act 1949 (as extended by the Continental Shelf Act 1964)	<p>This Act provides that where an obstruction or danger to navigation is caused, or is likely to result, the prior written consent of the Secretary of State is required for the siting of the offshore installation - whether mobile or permanent - in any part of the UK designated areas of the Continental Shelf. In practice, this means that consent must be obtained for each drilling operation and for all offshore production facilities.</p> <p>The issuing of 'consent to locate' under the Coast Protection Act Regulations 1949 section 34, part II, to an individual or organisation and provides an indication that impacts have been considered with respect to navigation, the local habitat within the proposed area and that no significant impacts would occur as a consequence of the proposed offshore installation</p> <p>The 1949 Act was extended by Section 4 (1) of the Continental Shelf Act 1964 to all parts of the UK Continental Shelf where oil and gas exploration and development is taking place.</p>
	Continental Shelf Act 1964	This act extends the UK government's right to grant licences to explore and exploit the UKCS.
	The Continental Shelf (Designation of Areas) (Consolidation) Order 2000	This Order consolidates the various Orders made under the Continental Shelf Act 1964 which have designated the areas of the continental shelf within which the rights of the United Kingdom with respect to the sea bed and subsoil and their natural resources are exercisable
	Marine and Coastal Access Act 2009 and Marine (Scotland) Act 2010	The Marine and Coastal Access Act (MCAA) and Marine (Scotland) Act will replace and merge the requirements of FEPA Part II (deposits to the sea) and the Coast Protection Act 1949 (navigation). The licensing provisions of these Acts enter into force in April 2011. See also Marine & Coastal Access Act 2009 & The Marine (Scotland) Act 2010.

A.16 Environmental Management System

Regulatory Body	Legislation	Summary of Requirements
DECC	OSPAR Recommendation 2003/5 to Promote the Use and Implementation of Environmental Management Systems by the Offshore Industry	All Operators controlling the operation of offshore installations on the UKCS are required to have in place an independently verified Environmental Management System designed to achieve: the environmental goals of the prevention and elimination of pollution from offshore sources and of the protection and conservation of the maritime area against other adverse effects of offshore activities and to demonstrate continual improvement in environmental performance. OSPAR recognises the ISO 14001: 2004 & EMS international standards as containing the necessary elements to fulfil these requirements. All operators are also required to provide a public statement of their environmental performance on an annual basis.

A.17 Decommissioning

Regulatory Body	Legislation	Summary of Requirements
DECC, MMO , Marine Scotland	Petroleum Act 1998	The Petroleum Act 1998 sets out requirements for undertaking decommissioning of offshore installations and pipelines including preparation and submission of a Decommissioning Programme.
	Energy Act 2008	Part III of the Energy Act 2008 amends Part 4 of the Petroleum Act 1998 and contains provisions to enable the Secretary of State to make all relevant parties liable for the decommissioning of an installation or pipeline; provide powers to require decommissioning security at any time during the life of the installation and powers to protect the funds put aside for decommissioning in case of insolvency of the relevant party.
	Food and Environment Protection Act 1985	The Marine and Coastal Access Act (MCAA) and Marine (Scotland) Act will replace and merge the requirements of FEPA Part II (deposits to the sea) and the Coast Protection Act (navigation). FEPA Part II remains in force in Scottish territorial waters to cover reserved activities (within 3 nm).
	Marine (Scotland) Act 2010	
	Marine and Coastal Access Act 2009	Many offshore sector activities are exempt from the acts; however certain activities including deposits of substances or articles in the seabed during abandonment and decommissioning operations are covered.
OSPAR Decision 98/3 on the Disposal of Disused Offshore Installations	Decision that requires operators to remove the whole installation. However large structures are possible exceptions from derogation.	

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APPENDIX B

Well Design

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B. MARINER AREA DEVELOPMENT WELL DESIGNS

B.1 Mariner Heimdal

B.1.1 Produced water re-injection (PWRI) wells

B.1.1.1 Short wells

Statoil plan to drill 6 short PWRI wells and 4 sidetrack wells at the Mariner Area Development. **Table B.1** presents the proposed well design for the Heimdal short, PWRI wells.

Table B.1: Preliminary well design for the Heimdal short, PWRI well and sidetrack well

Hole section	Casing depth (m)	Mud system	Cuttings (tonnes)	Fate of cuttings
28"	177	Seawater	70.7	Discharged to seabed
26"	538	WBM	771.2	Discharge to sea
17½"	2,012	WBM	772.7	Discharge to sea
13½"	2,550	LTOBM	167.8	Thermotreatment fine particles discharged to sea
9½" (reservoir section)	3,000	LTOBM	69.5	Thermotreatment fine particles discharged to sea or skip and shipped to shore
<i>Sidetrack section to access the additional reservoir target from the short well</i>				
13½"	600	LTOBM	187.2	Thermotreatment fine particles discharged to sea
9½"	700	LTOBM	108.1	Thermotreatment fine particles discharged to sea or skip and shipped to shore

Note: WBM – water-based mud; LTOBM – Low-toxicity oil based mud

B.1.1.2 Medium wells

Statoil plan to drill 4 medium PWRI wells and 33 sidetrack wells to access the Heimdal reservoir at the Mariner Area Development. **Table B.2** presents the proposed well design for the Heimdal medium, PWRI wells.

Table B.2: Preliminary well design for the Heimdal medium, PWRI well and sidetrack well

Hole section	Casing depth (m)	Mud system	Cuttings (tonnes)	Fate of cuttings
28"	177	Seawater	70.7	Discharged to seabed
26"	537	WBM	769.1	Discharge to sea
17½"	2,221	WBM	1,629.8	Discharge to sea
13½"	3,333	LTOBM	346.9	Thermotreatment fine particles discharged to sea
9½" (reservoir section)	4,233	LTOBM	139	Thermotreatment fine particles discharged to sea or skip and shipped to shore
<i>Sidetrack sections to access the additional reservoir target from the medium well</i>				
13½"	700	LTOBM	218.4	Thermotreatment fine particles discharged to sea
9½"	800	LTOBM	123.6	Thermotreatment fine particles discharged to sea or skip and shipped to shore

Note: WBM – water-based mud; LTOBM – Low-toxicity oil based mud

B.1.1.3 Long wells

Statoil plan to drill 2 long PWRI wells and 6 sidetrack wells to access the Heimdal reservoir at the Mariner Area Development. **Table B.3** presents the proposed well design for the Heimdal long, PWRI wells.

Table B.3: Preliminary well design for the Heimdal long, PWRI well and sidetrack well

Hole section	Casing depth (m)	Mud system	Cuttings (tonnes)	Fate of cuttings
28"	177	Seawater	70.7	Discharged to seabed
26"	537	WBM	769.1	Discharge to sea
17½"	2,501	LTOBM	1,029.6	Thermotreatment fine particles discharged to sea
13½"	4,055	LTOBM	484.8	Thermotreatment fine particles discharged to sea
9½" (reservoir section)	4,955	LTOBM	139	Thermotreatment fine particles discharged to sea or skip and shipped to shore
<i>Sidetrack sections to access the additional reservoir targets from the long wells</i>				
13½"	800	LTOBM	249.6	Thermotreatment fine particles discharged to sea
9½"	1,000	LTOBM	154.5	Thermotreatment fine particles discharged to sea or skip and shipped to shore

Note: WBM – water-based mud; LTOBM – Low-toxicity oil based mud

B.1.1.4 Extended reach wells

Statoil plan to drill 3 extended reach PWRI sidetrack wells to access the Heimdal reservoir at the Mariner Area Development. **Table B.4** presents the proposed well design for the Heimdal extended reach, PWRI sidetrack wells.

Table B.4: Preliminary well design for the 3 Heimdal extended reach, PWRI sidetrack wells

Hole section	Casing depth (m)	Mud system	Cuttings (tonnes)	Fate of cuttings
<i>Sidetrack sections to access the extended reach reservoir targets</i>				
13½"	1,000	LTOBM	312	Thermotreatment fine particles discharged to sea
9½"	1,200	LTOBM	185.4	Thermotreatment fine particles discharged to sea or skip and shipped to shore

Note: WBM – water-based mud; LTOBM – Low-toxicity oil based mud

B.1.2 Dual Producer wells

B.1.2.1 Short wells

Statoil plan to drill 2 short dual producer wells and 7 sidetrack wells to access the Heimdal reservoir at the Mariner Area Development. **Table B.5** presents the proposed well design for the Heimdal short, dual producer wells.

Table B.5: Preliminary well design for the Heimdal short, dual producer well and sidetrack well

Hole section	Casing depth (m)	Mud system	Cuttings (tonnes)	Fate of cuttings
28"	177	Seawater	70.7	Discharged to seabed
26"	537	WBM	769.1	Discharge to sea
17½"	808	WBM	262.3	Discharge to sea
13½"	2,400	LTOBM	496.7	Thermotreatment fine particles discharged to sea
9½" (reservoir section)	3,000	LTOBM	92.7	Thermotreatment fine particles discharged to sea or skip and shipped to shore
<i>Sidetrack sections to access the additional reservoir target from the short well</i>				
13½"	600	LTOBM	187.2	Thermotreatment fine particles discharged to sea
9½"	700	LTOBM	108.1	Thermotreatment fine particles discharged to sea or skip and shipped to shore

Note: WBM – water-based mud; LTOBM – Low-toxicity oil based mud

B.1.2.2 Medium wells

Statoil plan to drill 8 medium dual producer wells and 22 sidetrack wells to access the Heimdal reservoir at the Mariner Area Development. **Table B.6** presents the proposed well design for the Heimdal medium, dual producer wells.

Table B.6: Preliminary well design for the Heimdal medium, dual producer well and sidetrack well

Hole section	Casing depth (m)	Mud system	Cuttings (tonnes)	Fate of cuttings
28"	177	Seawater	70.7	Discharged to seabed
26"	537	WBM	769.1	Discharge to sea
17½"	1,392	WBM	827.5	Discharge to sea
13½"	2,504	LTOBM	346.9	Thermotreatment fine particles discharged to sea
9½" (reservoir section)	3,504	LTOBM	154.5	Thermotreatment fine particles discharged to sea or skip and shipped to shore
<i>Sidetrack sections to access the additional reservoir target from the medium well</i>				
13½"	700	LTOBM	218.4	Thermotreatment fine particles discharged to sea
9½"	800	LTOBM	123.6	Thermotreatment fine particles discharged to sea or skip and shipped to shore

Note: WBM – water-based mud; LTOBM – Low-toxicity oil based mud

B.1.2.3 Long wells

Statoil plan to drill 4 long dual producer wells and 15 sidetrack wells to access the Heimdal reservoir at the Mariner Area Development. **Table B.7** presents the proposed well design for the Heimdal long, dual producer wells.

Table B.7: Preliminary well design for the Heimdal long, dual producer well and sidetrack well

Hole section	Casing depth (m)	Mud system	Cuttings (tonnes)	Fate of cuttings
28"	177	Seawater	70.7	Discharged to seabed
26"	643	WBM	995.5	Discharge to sea
17½"	2,019	LTOBM	721.4	Thermotreatment fine particles discharged to sea
13½"	3,590	LTOBM	490.1	Thermotreatment fine particles discharged to sea
9½" (reservoir section)	4,590	LTOBM	154.5	Thermotreatment fine particles discharged to sea or skip and shipped to shore
<i>Sidetrack sections to access the additional reservoir targets from the long wells</i>				
13½"	800	LTOBM	249.6	Thermotreatment fine particles discharged to sea
9½"	1,000	LTOBM	154.5	Thermotreatment fine particles discharged to sea or skip and shipped to shore

Note: WBM – water-based mud; LTOBM – Low-toxicity oil based mud

B.1.3 Single Producer wells

Statoil plan to drill 1 single producer well and 2 sidetrack wells to access the Heimdal reservoir at the Mariner Area Development. **Table B.8** presents the proposed well design for the Heimdal single producer wells.

