

18 ENVIRONMENTAL MANAGEMENT

18.1 Introduction

Enterprise's approach to Environmental Management is to apply the key principles of environmental protection management to all of their operated oil and gas activities. These principles include:

- prior assessment of environmental impact;
- minimisation of potential impact through design and other mitigation controls;
- monitoring the effectiveness of controls set; and
- auditing of performance.

This section of the EIS documents shows how these principles have been applied by Enterprise to the subsea aspects of the Corrib Development.

18.2 General Environmental Standards

Enterprise's environmental standards are set by its Group's Health, Safety and Environmental Policy. The Environmental Policy sets the company's environmental goals which are:

1. Minimisation of environmental impact through reduction and where possible, elimination of harmful discharges, emissions and wastes by the following practices:
 - waste stream minimisation at source through careful design and operation;
 - consideration of best practicable environmental option and application of best available and commercially viable pollution control technology where total elimination is not possible;
 - efficient use of energy and natural resources; and
 - selection of least harmful production and process chemicals.
2. Maintenance of environmentally sound working standards and practices through the following practices:
 - provision of training for all employees to enable them to carry out their jobs in a way that cares for the environment;
 - open communication with and involvement of all employees in establishing sound working practices; and
 - ensuring that contractors' environmental standards are consistent with those of Enterprise.

3. The management of environmental protection as an integral component of the company's business processes including:
 - setting of target standards for environmental performance that drive continuous improvement;
 - monitoring of operations against targets and legal requirements to ensure these are met and to detect potential for environmental impact;
 - provision of emergency response to reduce environmental risk in case of accidental losses; and
 - auditing of operations and management processes to measure performance achievement.

These environmental goals encompass the environmental philosophy that will be applied by Enterprise to all aspects of the Corrib Field Development.

The specific mitigation measures that have been implemented for the Corrib Field Development are summarised in **Section 16** and presented in more detail in each of **Sections 5 to 15**.

18.3 Drilling Discharges and Waste Management

The specific mitigation measures which have been implemented in order to minimise environmental impacts of drilling discharges include:

- well design;
- pre-drill shallow hazards survey and seismic survey of the proposed drilling location;
- the selection of Water-Based Mud (WBM) systems as the preferred drilling fluid for the large diameter top hole sections;
- pre- and post drilling monitoring of drilling discharges;
- monitoring and maintenance of mud and cuttings handling systems (e.g. visual routine inspection of shale shaker screens); and
- retention on board the MODU of low toxicity oil based mud (LTOBM) base-fluid and used mud for subsequent onshore handling.

The waste management practices to be followed for solid and liquid wastes generated during drilling are outlined below:

- if LTOBM is used, cuttings "fines" from each well will be taken from the underflow of the centrifuge and stored onboard the rig during drilling. These will be shipped to shore for treatment and disposal at a licensed facility;

- bulk wastes generated on the drill rig will be segregated by type and back loaded to shore where they can be recycled or disposed of in a controlled manner. Enterprise will ensure that material such as scrap metal, waste oil and surplus chemicals are re-cycled or re-used as far as practicable. Other wastes will be sent to authorised landfills or incineration facilities, depending on the waste's precise nature and availability of suitable facilities;
- sewage sludge from the sewage treatment unit will be transported to shore and disposed of at a suitable facility; and
- a detailed Waste Management Plan (WMP) will be produced to cover all aspects of the Corrib Development.

18.4 Construction and Presence of Infrastructure and Pipeline

The mitigation measures outlined in previous sections will be incorporated into the Engineer, Procure, Install and Construct (EPC) contracts that will be issued for the works. Implementation of these measures will be further controlled by Enterprise's audit and review process (see below).

Specific mitigation measures include:

- the use of dynamically positioned vessels during construction which will avoid undue seabed disturbance caused by anchors;
- the inclusion of overtrawlable frames on the seabed installations in order to reduce the risk of fishing net snagging;
- laying of the pipeline on the seabed which reduces the amount of seabed disturbance;
- selection of open-cut methods for the crossings of the Sruwaddacon.

In addition the following management plans including the following will be put in place during construction:

- Traffic Management Plan;
- Noise Control Procedures;
- Dust Control Procedures;
- Archaeology method statement;
- Land/landfall restoration plan;
- Waste management plan;
- Oil Spill Control Plan; and
- Emergency Procedures and Contingency Plans.

During operations an Environmental Monitoring Plan-Operations, will be put in place, see **Appendix 7.5** and **table 16.2** for further details.

