system redundancy, the capability to retrieve and replace the failed component is designed into the system. Retrieveable modules include individual chokes, control pods, and actuated manifold valves.

6.2.3 TERMINAL

The overall control and monitoring of gas production, both offshore and onshore, and export from the Corrib system, will be from the terminal main control room.

The terminal receives well fluid from offshore, conditions the gas to satisfy specification Sales Gas compressed and exported via the onshore pipeline. The production of stabilised condensate is a by-product of this operation. It is planned to use the condensate as fuel within the terminal and export surplus as a by-product. A simple TVP specification is assumed adequate. The control strategy is therefore based on maintaining gas supplies.

Sales gas flow from the terminal will be flow and pressure controlled to the sales gas export pipeline.

The flowrate of gas from the Corrib terminal will be set by the onshore operating staff, based upon the required daily nomination. The flowrate will be measured by the export gas fiscal metering facilities.

The overall gas production rate through the slugcatcher and the dewatering system will govern production of stabilised condensate. Storage of stabilised condensate is provided which acts as a buffer to even out fluctuations in composition and provide fuel storage. Any surplus condensate will be exported by road tankers.

The inlet pressure to the dewatering system is automatically controlled by throttling the feed to the upstream filter separator under pressure control.

Performance of the gas/gas exchanger, can be moderated by use of manual bypasses. The control philosophy envisages use of pressure control reset by a temperature controller. The operator will receive gas quality data at the DCS console to enable corrective setting of the temperature and pressure controllers.

With the addition of mechanical refrigeration, around Year 9, temperature upstream of the J-T valve will be controlled by the chiller duty within the propane refrigeration package. Later in field life, and as arrival pressure decreases, the J-T valve will tend to the full open condition. The plant operation will be set by operator at the time of operation to ensure the most cost effective means of achieving the gas quality specification is used.
6.3 FUEL AND FLARE USAGE

6.3.1 FUEL USAGE
Fuel gas consumption is estimated at 2.7 MMscf/d. This amount of fuel gas has been deducted from the gross gas production profile to give Sales Gas profiles and reserves (see Section 3.4.3).

6.3.2 FLARE
It is intended that during normal operation, no gas will be flared. Some flaring will be inevitable however while the gas terminal is being commissioned and during emergency. Further information on the flare systems is given in Section 4.1.7.7.2.
SECTION END
7. FACILITIES DECOMMISSIONING

All facilities will be decommissioned in compliance with the relevant local and EU legislation prevailing at the time of abandonment. The sections that follow provide a view of how the Operator currently envisages the facilities will be decommissioned.

7.1 WELLS

It is likely that wells will be permanently abandoned in a similar manner to that specified in current PAD rules and procedures.

A permanent barrier will be placed above all permeable zones in the well and verified as a 'competent' permanent barrier. This first barrier above the point of potential influx will be termed the 'Primary Barrier'. Subsequent barriers in the well will be termed 'Secondary Barriers'. Secondary barriers will be placed at suitable positions in the well as deemed necessary.

On completion of 'barrier setting' operations, the wellhead will be removed from the well and recovered to surface.

7.2 SUBSEA

The subsea facilities will be decommissioned in accordance with a Decommissioning Plan that will have to satisfy regulatory requirements in force at the time. Such requirements are likely to include the following:

- All subsea items that are proud of the seabed such as trees, manifold, control distribution units to be removed and scrapped onshore.
- Piles and conductors that have been driven into the seabed to be cleared to a depth below seabed of at least 3 metres.
- Buried pipelines, flowlines and umbilicals to be flushed, filled with inhibited water and sealed.
- Non-buried parts of the pipeline to be removed or trenched to a standard of burial that will ensure safety to fishing activities.
- Inshore outfall pipe, diffuser and pipeline to be removed in its entirety unless the environmental impact of doing so warrants such action as undesirable.

Extensive studies will be carried out as part of pre-decommissioning measures. Such studies will typically include HAZOP, HAZID and Environmental Impact Assessment.
7.3 TERMINAL

Decommissioning of the terminal is addressed in some detail in the environmental impact statement. In summary:

1. All facilities shown on the Corrib Gas Terminal plot plan drawing in Section 2 of the planning application will be removed.
2. Process items of equipment will be decontaminated.
3. Contaminated and toxic materials will be analysed. Disposal routes and methods will be agreed with the local authority.
4. Underground pipework and pipelines within the site will be removed. The pipelines and open drain systems will be filled with grout and left in situ.
5. Depending on contamination of the soil, either:
   a) the removal of facilities to current grade level and then covering the site with soil and finishing by grassing and general landscaping, or
   b) the removal of all foundations and other non-soil type material to a depth of one metre below grade will occur followed by covering the site with soil and finishing by grassing and general landscaping.
6. Specialist agents will be contacted to investigate the possibility of re-selling items of terminal equipment or recycling scrap metal from the terminal.