Table B.8: Preliminary well design for the Heimdal single producer well and sidetrack wells

Hole section	Casing depth (m)	Mud system	Cuttings (tonnes)	Fate of cuttings
28"	177	Seawater	70.7	Discharged to seabed
26"	537	WBM	769.1	Discharge to sea
17½"	2,297	WBM	922.7	Discharge to sea
13½"	3,277	LTOBM	305.7	Thermotreatment fine particles discharged to sea
9½" (reservoir section)	4,477	LTOBM	185.4	Thermotreatment fine particles discharged to sea or skip and shipped to shore
<i>Sidetrack sections to access the additional reservoir target from the short well</i>				
13½"	800	LTOBM	249.6	Thermotreatment fine particles discharged to sea
9½"	1,00	LTOBM	154.5	Thermotreatment fine particles discharged to sea or skip and shipped to shore

Note: WBM – water-based mud; LTOBM – Low-toxicity oil based mud

B.2 Mariner Maureen

B.2.1 Produced water re-injection (PWRI) wells

B.2.1.1 Short wells

Statoil plan to drill 2 short PWRI wells at the Mariner Area Development. **Table B.9** presents the proposed well design for the Maureen short, PWRI wells.

Table B.9: Preliminary well design for the Maureen short, PWRI wells

Hole section	Casing depth (m)	Mud system	Cuttings (tonnes)	Fate of cuttings
28"	177	Seawater	70.7	Discharged to seabed
26"	687	WBM	1,089.5	Discharge to sea
17½"	1,270	WBM	564.2	Discharge to sea
13½"	2,550	LTOBM	399.3	Thermotreatment fine particles discharged to sea
9½" (reservoir section)	3,000	LTOBM	69.5	Thermotreatment fine particles discharged to sea or skip and shipped to shore

Note: WBM – water-based mud; LTOBM – Low-toxicity oil based mud

B.2.1.2 Long wells

Statoil plan to drill 4 long PWRI wells to access the Maureen reservoir at the Mariner Area Development. **Table B.10** presents the proposed well design for the Maureen long, PWRI wells.

Table B.10: Preliminary well design for the Maureen long, PWRI wells

Hole section	Casing depth (m)	Mud system	Cuttings (tonnes)	Fate of cuttings
28"	177	Seawater	70.7	Discharged to seabed
26"	686	WBM	1,087.4	Discharge to sea
17½"	2,399	LTOBM	898	Thermotreatment fine particles discharged to sea
13½"	4,115	LTOBM	535.4	Thermotreatment fine particles discharged to sea
9½" (reservoir section)	4,745	LTOBM	97.3	Thermotreatment fine particles discharged to sea or skip and shipped to shore

Note: WBM – water-based mud; LTOBM – Low-toxicity oil based mud

B.2.2 Single Horizontal Producer wells

B.2.2.1 Short wells

Statoil plan to drill 6 short single producer wells to access the Maureen reservoir at the Mariner Area Development. **Table B.11** presents the proposed well design for the Maureen short, single producer wells.

Table B.11: Preliminary well design for the Maureen short, single producer wells

Hole section	Casing depth (m)	Mud system	Cuttings (tonnes)	Fate of cuttings
28"	177	Seawater	70.7	Discharged to seabed
26"	692	WBM	1,100.2	Discharge to sea
17½"	757	WBM	62.9	Discharge to sea
13½"	2,037	LTOBM	399.3	Thermotreatment fine particles discharged to sea
9½" (reservoir section)	3,000	LTOBM	148.8	Thermotreatment fine particles discharged to sea or skip and shipped to shore

Note: WBM – water-based mud; LTOBM – Low-toxicity oil based mud

B.2.2.2 Medium wells

Statoil plan to drill 4 medium single producer wells to access the Maureen reservoir at the Mariner Area Development. **Table B.12** presents the proposed well design for the Maureen medium, single producer wells.

Table B.12: Preliminary well design for the Maureen medium, single producer well

Hole section	Casing depth (m)	Mud system	Cuttings (tonnes)	Fate of cuttings
28"	177	Seawater	70.7	Discharged to seabed
26"	610	WBM	925	Discharge to sea
17½"	1,723	WBM	1,077.2	Discharge to sea
13½"	2,567	LTOBM	263.3	Thermotreatment fine particles discharged to sea
9½" (reservoir section)	3,839	LTOBM	196.5	Thermotreatment fine particles discharged to sea or skip and shipped to shore

Note: WBM – water-based mud; LTOBM – Low-toxicity oil based mud

B.2.2.3 Long wells

Statoil plan to drill 5 long single producer wells to access the Maureen reservoir at the Mariner Area Development. **Table B.13** presents the proposed well design for the Maureen long, single producer wells.

Table B.12: Preliminary well design for the Maureen long, single producer well

Hole section	Casing depth (m)	Mud system	Cuttings (tonnes)	Fate of cuttings
28"	177	Seawater	70.7	Discharged to seabed
26"	685	WBM	1,085.3	Discharge to sea
17½"	1,948	LTOBM	662.1	Thermotreatment fine particles discharged to sea
13½"	3,900	LTOBM	609	Thermotreatment fine particles discharged to sea
9½" (reservoir section)	4,912	LTOBM	156.3	Thermotreatment fine particles discharged to sea or skip and shipped to shore

Note: WBM – water-based mud; LTOBM – Low-toxicity oil based mud

B.3 Mariner East Maureen

B.3.1 Single Producer Short wells

Statoil plan to drill 4 short single producer wells to access the Mariner East reservoir at the Mariner Area Development. **Table B.14** presents the proposed well design for the Mariner East short, single producer wells.

Table B.14: Preliminary well design for the Mariner East short, single producer wells

Hole section	Casing depth (m)	Mud system	Cuttings (tonnes)	Fate of cuttings
28"	177	Seawater	70.7	Discharged to seabed
26"	692	WBM	1,100.2	Discharge to sea
17½"	757	WBM	62.9	Discharge to sea
13½"	2,037	LTOBM	399.3	Thermotreatment fine particles discharged to sea
9½" (reservoir section)	3,000	LTOBM	148.8	Thermotreatment fine particles discharged to sea or skip and shipped to shore

Note: WBM – water-based mud; LTOBM – Low-toxicity oil based mud

B.4 Make-up Water (Water Producer) Well

Statoil plan to drill 1 make-up water well at the Mariner Area Development. The design for this well is based on the short, Maureen water injection well. **Table B.15** presents the proposed well design for the waste producer well.

Table B.15: Preliminary well design for the make-up water (water producer) well

Hole section	Casing depth (m)	Mud system	Cuttings (tonnes)	Fate of cuttings
28"	177	Seawater	70.7	Discharged to seabed
26"	687	WBM	1,089.5	Discharge to sea from rig
17½"	1,270	WBM	564.2	Discharge to sea from rig
13½"	2,550	LTOBM	399.3	Thermotreatment fine particles discharged to sea from rig
8½" (reservoir section)	3,000	LTOBM	55.7	Thermotreatment fine particles discharged to sea or skip and shipped to shore

Note: WBM – water-based mud; LTOBM – Low-toxicity oil based mud

B.5 Waste Disposal Well

Statoil plan to drill 1 waste disposal well at the Mariner Area Development. The design for this well is based on the long, Maureen water injection well. **Table B.16** presents the proposed well design for the waste producer well.

Table B.16: Preliminary well design for the disposal well

Hole section	Casing depth (m)	Mud system	Cuttings (tonnes)	Fate of cuttings
28"	177	Seawater	70.7	Discharged to seabed
26"	686	WBM	1,087.4	Discharge to sea from rig
17½"	2,399	LTOBM	898	Discharge to sea from rig
13½"	4,115	LTOBM	535.4	Thermotreatment fine particles discharged to sea from rig
8½" (reservoir section)	4,745	LTOBM	77.9	Thermotreatment fine particles discharged to sea or skip and shipped to shore

Note: WBM – water-based mud; LTOBM – Low-toxicity oil based mud

B.6 Total cuttings from the Mariner Area Development

Table B.17 details the total amount of mud and cuttings produced from the Mariner Area Development wells.

Table B.17: Total cuttings produced from the Heimdal, Maureen and Mariner East wells

Mud system	Disposal method	Mariner field	Mariner East field	Mariner Area Development
		Amount of cuttings (tonnes)		
Tophole section drilled with seawater / WBM	Discharged directly to seabed to seabed	3,536	283	3,819
WBM drilled sections	Discharged overboard to sea	70,796	4,652	75,448
LTOBM	Thermally treated fine particles discharged to seabed	54,183	1,597	55,780
LTOBM (reservoir sections)	Thermotreatment fine particles discharged to sea or skip and shipped to shore	20,582	595	21,178