Environmental Management and Community Liaison

Enterprise is committed to liaising with all relevant authorities and representatives of local communities and interest groups throughout the Corrib development. An environmental monitoring forum consisting of representatives of Enterprise, its contractors, Mayo County Council, the North West Regional Fisheries Board, and a representative from a local community council (through the Regional Development Board) will be established. The forum will monitor all relevant environmental aspects of the construction of the proposed gas reception terminal at Bellanaboy.

It is proposed that the remit of this forum be extended to include aspects associated with the construction of the pipeline and landfall. Its representation should be flexible in order to facilitate farming, fisheries, angling, tourism and other interests as appropriate for the various stages and elements of the project as it develops. The forum will have access to relevant and up-to-date detailed plans and also to all relevant environmental monitoring results. The forum would meet often enough to be able to discuss details of activities to take place in the upcoming period, discuss environmental management plans and mitigation measures proposed by Enterprise, and be able to provide input on the basis of the experience gained on such activities from previous phases of the project in terms of all issues relevant to the various stakeholders.

18.4.1 Operational Discharges

The key operational discharge (excluding drilling) is waste water. The water treatment and discharge from the Terminal will be the subject of an IPC licence and is fully discussed in the Terminal EIS and in **Section 9** of this EIS. The end point of the outfall has been selected on the basis of detailed hydrodynamic modelling to ensure rapid and efficient dispersion.

The discharge of treated water from the Terminal into Broadhaven Bay will not impact on the ecology of the Bay due to the very low levels of metals present in the discharge water. Due to the high levels of treatment of the produced water in the Terminal, the levels of metals discharged reach background within a few metres of the end of the outfall, or are at background before discharge, due to dilution with rain water.

A monitoring plan will be agreed with the EPA and the Department of Marine in consultation with local fisheries groups in order to ensure that the predicted no impact situation does actually occur.

18.4.2 Oil Spill Contingency Planning

The Terminal is designed to treat gas: no oil will be produced from Corrib. However, there are other materials at the site with the potential for oil spill scenarios, which include the following:

- oil-based mud;

- diesel;
- lube oils;
- hydraulic oils; and
- condensate/gas from flare drop out.

Only a spill of oil-based mud is likely to result in anything greater than a small spill for which a limited response will be required.

In the case of any spill, the response follows three stages:

1. initial response-ensure safety of personnel and installation and prevent escalation of incident;
2. characterise spill in terms of size and likely environmental impact (e.g. toxic, harmful); and
3. develop response tactics based on character of spill.

For small spills (less than 10 tonnes), the most likely course of action will be to leave alone and monitor, only mobilising response equipment if the situation changes.

The MODU supply vessel holds response equipment, including ocean booms and skimmers. The vessels will be on standby at the rig in the case of a medium spill (10 to 100 tonnes), in order to physically contain and recover spilt oil, and store and transport it for safe disposal.

Enterprise has membership of Oil Spill Response Ltd (OSRL), based in Southampton, UK. In the case of a larger spill (more than 100 tonnes), a response will be mobilised transporting equipment and expertise from Southampton, including chemical dispersants for use, if permitted by IMES and weather/sea conditions are correct. Dispersants cause oil to break up into small droplets which are then dispersed and diluted in the water column.

18.4.3 Traffic Management

Enterprise is committed to the implementation of a Traffic Management Plan. The plan will incorporate measures to minimise impacts of associated increased onshore construction traffic through:

- restriction of construction related journeys to off-peak periods;
- minibus services for construction operatives;
- clearly demarcated construction routes and enforceable penalties for failure to follow routes by contractors;
- reinstatement of the proposed haulage route following completion of construction; and
- monitoring of the route used by heavy vehicles as well as the load they are carrying.

This plan would be agreed with Mayo County Council and have the full support of the main contractor and all sub-contracting firms involved in the project. Further discussion of the Traffic Management Plan can be found in **Section 15**.

18.4.4 Noise Control

Noise control measures, following discussion with Mayo County Council and adhering to EPA and best practice guidelines, will be implemented throughout the construction period. Such measures will aim to:

- minimise the duration of noise producing operations through:
 - the restriction of operations to normal working hours, determined through liaison with Mayo county council; and
 - restriction of noise intensive operations to short intensive periods (as opposed to intermittent protracted periods);
- utilise noise sensitive construction techniques; and
- minimise the impact on surrounding communities and ecosystems through physical screening.

No noise emissions limits are proposed for the landfall site. The contractor will be responsible for maintaining reasonable control over noise levels generated on site.

In the event that blasting is required, monitoring of air overpressure will be undertaken to ensure that the EPA's overpressure noise limit is met. During underwater blasting, observations will be required to determine cetacean activity in the area. If large underwater charges were to be used, hydrophonic monitoring would be carried out.