It is likely that the site would be left with the existing perimeter fence.

7.4 ESTIMATED ABANDONMENT COSTS

Abandonment costs for offshore facilities and pipelines and for the terminal are forecast to be [REDACTED]

7.5 ANTICIPATED DATE

It is anticipated that, without exploration success, the Corrib Field will be decommissioned between 2020 and 2023, the timing depending both on the level of Corrib reserves and on the volume and timing of gas sales. However the date of decommissioning would be deferred if the Dodder and / or Deel prospects proved to contain gas and were tied back to the Corrib manifold and pipeline.

It is anticipated that, without exploration success, the terminal will also be decommissioned between 2020 and 2023. Again the timing depends on both on the level of Corrib reserves and on the volume and timing of gas sales. However decommissioning of the terminal would be probably deferred, possibly substantially, if other significant discoveries were made in the Slyne Basin since the gas from such discoveries is likely to processed in and exported via the Corrib terminal.
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SECTION END
8 HEALTH, SAFETY AND ENVIRONMENT

An appropriate Safety Report will be submitted to the Health and Safety Authority under the Seveso II regulations in the near future.

The terminal will require an Integrated Pollution Prevention and Control Licence from the Environmental Protection Agency.

Emergency procedures will be established for all phases of the development, including installation, operations, maintenance and decommissioning.

8.1 POLICY, GOALS AND OBJECTIVES

8.1.1 POLICY

Enterprise’s Policy is as follows:

It is the policy of the Company that so far as is reasonable and practicable to do so, the Company will conduct all its activities in such a way as to:

- Avoid harm to all personnel who may be affected by its operations;
- Minimise adverse effects of its operations on the environment;
- Seek progressive improvements in its health, safety and environmental performance;
- Comply with all applicable legislative requirements.

8.1.2 GOALS

The overall health, safety and environmental goal for the Corrib development project has been set as follows:

The Corrib development and its associated activities shall not give rise to accidents, personnel injuries or ill health, material losses or damage to the environment.

The project will manage its activities to satisfy this overall goal, by working towards the following objectives:

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Health, Safety and Working Environment:

Design, construct and install facilities for efficient operations, where personnel is protected against injury or occupational illness caused by exposure to dangerous substances or noise, and protected against ill health through the application of sound ergonomic principles.

Design safety:

Design shall be carried out with regard to `best practice` with respect to safety, in order to ensure that the total risk to personnel involved is as low as reasonably practicable.

Environment:

Discharges and emissions associated with the development and subsequent production of hydrocarbons from the Corrib Field shall be minimised as far as reasonably practicable, and the disturbance to the environment shall be kept to a minimum.

Quality and Audit:

The Corrib project shall develop and maintain an effective project management system, which will include systems for risk and change management as well as plans for inspection and audit.

8.1.3 OBJECTIVES

In addition to the specific goals developed for the Corrib Development Project, Enterprise’s HSE goals include the following:

- Prevent all injuries in the workplace
- Provide a health and safe place to work
- Minimise disturbance to the environment, avoiding harmful discharges and emissions
- Establish and maintain safe, healthy and environmentally sound working procedures and practices throughout its operations
- Provide property engineered facilities, plant and equipment and to maintain them in a safe and environmentally sound condition
PLAN OF DEVELOPMENT

- Provide appropriate selection and training for all personnel to ensure their competence to work safely and avoid damage to health and the environment
- Provide and maintain an emergency response capability at all locations
- Develop a high level of health, safety and environmental awareness among all staff
- Maintain an effective system of monitoring, identifying and reviewing health, safety and environmental performance and introduce improvements where appropriate
- Maintain effective systems of consultation with personnel on health, safety and protection of the environment
- Conduct and support research and development aimed toward improving safety and health at work and conserving the environment
- Ensure provision of competent advice and support to line managers to help them achieve the high standards of performance expected by the Company
- Work with governments, local authorities, industry, academic institutions, statutory consultees and other professional bodies to promote progressive improvement of health, safety and environmental protection performance through development of appropriate standards, codes of practice and legislation.
8.2 HEALTH AND SAFETY PROGRAM AND PLAN

The Corrib HSE programme and plan defines the overall goal of the project with respect to health and safety, identifies the project activities required by Enterprise’s HSE performance standards and establishes responsibilities and time scales for their execution.