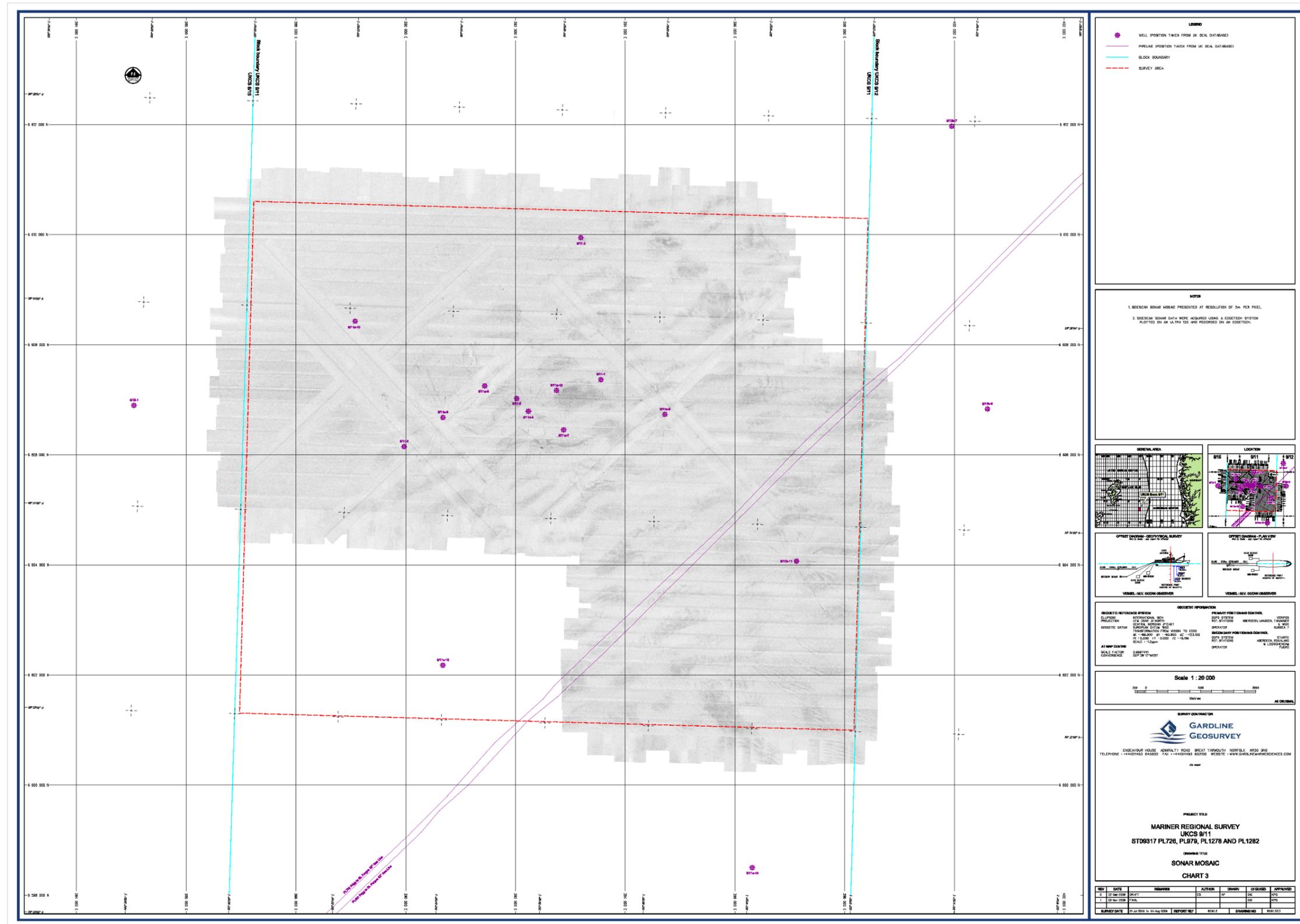
Appendix C

Baseline Figures

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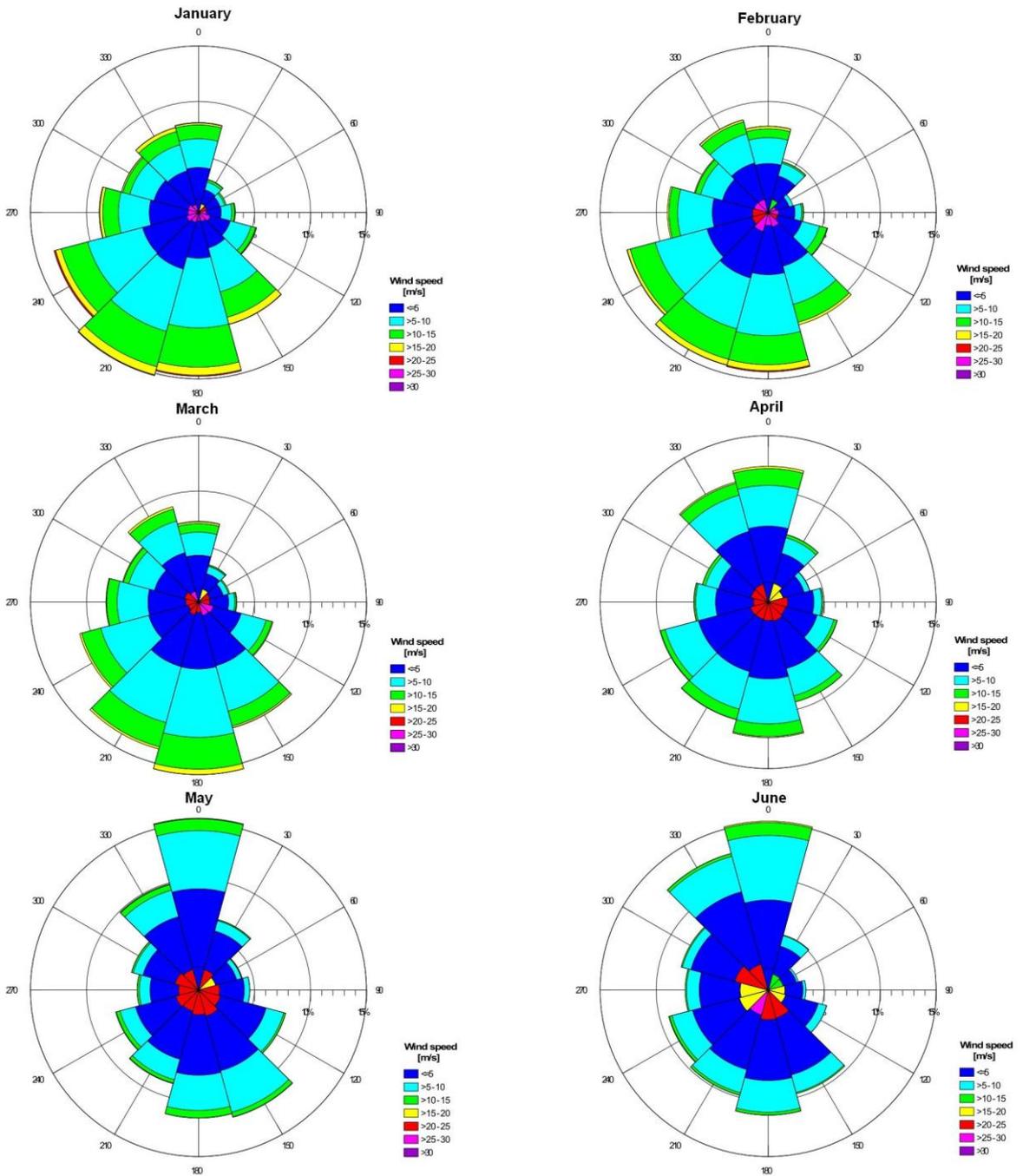
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C.2 BATHYMETRY (SHADED RELIEF)

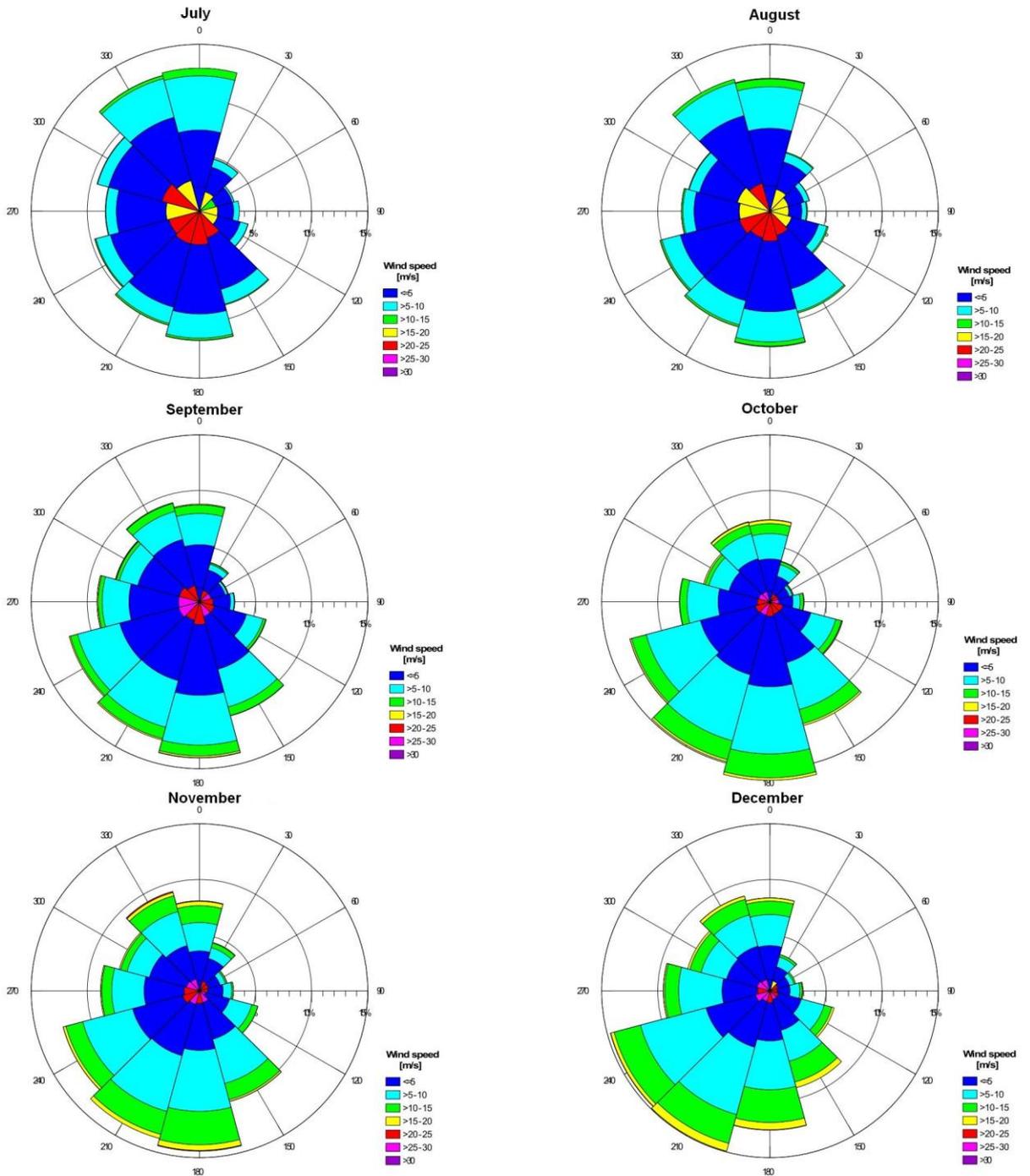


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C.3 MARINER AREA DEVELOPMENT MONTHLY WIND ROSES



C.3 (CONTINUED) MARINER AREA DEVELOPMENT MONTHLY WIND ROSES



APPENDIX D

Coastal Sensitivities

D. COASTAL ENVIRONMENTAL SENSITIVITIES

D.1 Introduction

The purpose of this section is to describe the coastal sensitivities in areas that may be impacted by oil from a pollution incident, including the worst-case scenario, at the proposed Mariner Area Development. The key sites of conservation designated under international legislation will then be highlighted for both the UK mainland and Islands and relevant neighbouring European coastlines. A more detailed look at the key sensitivities for the affected areas of the UK coastline will then be discussed.

D.1.1 Scenario upon which coastal sensitivities have been assessed

Worst case scenario oil spill modelling (**Section 8.6**) has indicated that crude oil from an instantaneous release at the Mariner Area Development has the potential to affect the eastern Shetland coastline of UK (**Figure D.1**).

The modelling has also shown that the European coastal area that may be impacted by such a hydrocarbon release is a part of the south-western Norway coastline (**Figure D.1**).