18.4.5 Decommissioning

Decommissioning of the Corrib Field will take place after 2015. It is outside the scope of this EIS to present a detailed assessment of the decommissioning options. This will form an integral component of the decommissioning process. Enterprise will prepare a Best Practical Environmental Option Study, which will comparatively assess the technical, cost, health, safety and environmental aspects of each decommissioning option. In accordance with current regulatory requirements Enterprise will be required to submit a Decommissioning Plan to the DOMNR in advance of commencing the decommissioning phase, and will submit the Plan within the required timescale prior to decommissioning.

The facilities will be decommissioned in accordance with applicable national and international regulations in force at the time.

An Environmental Management Plan will be prepared for decommissioning to include procedures based upon the outcome of a hazard and operability (HAZOP) study. Procedures will be developed for:

- contingency measures to cope with the worst case scenario identified during the HAZOP and risk assessment;
- flushing and cleaning the pipeline;
- removal of subsea manifolds and other subsea facilities;
- cutting well conductors and foundation piles; and
- assessment and removal of materials that could give rise to possible radioactive contamination.

In the event that a new activity is required that falls outwith the impacts assessed in this EIS an assessment will be undertaken to identify any specific impact on the local environment. Any environmental controls that may be found to be necessary to protect the surrounding environment will be implemented.

All recovered equipment and materials will, where suitable, be refurbished and re-used or disposed of in accordance with national and international regulations in force at the time.

Decommissioning activities will ensure that all installations, equipment and pipelines are removed in such a way as to minimise the risk to navigation through the area, and will comply with any legislation regarding this issue that is in place at the time of decommissioning.

Before completion of operations an ROV survey of the site and pipeline route will be carried out. Subsequently, a sidescan sonar survey will be performed over an agreed corridor either side of the route.

At present it has not been decided if any monitoring is required after decommissioning. This will be considered as part of the decommissioning study.

18.5 Monitoring Commitments

Enterprise's Environmental Policy involves monitoring of operations against targets and legal requirements. Specific monitoring commitments for the Corrib Development are summarised in **Table 18.1**.

18.6 Auditing and Reporting Strategy

The process of audit and review is key to the systematic assessment of the effectiveness of any Environmental Management System (EMS). For the Corrib Development an EMS will be implemented incorporating the key aspects identified in this EIS as requiring management, mitigation and monitoring. Using these techniques, non-conformances and improvement opportunities can be identified. Audits and reviews focus on both management systems and technical systems. The audit schedule will therefore vary depending on the type of system in question. The review and audit plans for the Corrib Development will be included in the overall work plans.

In the event that any negative environmental effects are recorded, due to the construction or as a result of operational issues, even if they were not anticipated, Enterprise has made a commitment to respond to such situations by remediating that effect.

Table 18.1: Specific Monitoring/Recording and Reporting Requirements

Aspect	Monitored Parameter	Discharge Limitation	Monitoring Frequency
Drilling Fluid	1. Drilling Fluid Additives	1. WBM – preferential selection of HOCNF E or PLONOR 2. LTOBM- no discharge	Daily
	2. Discharge Volume	1. No limit but in accordance with estimates in the EIS	Daily
	3. Oil Content	1. No sheen	Daily
Cuttings (During drilling)	Volume	1. No free oil	Daily
		2. LTOBM- no discharge	Daily
Mud and cuttings on seabed	Sediment chemistry and benthic invertebrates in the Corrib Field	No discharge of LTOBM or of LTOBM cuttings	Pre- and post-drilling
Sewage, domestic wastes and grey water offshore and onshore will follow MARPOL	1. BOD	50 mg/l	Periodic
	2. TSS	50 mg/l no floating solids	Periodic
Sewage, domestic wastes and grey water at landfall and Sruwaddacon crossings	1. Containment	N/A	Daily
Terminal waste water	Volumes and concentrations of constituents	Limits to be determined by the EPA within the IPC licence	Routine
Pipeline – Sidescan and video survey for stability/span	Evidence of spans, scour or debris adjacent to pipeline	N/A	On bi-annual basis

Aspect	Monitored Parameter	Discharge Limitation	Monitoring Frequency
Broadhaven Bay outfall	Water and sediment chemistry, sediment, benthic invertebrates and contaminants in fish and shellfish	N/A	Annually (possibly reducing)
Landscape	Recovery of flora at landfall and crossings		Annually

During construction there will be a number of mitigation and monitoring activities carried out to ensure that the predicted impacts are managed and that the operations are carried out with the minimum of disturbance to the environment. The following are the key activities which will be carried out:

- archaeology – watching brief;
- noise – communication with local residents;
- fishing interests – the fisheries liaison officer will communicate with national bodies (governmental and non governmental as well as local fishing interest groups) and
- in the event that blasting is required – pre, during and post operational monitoring will be carried out both visually and acoustically