8.2.1 APPROACH

The Project Director is responsible for ensuring that arrangements are in place to meet regulatory and company requirements for HSE performance. The management of HSE issues is a line management responsibility throughout the Corrib project.

Each party involved in the Corrib project will be required to

- Acknowledge the project HSE goals and programme.
- Have an effective health safety and environmental management system.
- Prepare and implement a safety plan for their work.
- Report and investigate any incidents arising.

8.2.2 HEALTH AND SAFETY REQUIREMENTS

The Corrib facilities will be designed in accordance with relevant standards and codes. Hazards identification activities as well as Hazards and Operability Studies form integral parts of the engineering effort for the project, and will be conducted to cover design, installation, commissioning, start-up, normal operations and maintenance.

All onshore construction activities shall be carried out in accordance with the requirements of the Safety, Health and Welfare at Work (Construction Regulations), 1994. All contractors will be required to have a relevant safety statement covering their Corrib personnel and sites.

8.2.3 HSA AGREEMENT AND EMERGENCY PROCEDURES

The terminal will require a safety statement. This will be developed throughout the course of design and installation and shall include information on risk assessments with respect to major hazards as well as occupational safety at the plant. All necessary controls shall be identified and appropriate procedures established and documented.

(The terminal fire fighting capabilities are described in Section 4.1.6.7.7 and the terminal protection system and shut-down procedures in Sections 4.1.7.8 and 4.1.7.9.)

It is expected that the Terminal will be termed a Major Hazards site (tier II) under the definition of the Seveso Directive. Emergency Response requirements will be assessed and systems established in accordance with the requirements of the Directive and associated Irish legislation.
8.2.4 QUALITY AND INTEGRITY

The following lists the key HSEQ performance standards that pertain to Quality and Integrity and will be applied through the Corrib Field Development HSEQ management systems:

- Health and Safety Management
- Environmental Management
- Risk Management
- Emergency Response Contractor HSEQ Management
- Technical Integrity
- Marine Operations
- Regulatory Compliance
- Oil Spill Response
- Auditing

Quality will be achieved through the implementation of Quality Plans to address each discrete project activity. Each Quality Plan will identify the management controls and requirements for monitoring, inspecting, and reviewing of the facilities design, construction and commissioning activities. Quality Plans will typically address the following: design control; procurement; document control; material control; sub-contractors; construction control; commissioning and hand-over control.

Technical integrity will be ensured through the above processes and supplemented by third party independent verification of the critical elements.

For critical items of subsea equipment, particular emphasis will be placed on achieving high reliability, through:

- Rigorous inspection plans;
- Comprehensive testing procedures; and
- Use of field-proven equipment.

A full systems integration test will be undertaken on all subsea equipment prior to deployment.
8.3 ENVIRONMENT

8.3.1 ENVIRONMENTAL IMPACT STATEMENTS

An Environmental Impact Statement relating to the Offshore Facilities and Pipeline has been submitted to the Department of Marine and Natural resources (Coastal Zone Division) in connection with a Foreshore Licence Application.

An Environmental Impact Statement relating to the terminal has been submitted to the Environmental Protection Agency and Mayo County Council.

8.3.2 OIL SPILL CONTINGENCY PLAN

Oil spill contingency plans will be required for development drilling and will be submitted to the Irish Coastguard for prior approval in accordance with rules and procedures for Offshore Petroleum Exploration Operations.

8.3.3 DISCHARGE PERMIT

All operational emissions and discharges from the terminal will be incorporated in the Integrated Pollution Prevention and Control Licence (IPPC).

8.3.4 IPC LICENCE

An application for an IPPC Licence will be made for the terminal in accordance with relevant EPA guidance.
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SECTION END
9. PLANNING AND FORESHORE PERMISSIONS

9.1 FOreshore Licence

An application for a Foreshore Licence relating to the pipeline, umbilical and outfall pipe has been submitted to the Department of the Marine and Natural Resources.

9.2 PLANNING PERMISSION

A Planning Application has been submitted to Mayo County Council for permission to construct the terminal facilities at Bellanaboy Bridge. An Environmental Impact Statement covering pipeline, umbilical and outfall pipe from the landfall to the terminal as well as the terminal itself accompanied the Planning Application.
SECTION END
10. PROJECT COSTS

10.1 CAPITAL EXPENDITURE
10.2 OPERATING COSTS
SECTION END
11. INSURANCE

Enterprise Energy Ireland Limited, on behalf of itself and its partners Statoil Exploration Ireland and Marathon International Petroleum Hibernia Limited, is currently in a tendering phase for the Corrib development insurance programme.