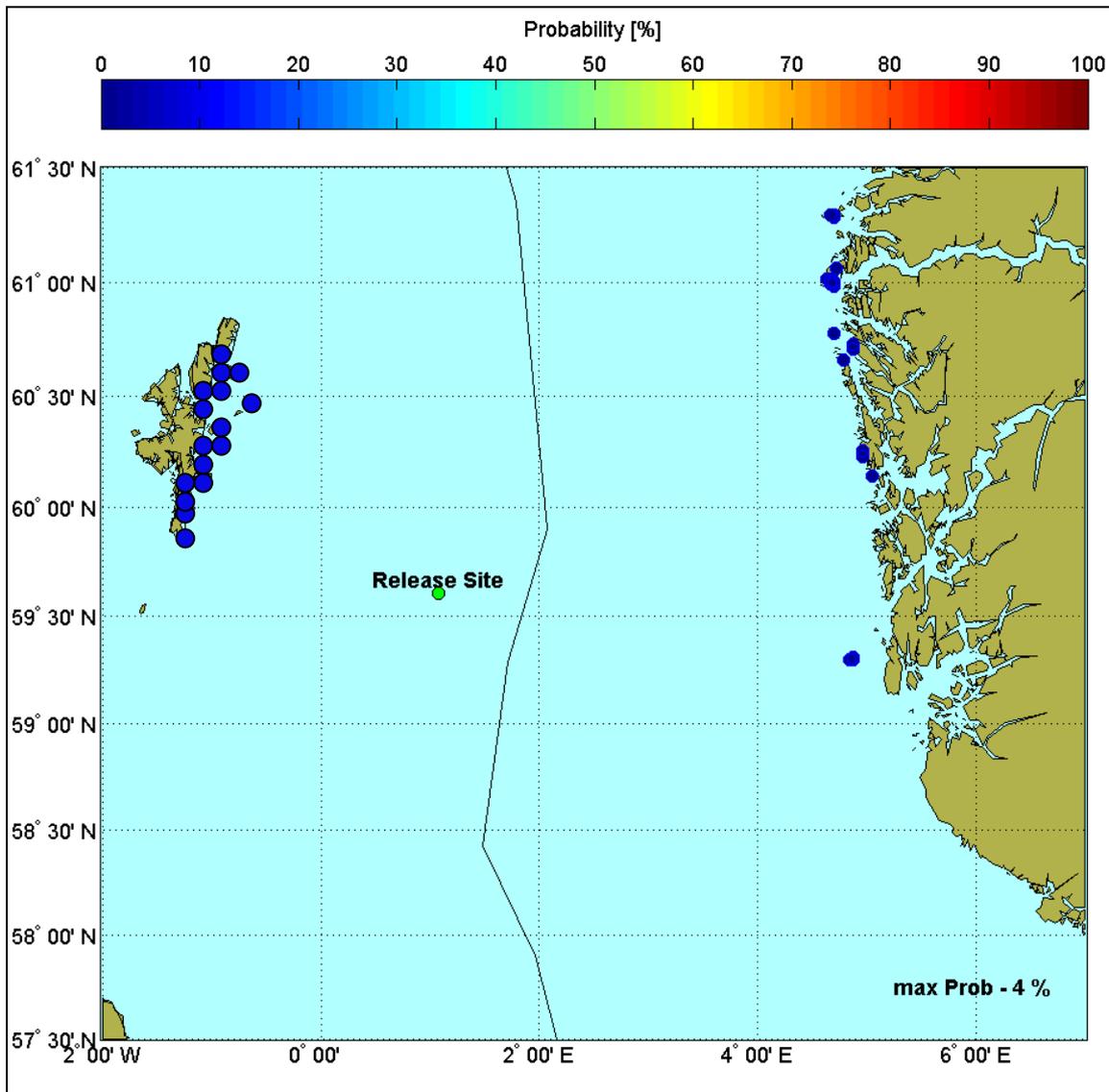


Figure D.1: Worst case scenario model output showing potential beaching areas around the UK and Norway coastlines.

D.1.2 Summary of key Shetland and Norway coastline features

D.1.2.1 Shetland

The Shetland coastline of the UK is highly varied with a variety of hard and soft substrates and sediments and numerous islands and skerries. Hard coastlines consist of sheltered inlets, exposed headlands, caves, sea stacks and many kilometres of high sea cliffs (Barne *et al.*, 1997a & b; DTI, 2001). This multitude of habitats supports a variety of maritime vegetations and animal communities. Many of these coastal features are of geomorphological importance and have been designated as Sites of Special Scientific Interest (SSSI) (SNH, 2012b).

D.1.2.2 Norway

The Norwegian coastline comprises a diverse range of substrates and habitat types. Norway has a long, rugged coastline broken by fjords and thousands of islands and stretches over 2,500 km (SOE, 2010). The coastal scenery of southwest, central and north-western Norway is dominated by numerous fjords and valleys, with many islands and skerries, raised beaches, sand dune systems and adjoining wetlands and coastal meadows (DTI, 2001).

D.2 Coastal Conservation Areas

D.2.1 European Site Designations Under International Convention and EC Directives

There are a large number of sites along the potentially impacted coastlines of the UK and Norway that are designated as conservation areas under international legislation. Sites designated under international conventions to which these countries are contracted parties are detailed below.

D.2.1.1 Natura sites

Natura is the collective name given to Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) designated under the European Habitats and Birds directives, respectively (JNCC, 2011a & b; SNH, 2012b).

SACs are selected for threatened habitats and species listed in the Habitats Directive (92/43/EEC) on conservation of natural habitats and wild fauna and flora, including species listed as European Protected Species (EPS).

SPAs are selected under the Birds Directive (2009/147/EC) of the European Parliament and the Council on the conservation of wild birds, which protects all wild birds and their eggs, nests and habitats within the EC. The Directive gives member states the power and responsibility to classify sites as SPAs to protect rare, threatened or vulnerable birds, including migrants, listed in Annex I of the Directive. For a list of Annex I species relevant to sites affected along the UK coastline see **Table D.1**.

D.2.1.2 Ramsar sites

Ramsar sites are areas of internationally important wetland designated under the Convention of Wetlands of International Importance adopted in Ramsar, Iran, in 1971 and signed by the UK in 1976. Compared to many countries, the UK has a relatively large number of Ramsar sites, but they tend to be smaller in size than many countries. The emphasis is on selecting sites of importance to waterbirds within the UK, and consequently many Ramsar sites are also Special Protection Areas (SPAs) classified under the Birds Directive (Wetlands International, 2010).

Table D.1: Migratory and/or Annex I bird species for which UK SPAs are selected

Migratory and Annex 1 bird species			
Divers and Grebes		Waterfowl	
Red-throated Diver	<i>Gavia stellata</i>	Bewick's Swan	<i>C. columbianus bewickii</i>
Black-throated Diver	<i>Gavia arctica</i>	Whooper Swan	<i>Cygnus cygnus</i>
Little Grebe	<i>Tachybaptus ruficollis</i>	Bean Goose	<i>Anser fabalis</i>
Great Crested Grebe	<i>Podiceps cristatus</i>	Pink-footed Goose	<i>Anser brachyrhynchus</i>
Slavonian Grebe	<i>Podiceps auritus</i>	Russian White-fronted Goose	<i>Anser albifrons albifrons</i>
Seabirds		Greenland White-fronted Goose	<i>Anser albifrons flavirostris</i>
Fulmar	<i>Fulmarus glacialis</i>	Icelandic Greylag Goose	<i>Anser anser</i>
Manx Shearwater	<i>Puffinus puffinus</i>	Greenland Barnacle Goose	<i>Branta leucopsis</i>
Storm Petrel	<i>Hydrobates pelagicus</i>	Svalbard Barnacle Goose	<i>Branta leucopsis</i>
Leach's Petrel	<i>Oceanodroma leucorhoa</i>	Dark-bellied Brent Goose	<i>Branta bernicla bernicla</i>
Gannet	<i>Morus bassanus</i>	Canadian Light-bellied Brent	<i>Branta bernicla hrota</i>
Cormorant	<i>Phalacrocorax carbo carbo</i>	Svalbard Light-bellied Brent	<i>Branta bernicla hrota</i>
Shag	<i>Phalacrocorax aristotelis</i>	Shelduck	<i>Tadorna tadorna</i>
Guillemot	<i>Uria aalge</i>	Wigeon	<i>Anas penelope</i>
Razorbill	<i>Alca torda</i>	Gadwall	<i>Anas strepera</i>
Puffin	<i>Fratercula arctica</i>	Teal	<i>Anas crecca</i>
Gulls, Terns and Skuas		Mallard	<i>Anas platyrhynchos</i>
Arctic Skua	<i>Stercorarius parasiticus</i>	Pintail	<i>Anas acuta</i>
Great Skua	<i>Catharacta skua</i>	Shoveler	<i>Anas clypeata</i>
Mediterranean Gull	<i>Larus melanocephalus</i>	Pochard	<i>Aythya ferina</i>
Black-headed Gull	<i>Larus ridibundus</i>	Tufted Duck	<i>Aythya fuligula</i>
Common Gull	<i>Larus canus</i>	Scaup	<i>Aythya marila</i>
Lsr Black-backed Gull	<i>Larus fuscus</i>	Eider	<i>Somateria mollissima</i>
Herring Gull	<i>Larus argentatus</i>	Long-tailed Duck	<i>Clangula hyemalis</i>
Grt Black-backed Gull	<i>Larus marinus</i>	Common Scoter	<i>Melanitta nigra</i>
Kittiwake	<i>Rissa tridactyla</i>	Velvet Scoter	<i>Melanitta fusca</i>
Sandwich Tern	<i>Sterna sandvicensis</i>	Goldeneye	<i>Bucephala clangula</i>
Sandwich Tern	<i>Sterna sandvicensis</i>	Red-breasted Merganser	<i>Mergus serrator</i>
Roseate Tern	<i>Sterna dougallii</i>	Goosander	<i>Mergus merganser</i>
Common Tern	<i>Sterna hirundo</i>	Waders	
Arctic Tern	<i>Sterna paradisaea</i>	Oystercatcher	<i>Haematopus ostralegus</i>
Little Tern	<i>Sterna albifrons</i>	Avocet	<i>Recurvirostra avosetta</i>
Crakes and Rails		Stone Curlew	<i>Burhinus oedicnemus</i>
Spotted Crake	<i>Porzana porzana</i>	Ringed Plover	<i>Charadrius hiaticula</i>
Corncrake	<i>Crex crex</i>	Dotterel	<i>Charadrius morinellus</i>
Coot	<i>Fulica atra</i>	Golden Plover	<i>Pluvialis apricaria</i>
Birds of Prey and Owls		Grey Plover	Pluvialis squatarola
Honey Buzzard	<i>Pernis apivorus</i>	Lapwing	<i>Vanellus vanellus</i>
Red Kite	<i>Milvus milvus</i>	Knot	<i>Calidris canutus</i>
Marsh Harrier	<i>Circus aeruginosus</i>	Sanderling	<i>Calidris alba</i>
Hen Harrier	<i>Circus cyaneus</i>	Purple Sandpiper	<i>Calidris maritima</i>
Golden Eagle	<i>Aquila chrysaetos</i>	Dunlin	<i>Calidris alpina schinzii</i>
Osprey	<i>Pandion haliaetus</i>	Ruff	<i>Philomachus pugnax</i>
Merlin	<i>Falco columbarius</i>	Snipe	<i>Gallinago gallinago</i>
Peregrine	<i>Falco peregrinus</i>	Black-tailed Godwit	<i>Limosa limosa</i>
Short-eared Owl	<i>Asio flammeus</i>	Bar-tailed Godwit	<i>Limosa lapponica</i>
Other bird species		Whimbrel	<i>Numenius phaeopus</i>
Capercaillie	<i>Tetrao urogallus</i>	Curlew	<i>Numenius arquata</i>
Nightjar	<i>Caprimulgus europaeus</i>	Greenshank	<i>Tringa nebularia</i>
Woodlark	<i>Lullula arborea</i>	Wood Sandpiper	<i>Tringa glareola</i>
Fair Isle Wren	<i>T. troglodytes fridariensis</i>	Turnstone	<i>Arenaria interpres</i>
Aquatic Warbler	<i>Acrocephalus paludicola</i>	Red-necked Phalarope	<i>Phalaropus lobatus</i>
Dartford Warbler	<i>Sylvia undata</i>	Redshank	<i>Tringa totanus</i>
Chough	<i>Pyrrhocorax pyrrhocorax</i>	Herons, Bitterns and Egrets	
Scottish Crossbill	<i>Loxia scotica</i>	Bittern	<i>Botaurus stellaris</i>
		Little Egret	<i>Egretta garzetta</i>

Source: JNCC (2011c)

D.2.1.3 Important Bird Areas (IBA)

The Important Bird Areas (IBA) Programme is a worldwide initiative aimed at identifying and protecting a network of critical sites for the conservation of the world's birds (Birdlife, 2012). IBAs are key sites for conservation – small enough to be conserved in their entirety and often already part of a protected-area network. They do one (or more) of three things:

- hold significant numbers of one or more globally threatened species;
- are one of a set of sites that combined hold a suite of restricted-range or biome-restricted species; and
- have exceptionally large numbers of migratory or congregatory species.

D.2.1.4 Biogenic Reserves

Biogenetic reserves are a non-statutory designation made by the Council of Europe under resolutions 76(17) on the European Network of Biogenetic Reserves, and 79(9) concerning rules for the European Network of Biogenetic Reserves. The concept of biogenetic reserves arose from the Bern Convention on the Conservation of European Wildlife and Natural Habitats (ratified by the UK Government in 1983), Biogenetic reserves were first established to accommodate biological research; their purpose has since been overtaken by that of the National Nature Reserve network (SNH, 2012b).

D.2.1.5 Biosphere Reserves

Biosphere reserves are a non-statutory designation made by the United Nations Education, Science and Culture Organisation (UNESCO) under its 'Man and the Biosphere' ecological programme launched in 1970 (UNESCO, 2010; SNH, 2012b).

D.2.1.6 World Heritage Sites

World heritage site is the highest and most prestigious accolade that can be given in recognition of an areas globally outstanding natural and/or cultural heritage. It is a non-statutory designation made by the United Nations Education, Science and Culture Organisation (UNESCO) under the *Convention Concerning the Protection of the World Cultural and Natural Heritage*, adopted in 1972 by the General Conference of UNESCO and ratified by the UK Government in 1984 (UNESCO, 2010).

D.2.1.7 OSPAR Marine Protected Areas

OSPAR is the mechanism by which 15 governments of Western Europe work together to protect the marine environment of the North-East Atlantic. The UK government are committed to establishing a well-managed, ecologically coherent network of Marine Protected Areas (known as the OSPAR MPA commitment). Marine Special Areas of Conservation (mSACs) designated under the Habitats Directive have been submitted as the UK's initial contribution to the OSPAR network. The Marine (Scotland) Act 2010 and the UK Marine and Coastal Access Act 2009 contain provisions for new Marine Protected Areas in inshore and offshore waters. In 2011 a 107 SPA and SAC sites have been reported as OSPAR MPAs (SNH, 2012b). In total in the UK there are 170 designated MPAs (SNH, 2012b).

For a list and the number of sites with international conservation designations along the UK Shetland seaboard see **Table D.2**.

D.2.2 UK Site Designations Under National and Local Legislation

There are a large number of sites along the UK coastline that are designated as conservation areas under national or local legislation (SNH, 2012b). Protected coastal sites designated under UK national or local authority include:

- Sites of Special Scientific Interest (SSSIs)
- Marine Protected Areas (MPAs)
- National Nature Reserves (NNR)
- National Parks
- National Scenic Areas (NSAs)
- Biogenetic Reserves
- Voluntary Marine Reserves (VMR)
- Preferred Conservation Zones (PCZ)
- Regional Landscape Designations
- Marine Consultation Area
- Areas of Outstanding Natural Beauty
- Heritage Coasts
- Environmentally Sensitive Areas (ESA)
- Local Nature Reserves (LNR)

A summary of the number of sites with national and local conservation designations along the UK Shetland seaboard is recorded in **Table D.2**.

Table D.2: Sites recorded along a Shetland coastline with international, national and local conservation designations

Designation	Shetland coastline
Special Areas of Conservation (SAC)	7
Special Protection Areas (SPA)	6
RAMSAR	1
Important Bird Areas (IBA)	8
Biosphere reserve	-
Biogenetic Reserve	-
National Scenic Area	2
Marine Consultation Area	3
National Nature Reserves (NNR)	2
Sites Of Special Scientific Interest (SSSI)	81
National Trust/National Trust for Scotland sites	-

Source: DTI (2002); DTI (2004); SNH (2012b); JNCC (2011a & b); Natural England (2012); Protected Planet (2012)

D.3 Potential Shoreline Impact Areas of International Conservation Concern

This section will highlight the potential conservation sites with international designation that may be impacted by the modelled oil release from the Mariner Area Development (**Section 8.6**). **Figure D.2** shows the areas of conservation concern based on the modelled oil spill trajectory of the worst case scenario. Along the Shetland coastline almost all national and local designations overlap, lie within or are the basis for international designations; as such this section will only focus on key areas of conservation at the international designation level.

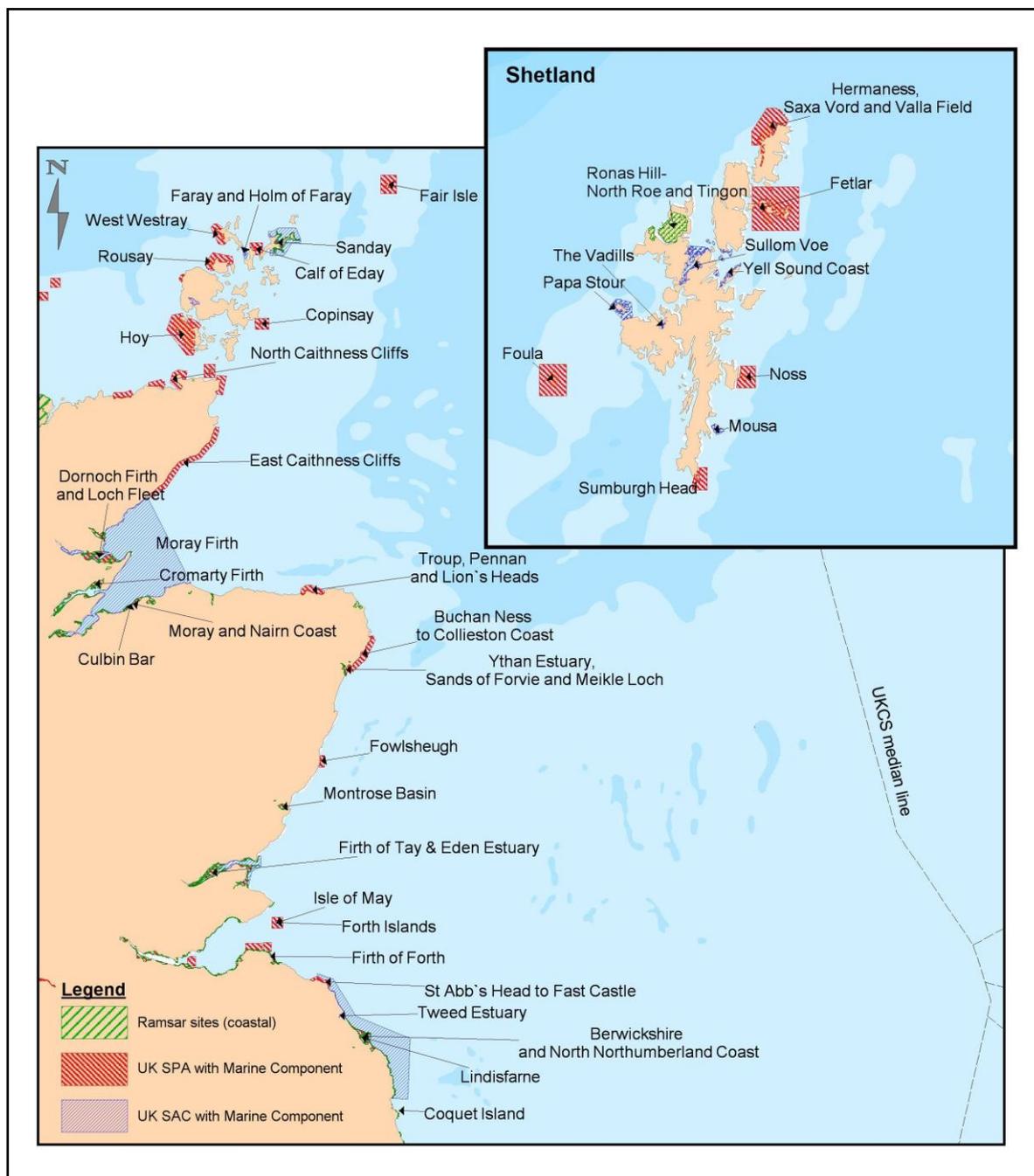


Figure D.2: Conservation sites designated under international conventions.

D.3.1 UK Sites of Potential Impact of Conservation Concern

D.3.1.1 Special Areas of Conservation (SAC)

Table D.3 lists the SAC sites along the eastern Shetland coastline that may be impacted under the worst case oil spill model parameters and highlights their key features of conservation interest.

Table D.3: SAC Sites potentially impacted along the Shetland coastline by the worst case scenario

	Site name	Main Conservation Interest(s) / Qualifying Feature(s)
Special Areas of Conservation (SAC)	Hascosay	Blanket bogs and otter <i>Lutra lutra</i> .
	Keen of Hamar	Calaminarian grasslands of the <i>Violetalia calaminariae</i> ; Calcareous and calcshist screes of the montane to alpine levels (<i>Thlaspietea rotundifolii</i>)
	Mousa	Reefs, submerged and partially submerged sea caves, common seals.
	North Fetlar	European dry heaths and alkaline fens.
	Ronas Hill – North Roe and Tingon	Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or of the Isoëto-Nanojuncetea; Natural dystrophic lakes and ponds; Alpine and Boreal heaths; Northern Atlantic wet heaths with <i>Erica tetralix</i> ; European dry heaths; Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>).
	Sullom Voe	Large shallow inlets and bays, coastal lagoons and reefs.
	Yell Sound Coast	Otter <i>Lutra lutra</i> and common seal <i>Phoca vitulina</i> .

Sources: SNH (2012b); JNCC (2011a, b).

D.3.1.2 Special Protection Areas (SPA)

Table D.4 lists the SPA sites along the eastern Shetland coastline that may be impacted and highlights their key features of conservation interest.

Table D.4: SPA Sites potentially impacted along the Shetland coastline

	Site name	Main Conservation Interest(s) / Qualifying Feature(s)
Special Protection Areas (SPA)	Fetlar	<i>Calidris alpine schinzii</i> , <i>Catharacta skua</i> , <i>Fulmarus glacialis</i> , <i>Numenius phaeopus</i> , <i>Phalaropus lobatus</i> , <i>Stercorarius parasiticus</i> , <i>Sterna paradisaea</i>
	Mousa	<i>Hydrobates pelagicus</i> , <i>Sterna paradisaea</i>
	Noss	<i>Catharacta skua</i> , <i>Fratercula arctica</i> , <i>Fulmarus glacialis</i> , <i>Fulmarus glacialis</i> , <i>Rissa tridactyla</i> , <i>Uria aalge</i>
	Ramna Stacks and Gruney	<i>Oceanodroma leucorhoa</i>
	Ronas Hill – North Roe and Tingon	<i>Gavia stellata</i> , <i>Fulmarus glacialis</i> , <i>Stercorarius parasiticus</i> , <i>Catharacta skua</i> , <i>Catharacta skua</i> , <i>Cephus grille</i> , <i>Phoca vitulina</i> , <i>Lutra lutra</i> , <i>Eurycercus glacialis</i> .
	Sumburgh Head	<i>Fulmarus glacialis</i> , <i>Rissa tridactyla</i> , <i>Sterna paradisaea</i> , <i>Uria aalge</i>

Source: SNH (2012b); JNCC (2011a,b).

D.3.1.3 Ramsar Sites

There are 16 Ramsar sites along the eastern UK coastline (Shetland to Norfolk) conserving a range of habitats and the species that utilise them. All Ramsar sites are also SPAs or SACs, and many are SSSIs; although no specific legal framework protect Ramsar sites, they benefit from the protection afforded the Natura sites and SSSIs. Along potentially affected Shetland coastline there is one Ramsar site.