The tendering exercise is based on a Builders All Risk policy covering the widest available terms but including Inland Transit Risks, Third Party Liabilities and pollution coverage.

The insurance is expected to commence from contractor awards (end January 2001) and continue to the issue of a provisional acceptance certificate (January 2003) plus twenty-four month warranty period.
SECTION END
12. SECURITY OF FACILITIES

12.1 SUBSEA

Enterprise Energy Ireland Limited intends to apply for an Exclusion Zone around the wellheads and subsea equipment.

12.2 TERMINAL

Security for the terminal is provided by a stock-proof perimeter security fence with a power fence inside and a closed circuit television system.

The terminal fence will be a galvanised intermediate weld mesh supported by steel posts with a buried concrete sill. On the terminal side will be an electric powered anti intruder type system consisting of an array of high voltage low pulse live wires.

Pan-and-tilt type closed circuit cameras and perimeter lighting activated by the electric fence will be included.

Entrance and exit to the terminal will be via a sliding style gate at the main entrance, with a separate full width gate as an alternative emergency exit. Pedestrian panic gates will be positioned around the perimeter.
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SECTION END
13. **SOCIO-ECONOMIC IMPACT**

13.1 **IRISH GAS MARKET**

13.1.1 **DEMAND**

The Irish natural gas market continues to grow rapidly. Figure 13.1 shows projected annual gas demand in Ireland for the period 1998 to 2010. The projected increase in demand is principally due to the increasing use of gas-fired power generation to meet the rapidly growing demand for electricity. Currently, some 25% of Ireland's electricity is generated from gas. Gas demand from this sector is expected to increase from 5.9 million cubic metres per day in 1998 to over 12.0 million cubic metres per day in 2010.

The markets for gas and electricity in Ireland have yet to be fully liberalised. Government policy on how these markets will operate has not yet been determined in detail. This is a significant area of uncertainty for the Corrib development.

Deregulation of the Irish gas market, in accordance with the Gas Directive 98/30/EC of 22 June 1998 is, in the first instance, expected to give about nine commercial or industrial users, including ESB and IFI, the right to choose their gas supplier. Together, ESB, BGE and IFI account for at least 97% of purchasers of gas in Ireland in 1999. Independent gas suppliers (such as the Corrib co-owners) will be entitled to sell gas to this small group of customers. Until liberalisation is introduced at lower levels of consumption, the number of potential customers will not significantly increase.

Demand for gas for power generation is expected to grow as other less environmentally acceptable fuels are phased out, and to meet the continuing increase in demand for electricity. The electricity market in Ireland was partially opened to the first stage of competition in February 2000. Whilst a number of gas-fired independent power stations may thereafter be brought on stream, it is unlikely that there will be a large number of new entrants until the future regulatory environment and the trading arrangements for electricity are known.

In addition to the power generation market, organic growth in the demand for energy in Ireland in other areas is anticipated to continue rising. As Figure 13.1 shows, from 2004 onwards the projected annual demand for gas in Ireland will exceed that which can be supplied from the existing Kinsale area fields and via the UK/Ireland inter-connector which currently has capacity constraints at Moffat.
13.1.2 SUPPLY

Gas from the Corrib Field is planned to be first produced in 2003. Production will continue for between fifteen and twenty years. Figure 13.1 shows the decline in production from the Kinsale area fields and the anticipated production from Corrib.

Additional potential production is provided by prospects in the Corrib area (Section 14). The development of these prospects is dependent upon the Corrib Field first being developed.

13.2 DIRECT AND INDIRECT EMPLOYMENT

13.2.1 SUBSEA

Manufacture and installation of the subsea facilities will be undertaken by specialised contractors, who operate the vessels and equipment needed for this type of application. There are no suppliers of these services in Ireland, although there may be some spin off in logistics support and services.

Construction of the onshore section of pipeline and umbilical from the landfall to the terminal will involve conventional civil engineering techniques and it is expected that local Irish contractors will be involved in this activity. However, this will not be particularly significant in the overall context of the buoyant state of the construction industry in Ireland.

13.2.2 TERMINAL

Manpower requirements will vary during the initial site preparation work, during construction and during normal operation. During Construction manning level is expected to peak at around four hundred.