Table D.5: Sites designated under Ramsar

	Site name	Ramsar designation criteria
Ramsar Sites	Ronas Hill – North Roe and Tingon	Supporting outstanding examples of blanket bog with extensive pool systems. The lower ground at North Roe and most of Tingon is covered by deep peat with some of the best preserved active blanket bog in Shetland. The peat layer has remained intact at Tingon with none of the erosion seen in other typical sites on Shetland. Further patches of wet heath and mire are found on the higher ground. The site also contains many oligotrophic lochs and dystrophic lochans and has an unusual formation of peat moulds. Supports a number of rare species of animal and plant. The mammal fauna includes common seal <i>Phoca vitulina</i> and otter <i>Lutra lutra</i> and the invertebrate fauna includes the arctic water flea <i>Eurycercus glacialis</i> found at only one other site in Britain.

Source: Wetlands International (2010)

D.3.1.4 Important Bird Areas (IBA)

There are 149 Important Bird Areas (IBAs) in the UK which regularly support over 20,000 wintering or passage water birds, or more than 1% of the biogeographic or flyway population of a waterbird species; 46 IBAs for breeding seabirds; and 20 sites for breeding waterbirds (including gulls and terns) (Heath & Evans 2000). Along the impacted coastline of Shetland there are 8 IBA sites.

D.3.1.5 Biosphere reserve

There are 9 Biosphere reserves throughout the UK. None of the Biosphere reserves is located along the affected coastline of Shetland.

D.3.2 European Sites of Conservation Concern

The model predicts that neighbouring coastlines along the south-western Norway coastline may also be impacted. These have been summarised with a brief introduction to the conservation features of interest in the following tables. **Table D.6** provides a summary of potentially impacted sites of international importance along the south-western Norway coastline.

Table D.6: International conservation areas along the potentially affected coastlines of Norway

Country	Site Name	Ramsar	SPA	SCA/sci	Biosphere	Main Conservation Interest(s)
NORWAY	Jæren Wetland System	•	*	*		Coast & freshwater wetlands with sand, stone, mud & pebble shores. Dune systems, reedbeds & mire. Most important wetland bird area in Norway, for staging, wintering & breeding endangered birds.
	Rott-Håstein-Kjør	•	*	*		Landscape Protected Area, Nature Reserve. Characterised by a large number of small islands, skerries and islets surrounded by shallow marine water. The highly diverse marine ecosystems harbour extensive areas of shell sand and kelp <i>Laminaria hyperborean</i> . The site is important as staging, moulting and breeding area for a large number of seabirds, including the highest national population of breeding European Shag <i>Phalacrocorax aristotelis</i> . Common seal <i>Phoca vitulina</i> and Grey Seal <i>Halichoerus grypus</i> also occur within the site.

Sources: Natura (2000), (2010); UNESCO (2010); Wetlands International (2010)

D.4 Priority Species of Conservation Concern

The following section briefly describes sensitive and priority species for which the major designations are implemented. The section will focus on UK sensitivities in key coastal bird and mammal populations.

Key areas that fall within the models predicted beaching area along the Shetland coastline; support nationally and internationally important numbers of seabirds, waders and waterfowl.

Shetland are particularly important for their cliff and island nesting birds, overwintering wildfowl, waders and divers. In the summer, the cliffs and adjacent coastal areas support large colonies seabirds, including Arctic Tern, Guillemot, Great Skua, Puffin, Shag, Storm Petrel and Gannet populations of international importance and Leach's Petrel, Kittiwake, Razorbill, Fulmar and gull populations of national importance. Shetland contains key sites for divers and waders with 5% and 5.3% of the UK Whimbrel and Red-throated Diver populations, respectively, breeding here. In addition 1% of the UK Ringed Plovers breed at the Papa Stour SPA, representing the highest density in the UK and one of the highest in Europe (DTI, 2004; SNH, 2012b).

D.5 Coastal Marine Mammals

Marine mammals that are resident along the potentially affected coastlines are grey seals (*Halichoerus grypus*), common (or harbour) seals (*Phoca vitulina vitulina*) and Eurasian otters (*Lutra lutra*). Other species occasionally occurring are the ringed seal (*Phoca hispida*), harp seal (*Phoca groenlandica*) and the hooded seal (*Cystophora cristata*) all of which are Arctic species and may travel south in search of food (SCOS, 2009).

D.5.1 Seals

Grey seals feed in the open sea and regularly return to "haul out" sites on land to rest, breed and moult. Grey seals spend more time hauled out during their moulting season between December and April and during their breeding season between August and December. Typical grey seal breeding areas are remote islands, coasts and caves. Grey seals have an increasing world population of around 469,000 animals (Thompson & Härkönen, 2008).

Common seals occur around the coasts of the North Atlantic and North Pacific from the subtropics to the Arctic. Common seals haul out in sheltered waters, on sandbanks, in estuaries or in rocky areas. Pups are born in June and July and moulting occurs in August (SCOS, 2009).

D.5.1.1 UK seal population

The Scottish coast provides breeding habitat for internationally important numbers of grey seals – around 45% of the world's grey seals breed in the UK, 90% of which breed in Scotland. The main breeding areas of grey seals in Scotland are the Outer Hebrides, Orkney, Shetland and the north and east coasts of the mainland. The abundance of UK grey seals, estimated via pup counts, has steadily increased since the 1960s and is now levelling off. Female grey seals often return to the same colony to breed each year. Shetland and the Scottish mainland account for around 82% of the total UK grey seal population (SCOS, 2009).

Around 30% of the total population of European common seals breed in the UK, 85% of which occur in Scotland. The main areas of population in Scotland are the Hebrides, Shetland and Orkney, the Firth of Tay and the Moray Firth. Shetland accounts for around 15% of the Scottish common seal population. The Scottish common seal population has decreased by 50% since 2002 (SCOS, 2009).

D.5.2 UK otter population

The Eurasian otter are largely solitary, semi-aquatic mammals that depend on lochs, rivers and the sea for their habitat. They feed largely on fish but also amphibians, crustaceans, molluscs, birds and mammals (SNH, 2012a). Suitable habitat for otters must have a supply of freshwater so that otters can wash the salt out of their fur which otherwise prevents it from being insulative. Otters also require rocky or vegetated areas in which to shelter and ground in which to dig their holts.

Otters occur throughout the UK along the eastern UK coastline, but approximately 90% of the population (around 8000 animals) occurs in Scotland (SNH, 2012a). Surveys of Scottish otter abundance were carried out by the Vincent Wildlife Trust between 1977 and 1994 and by SNH from 2003 onwards (Strachan, 2007). These surveys have shown that otters have increased their population abundance and range over the survey period and are now ubiquitous throughout Scotland. The otter population along the potentially impacted coastline of Shetland is one of the most intensively-studied in Europe. Not only are the Shetland animals morphologically distinct from their mainland counterparts, they are also believed to be genetically distinct. In addition, specialists consider that the populations are possibly the densest in Europe. The Shetland population is considered of special importance in a UK context. Within Shetland, the Yell Sound area has the highest density of otter. The site is believed to support more than 2% of the entire GB otter population. (SNH, 2012a). Coastal otters are commonly active in the day, feeding on benthic fish, crustaceans and molluscs, and tend to favour shallow inshore rocky areas with dense seaweed cover.

D.6 Coastal Fisheries and Aquaculture

D.6.1 UK Coastal Fisheries

Shetland is an important aquaculture region for the UK because of their many voes and inlets that provide ideal sheltered waters (DTI, 2004). The main species farmed is Atlantic salmon. In 2010, 45,439 tonnes of farmed Atlantic salmon was produced in Shetland, out of a total of 154,164 tonnes for the whole of Scotland (Walker & McAlister, 2011). Fish species farmed in Shetland on a smaller scale are cod, halibut, sea trout and haddock (Shetland Aquaculture, 2011). Shellfish are also farmed in Shetland, with 34 businesses farming mussels and oysters (Mayes & Fraser, 2012).

D.7 Tourism and Recreation

D.7.1 UK Tourism and Recreation

Tourism and leisure activities are important for the UK coastal areas. Attractions include dramatic scenery, its variety of wildlife and sites of historical interest. Key leisure and tourism activities include walking, sailing, golf, sea angling and water sports. No attempt has been made to quantify the impact of a potential oil spill on tourism and recreation in the study area. It is assumed that the industry would experience loss of customers in the affected areas for a period during and after a major oil spill (DTI, 2002; DTI, 2003; DTI, 2004).

D.8 Coastal Heritage and Archaeology

Many thousands of archaeological sites have been found on the North Sea coast of Shetland, Orkney and Scotland including evidence of pre-historic settlement, standing stones, burials, Neolithic farms pottery middens, submarine archaeological remains and fish traps dating back to 12,000 years ago. UN Conventions, European laws and directives, UK legislation, Scottish legislation, and non statutory codes or procedures all apply to coastal and offshore marine, maritime and submarine archaeology (DTI, 2002; DTI, 2003; DTI, 2004). Relevant areas of interest that may be impacted by oil pollution include a wealth of coastal archaeological sites dating back to prehistoric times, including Iron Age forts (brochs) and Neolithic farms in Shetland.

APPENDIX E

Insignificant and Low Risk Impacts

E. JUSTIFICATION OF INSIGNIFICANT AND LOW ENVIRONMENTAL RISKS

This Appendix provides the justification for the environmental risks (impacts) that were considered to be “insignificant” and “low” during the Environmental Risk Assessment (**Section 7**) and were excluded from further investigation within the main Environmental Statement.

Table E.1: Justification for excluding the causes of risks assessed to be “Insignificant” and “Low” from further investigation in the EIA for drilling activities (Mariner)

Aspect	Environmental Impact of Risk	Proposed Control and Mitigation	Justification
<i>Installation and drilling from the jack-up drilling rig – Planned events</i>			
Mobilisation of rig to location	<ul style="list-style-type: none"> • Temporary loss of access to fishing grounds. • Temporary potential impedance to navigation. 	<ul style="list-style-type: none"> • Statoil will notify the Hydrographic Office, which will issue notices to mariners to advise fishing and shipping traffic of the potential hazards to navigation that will be associated with the project. • Mariners will be advised of specific periods and locations in which vessel operations should be avoided. 	<ul style="list-style-type: none"> • During mobilisation and demobilisation activities there will be a temporary loss of a very small area of fishing grounds. However, the potential area that will be affected by the physical presence of the vessels mobilising the rig and vessels represents only a small fraction of the available fishing grounds and fisherman will be able to secure their Total Allowable Catches by fishing in nearby locations. • All impacts will be temporary not permanent.
Ballast water discharge from transport vessel(s)	<ul style="list-style-type: none"> • Discharge of sediments and water in the ballast tanks can introduce non-native planktonic and benthic species into the water column, impacting water quality and organisms in a localised area immediately around the discharge point. 	<ul style="list-style-type: none"> • Statoil will adhere to the International Convention for the Control and Management of Ships' Ballast Water and Sediments, adopted in 2004. • Adherence to recent ballast water guidance. Since April 2008, the Helsinki and OSPAR Commissions have issued General Guidance on the voluntary Interim application of the D1 Ballast Water Exchange Standard. The guidance requests that vessels entering NE Atlantic waters exchange all their ballast tanks at least 200 nm from the nearest land, in waters at least 200 m deep. • Statoil will ensure good practice for vessel management of FSU to minimise risk. 	<ul style="list-style-type: none"> • Ballast water released during on/offloading of oil from the FSU is unlikely to have a negative impact on marine organisms. Released water will be natural seawater from the Mariner Area Development location and will contain only naturally occurring organisms and no added substances. • Operational ballast transfer of local seawater from the FSU will not have any transboundary, cumulative or global impact on any environmental receptor. • Statoil's adherence to the International Convention for the Control and Management of Ships' Ballast Water during towing the FSU from the conversion yard is expected to mitigate any potential transboundary, cumulative or global impact that may result from the transfer of organisms from one region to another.