The terminal will be a 24 hour manned operation utilising a day / night shift system. It is envisaged that most of the terminal operation including maintenance, service activities and administration will be carried out during the day shift period and that night shift work will primarily consist of a process supervisory nature with some additional minor maintenance tasks being undertaken.

The overall manpower requirement, discipline breakdown and shift cycles are yet to be finalised however it is currently estimated that the total terminal compliment will be in the region of sixty to sixty five people. This will comprise of terminal management and administration, operations and maintenance staff.

Ancillary support services such as security, catering, and laboratory requirements are yet to be finalised.

13.2.3 GAS EXPORT PIPELINE
This will provide additional employment during the construction phase. However, as this pipeline will be owned, constructed and operated by BGE, Enterprise is unable to comment further.

13.3 PROVIDERS OF IRISH GOODS AND SERVICES

Under the EU Treaty of Rome it is illegal for the Corrib co-venturers to discriminate in favour of any category of supplier. Enterprise Energy Ireland Limited is, however, working closely with Enterprise Ireland, the state agency responsible for encouraging the development of Irish industry, providing Enterprise Ireland with details of the Corrib project and regular updates on its progress/programme in order to give Irish suppliers full opportunity to assess the business potential associated with the Corrib project.

13.4 INFRASTRUCTURE

13.4.1 OFFSHORE ACTIVITY

Ports used to support the drilling operations are Killybegs in Ireland and Aberdeen and Ayr in the UK. Over time, increased dependency on the port of Killybegs has developed, such that around 70% of vessel movements are now from this location. A local office together with warehouse and pipeyard has been established in Killybegs with a view to longer term continuity.

Equipment is transferred from Aberdeen to Killybegs by both boat and truck. The bigger equipment is generally shipped at the commencement of the annual campaign, with more smaller rental equipment transferred by road from Aberdeen via the ports of Stranraer and Belfast.

Air support has been provided more recently by helicopter from Donegal airport. This has worked effectively and is set to continue for the duration of the drilling programme.

Logistics support for offshore construction operations will probably also use Enterprise facilities in Killybegs, and possibly, other western ports eg Galway or Sligo. There may be temporary requirements for quayside storage at these ports for pipeline materials prior to shipment offshore – location of suitable storage is not anticipated to be a problem. Materials and equipment for the landfall and onshore pipeline to the terminal will be transported by road to the terminal site at Bellanaboy Bridge.
13.4.2 ONSHORE ACTIVITY

The terminal can be accessed from either the north from the main regional towns of Ballina or Castlebar and Westport. The northern route is via the R314 from Ballycastle, while the southern route is via the N59 from Castlebar and Westport or Ballina. The terminal site is approximately one hour by road from each of these towns.

General supply road transport movements will be restricted to the use of standard vehicles with a maximum length of 16.5m and a maximum width of 2.6m. Any vehicle that exceeds standard transport regulations will require special movement permits from the appropriate county councils.

The access road to the terminal site from the R314 will be widened to 6m to facilitate construction traffic. Construction traffic movement within the terminal site will be via temporary construction roads which, on completion of the terminal, will be developed into permanent plant roads.

The nearest rail link is at Ballina. This principally operates as a freight line from the main passenger line service to Westport.

The nearest port is Silgo, which has a rail link and can handle vessels up to 3200dwt.

13.5 OTHER USERS OF THE MARINE ENVIRONMENT

As all of the field installations will be underwater, there will be little physical interface with users of the marine environment, e.g. fishing, leisure and tourism.

Underwater structures and the pipeline and umbilical system will be protected to avoid damage from, or interference with, trawling activities in the field and along the pipeline.

There will be localised short periods during construction and routine inspection operations when marine vessels will be present offshore - such activities will be subject to notification to the Dept of the Marine and Natural Resources and the publication of Marine Notices. The location of the subsea equipment and offshore pipeline will be marked on Admiralty charts. As stated above, Enterprise intends to apply for an Exclusion Zone around the wellheads and subsea equipment.

The field development area and pipeline route are not in a international shipping lane and the level of shipping traffic in the area is low, mainly consisting of local coastal traffic. There are no major ports in the area.
Figure 13.1  **Graph showing anticipated Irish gas demand (grey), indicative forecast gas supply from Kinsale Head (blue) and P50 forecast from Corrib (red)**
14. NEARBY ACREAGE POTENTIAL AND CO-ORDINATION
Figure 14.2  Map showing potential tie-back distances from Corrib Field and from terminal
SECTION END