Table E.1 (continued): Justification for excluding the causes of risks assessed to be “Insignificant” and “Low” from further investigation in the EIA for drilling activities (Mariner)

Aspect	Environmental Impact of Risk	Proposed Control and Mitigation	Justification
<i>Installation and drilling from the jack-up drilling rig – Planned events</i>			
Overboard discharge of non-hazardous drains	<ul style="list-style-type: none"> Slight deterioration in seawater quality around point of discharge. Potential effects on marine fauna inhabiting the upper water column (plankton, fish and marine mammals). 	<ul style="list-style-type: none"> Non-hazardous drains, by their design, discharge only non-hazardous rainwater which may be slightly contaminated with oily deposits. Access points for non-hazardous deck drains are controlled, so any spillages on deck will not enter the drainage system, but will be cleaned up. Non-hazardous drains are designed to take storm and rain water run-offs from the decks. 	<ul style="list-style-type: none"> Any possible deterioration of water quality will be short-term. The permitted discharge of low volumes of fluids will be dispersed in the offshore environment and there will be no cumulative or transboundary effects. Any possible effects on water quality and marine fauna inhabiting the upper water column (plankton, fish and marine mammals) will therefore be confined to the immediate vicinity of the discharge point.
Discharge of sewage and macerated galley waste	<ul style="list-style-type: none"> Localised increase in BOD (Biological Oxygen Demand) around the point of discharge (caused by bacterial degradation of the sewage). Input of organic nutrients results in localised increase in productivity in fish, plankton and micro-organisms. Slight deterioration in seawater quality around point of discharge. Potential effects on marine fauna inhabiting the upper water column (plankton, fish and marine mammals). 	<ul style="list-style-type: none"> Sewage will be treated prior to disposal at sea, or contained and shipped to shore. Vessels will be audited to ensure compliance. Food waste will be macerated as required by MARPOL and The Merchant Shipping (Prevention of Pollution by Sewage and Garbage from Ships) Regulations 2008; this will aid its dispersal and decomposition in the water column. 	<ul style="list-style-type: none"> Relatively few people are involved in vessel operations, so BOD and organic input from sewage will be low. Sewage and macerated food waste (organic material only) will be readily dispersed in the offshore environment and broken down. The particles of food waste will be <25 mm in diameter, and will be rapidly and widely dispersed in the water column offshore. The total quantities discharged over the proposed drilling programme from a rig will be very small in relation to other natural and anthropogenic sources of nutrient enrichment offshore. Any possible effects on water quality and marine fauna inhabiting the upper water column (plankton, fish and marine mammals) will therefore be confined to the immediate vicinity of the discharge point.

Table E.1 (continued): Justification for excluding the causes of risks assessed to be “Insignificant” and “Low” from further investigation in the EIA for drilling activities (Mariner)

Aspect	Environmental Impact of Risk	Proposed Control and Mitigation	Justification
Installation and drilling from the jack-up drilling rig – Planned events			
Discharge of bilge water	<ul style="list-style-type: none"> Deterioration in seawater quality around the discharge point and the potential for oil slick formation. Potential effects on marine fauna inhabiting the upper water column (plankton, fish and marine mammals). 	<p>Compliance with MARPOL which requires:</p> <ul style="list-style-type: none"> Oil-water separation and filtration equipment, monitoring and discharge to ensure oil concentration is compliant with current limits. Retention of the bulk oil fraction after separation, for recycling or incineration onshore. <p>UK or International Pollution Prevention Certificate for vessel drainage systems. Vessel audits to ensure compliance.</p>	<ul style="list-style-type: none"> The intermittent discharge of low concentrations of hydrocarbons will be dispersed and broken down rapidly in the offshore environment. Any possible effects on water quality and marine fauna inhabiting the upper water column (plankton, fish and marine mammals) will therefore be confined to the immediate vicinity of the discharge point. There will therefore be no significant incremental impact on the environment, transboundary or cumulative impacts resulting from discharge of treated bilge water.
Aqueous discharges from tug/transport vessel(s)	<ul style="list-style-type: none"> Deterioration in seawater quality around the discharge point and the potential for oil slick formation. Potential effects on marine fauna inhabiting the upper water column (plankton, fish and marine mammals). 	<ul style="list-style-type: none"> UK or International Pollution Prevention Certificate for vessel drainage systems. Vessel audits to ensure compliance. 	<ul style="list-style-type: none"> Any possible effects on water quality and marine fauna inhabiting the upper water column (plankton, fish and marine mammals) will therefore be confined to the immediate vicinity of the discharge point. There will therefore be no significant incremental impact on the environment, transboundary or cumulative impacts resulting from discharge of treated bilge water.
VOCs from mud usage and fuel transfer	<ul style="list-style-type: none"> Deterioration in local air quality caused by the release of VOCs into atmosphere. 	<ul style="list-style-type: none"> Minimise the use of mud and transfer fuel only when necessary. 	<ul style="list-style-type: none"> Maximum concentrations, which will occur within the vicinity of emissions, will be well below any air quality objectives. There will be no discernible impact at the UK/Norwegian median line or at the coasts.
Installation and drilling from the jack-up drilling rig – Planned events			
Demobilisation of the rig	Refer to “Mobilisation of the Drilling Rig”		

Table E.1 (continued): Justification for excluding the causes of risks assessed to be “Insignificant” and “Low” from further investigation in the EIA for drilling activities (Mariner)

Aspect	Environmental Impact of Risk	Proposed Control and Mitigation	Justification
<i>Installation and drilling from the jack-up drilling rig – Emergency/ Contingency events</i>			
Onshore disposal of solid waste	<ul style="list-style-type: none"> The treatment and disposal of solid wastes at onshore waste treatment and landfill sites could result in impacts to the air quality, hydrology, flora and fauna, and socioeconomic aspects of such sites. 	<ul style="list-style-type: none"> Waste generation will be minimised. All waste will be segregated to allow maximum reuse/recycling, then contained, and then shipped to shore for recycling or disposal by a licensed company in full compliance with UK waste legislation and Duty of Care. Use of designated licensed onshore waste disposal / transfer /handling facilities only. Auditing of waste management contractor to ensure compliance. 	<ul style="list-style-type: none"> Documentation will be in place to ensure that contractors segregated, stored, transported, treated and disposed of waste in accordance with all relevant regulations and Statoil’s requirements.
<i>Installation and drilling from the jack-up drilling rig – Accidental events</i>			
Objects dropped into sea	<ul style="list-style-type: none"> Disturbance to seabed and benthos. The creation of artificial substrata that will be colonised by marine organisms. Possible obstruction to fishing/snagging hazard. Potential effects on marine fauna inhabiting the upper water column (plankton and fish). 	<ul style="list-style-type: none"> Accurate accounting for all casing and flowline sections (which have individual test certificates and records) and major items of equipment. Adherence to lifting and handling procedures and use of certified equipment for lifting. Requirement to retrieve major items of debris from the seabed after operations, in compliance with relevant legislation. 	<ul style="list-style-type: none"> Pipe sections and major items will be recovered from the seabed, therefore no long term impact would be anticipated. Loss of individual hand-tools and other minor items of equipment will not constitute a threat to species, habitats or fishing.

Table E.1 (continued): Justification for excluding the causes of risks assessed to be “Insignificant” and “Low” from further investigation in the EIA for drilling activities (Mariner)

Aspect	Environmental Impact of Risk	Proposed Control and Mitigation	Justification
<i>Drilling from the PDQ – Planned events</i>			
Overboard discharge from non-hazardous drains	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Planned events		
Discharge of bilge water	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Planned events		
Discharge of sewage	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Planned events		
Onshore disposal of solid waste (operational, OBM)	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Emergency / Contingency events		
VOCs from mud usage and fuel transfer	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Planned events		
<i>Drilling from the PDQ – Emergency/ Contingency events</i>			
Onshore disposal of solid waste	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Emergency / Contingency events		
<i>Drilling from the PDQ – Accidental events</i>			
Objects dropped into the sea	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Accidental events		

Table E.2 : Justification for excluding the causes of risks assessed to be “Insignificant” and “Low” from further investigation in the EIA for drilling activities (Mariner East)

Aspect	Environmental Impact of Risk	Proposed Control and Mitigation	Justification
Planned events – Semi-submersible			
Mobilisation of rig to location	Refer to “Mobilisation of the Drilling Rig – <i>Installation and drilling from the jack-up drilling rig – Planned events</i> ”		
Ballast water discharge from transport vessel(s)	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Planned events		
Overboard discharge of non-hazardous drains	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Planned events		
Discharge of sewage and macerated galley waste	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Planned events		
Discharge of bilge water	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Planned events		
Aqueous discharges from tug/transport vessel(s)	Refer to “Aqueous discharges from tug/transport vessel(s) – <i>Installation and drilling from the jack-up drilling rig – Planned events</i> ”		
Demobilisation of the rig (after 5 years of the first production)	Refer to “Demobilisation of the Drilling Rig – <i>Installation and drilling from the jack-up drilling rig – Planned events</i> ”		
Emergency/ Contingency events			
Onshore disposal of solid waste	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Emergency/ Contingency events		
Accidental			
Objects dropped into the sea	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Accidental events		

Table E.3: Justification for excluding the causes of risks assessed to be “Insignificant” and “Low” from further investigation in the EIA for the installation of the PDQ

Aspect	Environmental Impact of Risk	Proposed Control and Mitigation	Justification
Installation of the PDQ – Planned events			
Aqueous discharges from the vessels	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Planned events		
Discharge of sewage & macerated galley waste	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Planned events		
Discharge of treated bilge water from vessels	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Planned events		
Onshore disposal of solid waste from vessels	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Emergency / Contingency events		
Leakage of hydraulic fluid during the piling operations	<ul style="list-style-type: none"> • Pollution of water column from the release of hydraulic fluid on the actuation of subsea valves. • Potential effects on marine fauna inhabiting the upper water column (plankton, fish, marine mammals and seabirds). 	<ul style="list-style-type: none"> • All chemicals will be risk-assessed and have prior approval from DECC and the controlled short-term discharges will be permitted by the PON15D for the selected FSU under the Offshore Chemicals Regulations 2002 (as amended). 	<ul style="list-style-type: none"> • Hydraulic fluid is soluble in water and is therefore likely to disperse on discharge. Due to the small amount of the fluid discharged it is unlikely that environmental impact will be significant.
Accidental events			
Objects dropped into the sea	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Accidental events		

Table E.4: Justification for excluding the causes of risks assessed to be “Insignificant” and “Low” from further investigation in the EIA for the installation of the FSU

Aspect	Environmental Impact of Risk	Proposed Control and Mitigation	Justification
Installation of the FSU – Planned events			
Placement of transponders and subsea positioning	<ul style="list-style-type: none"> Disturbance to seabed and benthos. Potential effects on marine fauna inhabiting the upper water column (plankton and fish). 	<ul style="list-style-type: none"> Statoil has conducted a debris survey in the Mariner Area Development and is aware of the seabed nature at the proposed FSU location. All transponders will be completely removed from the seabed at the end of the FSU operations. 	<ul style="list-style-type: none"> Placement of transponders on the seabed will not constitute a threat to species, habitats or fishing. The area of seabed that will be disturbed as a result of placing transponder on the seabed will be localised and very small. Re-colonisation will occur after transponders have been removed.
Aqueous discharges	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Planned events		
Discharge of sewage & macerated galley waste	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Planned events		
Onshore disposal of solid waste	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Emergency/ Contingency events		
Discharge of ballast water	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Planned events		
Emergency/ Contingency events			
Scour stabilisation	<ul style="list-style-type: none"> Disturbance to seabed and benthos. The creation of artificial substrata that will be colonised by marine organisms. Possible obstruction to fishing/snagging hazard 	<ul style="list-style-type: none"> A 500 m safety zone around the rig during installation would prohibit fishing and other vessel activity 	<ul style="list-style-type: none"> If rig stabilisation is required, Statoil will ensure that they only use the minimum necessary amount of gravel (at the most 3,000 tonnes, Section 3). A worst-case scenario of rock-dumping at all three legs of the rig would impact on a total area of approximately 400 m². Any rock-dumping would be carried out under the appropriate licence.
Accidental events			
Objects dropped into the sea	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Accidental events		

Table E.5 Justification for excluding the causes of risks assessed to be “Insignificant” and “Low” from further investigation in the EIA for the installation of the pipelines, umbilicals and subsea structures

Aspect	Environmental Impact of Risk	Proposed Control and Mitigation	Justification
<i>Installation of the pipelines, umbilicals and subsea structures – Planned events</i>			
Discharge of treated bilge water	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Planned events		
Discharge of sewage & macerated galley waste	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Planned events		
Loss of hydraulic fluid during the piling	Refer to Table 2, Installation of the PDQ – Planned events		
<i>Accidental events</i>			
Objects dropped into the sea	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Accidental events		

Table E.6: Justification for excluding the causes of risks assessed to be “Insignificant” and “Low” from further investigation in the EIA for the production activities

Aspect	Environmental Impact of Risk	Proposed Control and Mitigation	Justification
PDQ Topsides – Planned events			
Drainage discharges	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Planned events		
Chemical discharge	<ul style="list-style-type: none"> Some associated deterioration of water quality. Potential effect on plankton, fish, shellfish and marine mammals. 	<ul style="list-style-type: none"> All chemicals will be risk-assessed and presented in the appropriate permit for statutory approval from the DECC (Section 3). Chemicals will be selected in order to minimise hazards to the environment in accordance with Offshore Chemicals Regulations 2002 (as amended). 	<ul style="list-style-type: none"> Chemicals will have been approved by the DECC and risk assessments will indicate the potential for any environmental impact (Section 3). Discharges will be rapidly dispersed and diluted in the offshore environment and will not be expected to significantly impact the benthos, water column, fish or marine mammals. The quantity used will be minimised as far as practicable.
Overboard disposal of sand	<ul style="list-style-type: none"> Impact on water quality and pelagic organisms in a localised area immediately around the discharge point. Organisms that could be at risk include planktonic organisms and pelagic species of fish. 	<ul style="list-style-type: none"> Statoil will ensure good practice on the PDQ to minimise risk. 	<ul style="list-style-type: none"> The discharge of sand will be rapidly dispersed and diluted in the offshore environment. The impacts will be temporary not permanent. Any effects would be localised. In the offshore environment there would be rapid dispersion and dilution, therefore it is not expected that there would be any cumulative effects. Any possible effects on water quality and marine fauna inhabiting the upper water column will be confined to the immediate vicinity of the discharge point.
FSU operation – Planned events			
Discharge of treated bilge water	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Planned events		
Discharge of sewage & macerated waste	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Planned events		
Drainage discharge	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Planned events		
Ballast water discharges	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Planned events		

Table E.6 (continued): Justification for excluding the causes of risks assessed to be “Insignificant” and “Low” from further investigation in the EIA for the production activities

Aspect	Environmental Impact of Risk	Proposed Control and Mitigation	Justification
<i>Pipelines, Umbilical and Cables - Planned events</i>			
Wastage of anodes	<ul style="list-style-type: none"> Release of contaminants into the water column, which could have potential effect on plankton. 	<ul style="list-style-type: none"> Anodes will be suitable for long term continuous service in seawater, saline mud or alternating seawater and saline mud environments. The required mass of anodes to be fitted to the flowlines and umbilical will be carefully calculated in order to use the smallest amount of material while still ensuring that they are adequately protected against external corrosion. 	<ul style="list-style-type: none"> The concentrations of metals released will be very low and will be unlikely to cause toxic effects on organisms. Any metals released will be rapidly dispersed and diluted in the offshore environment. Anodes are required to protect the flowlines from corrosion, which could lead to flowline failure and release of hydrocarbons.
<i>Emergency/ Contingency events</i>			
Additional chemical usage	<ul style="list-style-type: none"> Transportation of additional chemicals offshore will contribute to slight deterioration of air quality. 	<ul style="list-style-type: none"> Vessels will use ultra low sulphur fuel in line with MARPOL requirements. 	<ul style="list-style-type: none"> Any possible deterioration of air quality will be short-term.

Table E.7: Justification for excluding the causes of risks assessed to be “Insignificant” and “Low” from further investigation in the EIA for the decommissioning activities

Aspect	Environmental Impact of Risk	Proposed Control and Mitigation	Justification
Vessel operations – Planned events			
Discharge of bilge water	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Planned events		
Discharge of sewage	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Planned events		
Wells – Planned events			
Well plugging and abandonment	<ul style="list-style-type: none"> • Potential for temporary deterioration of water quality and effects on plankton • Disturbance to sediments and potential for debris to remain on the seabed. • Temporary alteration of sediment structure and smothering of seabed organisms. 	<ul style="list-style-type: none"> • Post-decommissioning a debris survey will be undertaken to remove any objects remaining on the seabed. 	<ul style="list-style-type: none"> • The area of seabed that will be disturbed as a result of decommissioning activities will be localised and very small. Re-colonisation will occur after operations had ceased. • Any possible deterioration of water quality will be rapidly dispersed and diluted. • All impacts will be temporary not permanent.
Mechanical cutting and casing	<ul style="list-style-type: none"> • Disturbance to sediments and potential for debris to remain on the seabed. • Noise resulting from vessels and sub-sea operations may cause disturbance to cetaceans. 	<ul style="list-style-type: none"> • Post-decommissioning a debris survey will be undertaken to remove any objects remaining on the seabed. 	<ul style="list-style-type: none"> • The area of seabed that will be disturbed as a result of decommissioning activities will be localised and very small. Re-colonisation will occur after operations had ceased. • Generally there are low numbers of cetaceans occurring in the area of the proposed development. Noise disturbance associated with decommissioning activities will be localised and short-term. Cetaceans will return to the area once the noise had ceased. • Strict compliance with legislation on wastes and emissions.

Table E.7 (continued): Justification for excluding the causes of risks assessed to be “Insignificant” and “Low” from further investigation in the EIA for the decommissioning activities

Aspect	Environmental Impact of Risk	Proposed Control and Mitigation	Justification
Wells – Planned events			
Retrieval and disposal of Mariner East sub-sea wellheads	<ul style="list-style-type: none"> Disturbance to sediments and potential for debris to remain on the seabed. Where materials are disposed of, potential use of landfill space and loss of resources. Potential for temporary deterioration of water quality. 	<ul style="list-style-type: none"> Post-decommissioning a debris survey will be undertaken to remove any objects remaining on the seabed. Materials are reused or recycled where possible. Compliance with UK waste legislation and Duty of Care. Use of designated licensed sites only. 	<ul style="list-style-type: none"> The area of seabed that will be disturbed as a result of decommissioning activities will be localised and very small. Re-colonisation will occur after operations had ceased. Strict compliance with legislation on wastes and emissions. Any possible deterioration of water quality will be rapidly dispersed and diluted. All impacts will be temporary not permanent.
Removal of the FSU – Planned events			
FSU removal	<ul style="list-style-type: none"> Temporary disturbance of seabed and benthos and potential for debris to remain on the seabed. Temporary loss of access to fishing grounds. Temporary potential impedance to navigation. Temporary alteration of sediment structure and smothering of seabed organisms. Potential for temporary deterioration of water quality and effects on plankton. 	<ul style="list-style-type: none"> Post-decommissioning a debris survey will be undertaken to remove any objects remaining on the seabed. 	<ul style="list-style-type: none"> The area of seabed that will be disturbed as a result of removal of anchors and moorings will be localised and very small. Re-colonisation will occur after operations had ceased. The area of seabed that will be impacted will be small and localised. Any possible deterioration of water quality will be rapidly dispersed and diluted. All impacts will be temporary not permanent.
Recycling/ disposal onshore	<ul style="list-style-type: none"> Where materials are disposed of, use of landfill space and loss of resources. 	<ul style="list-style-type: none"> Materials are reused or recycled where possible. Compliance with UK waste legislation and Duty of Care. Use of designated licensed sites only. 	<ul style="list-style-type: none"> Strict compliance with legislation on wastes and emissions.

Table E.7 (continued): Justification for excluding the causes of risks assessed to be “Insignificant” and “Low” from further investigation in the EIA for the decommissioning activities

Aspect	Environmental Impact of Risk	Proposed Control and Mitigation	Justification
<i>Removal of the PDQ – Planned events</i>			
Remove platform	<ul style="list-style-type: none"> • Temporary disturbance of seabed and benthos and potential for debris to remain on the seabed. • Temporary loss of access to fishing grounds. • Temporary potential impedance to navigation. • Temporary alteration of sediment structure and smothering of seabed organisms. • Potential for temporary deterioration of water quality and effects on plankton. 	<ul style="list-style-type: none"> • Post-decommissioning a debris survey will be undertaken to remove any objects remaining on the seabed. • A statutory 500 m exclusion zone around the platform. 	<ul style="list-style-type: none"> • The area of seabed that will be disturbed as a result of decommissioning activities will be localised and very small. Re-colonisation will occur after operations had ceased. • During decommissioning activities there will be a temporary loss of a very small area of fishing grounds. However, the potential area that will be affected by the physical presence of the rig and vessels represents only a small fraction of the available fishing grounds and fisherman will be able to secure their Total Allowable Catches by fishing in nearby locations. • The area of seabed that will be impacted will be small and localised. • Any possible deterioration of water quality will be rapidly dispersed and diluted. • All impacts will be temporary not permanent.
Recycling/ disposal onshore	Refer to Table 1, Removal of the FSU – Planned events		

Table E.7 (continued): Justification for excluding the causes of risks assessed to be “Insignificant” and “Low” from further investigation in the EIA for the decommissioning activities

Aspect	Environmental Impact of Risk	Proposed Control and Mitigation	Justification
Pipelines - Planned events			
Removal of concrete mattresses, rock-dumping and crossings	<ul style="list-style-type: none"> • Temporary disturbance of seabed and benthos. • Temporary loss of access to fishing grounds. • Temporary potential impedance to navigation. • Temporary alteration of sediment structure and smothering of seabed organisms. • Potential for temporary deterioration of water quality and effects on plankton. 	<ul style="list-style-type: none"> • The quantity of rockdump and number of mattresses will be minimised and only used where necessary. 	<ul style="list-style-type: none"> • Area of seabed disturbance from removal of rock habitat will be very small and will be re-colonised. • During decommissioning activities there will be a temporary loss of a very small area of fishing grounds. However, the potential area that will be affected by the physical presence of the rig and vessels represents only a small fraction of the available fishing grounds and fisherman will be able to secure their Total Allowable Catches by fishing in nearby locations. • Any possible deterioration of water quality will be rapidly dispersed and diluted. • All impacts will be temporary not permanent.
Recycling and/or disposal of materials onshore	Refer to Table 1, Removal of the FSU – Planned events		
Emergency/ Contingency events			
Objects dropped into the sea	Refer to Table 1, Installation and drilling from the jack-up drilling rig – Accidental events		