

## 2 INTRODUCTION

### 2.1 BACKGROUND

The Beatrice oil field is located in Block 11/30a of the United Kingdom Continental Shelf (UKCS), in the Inner Moray Firth approximately 22km east of Helmsdale on the Caithness coast. Beatrice began production in September 1981, and by July 2005 had produced some 164 million barrels of oil, representing a recovery efficiency of about 33% with a total recovery currently predicted to be 38%. Production in the field has been declining steadily since the mid 1980s. At present rates of extraction, and under existing economic constraints, it is forecast that the field could cease production as early as 2006, although at the current world oil price it is conceivable that production could continue until 2025. An outline decommissioning programme for the Beatrice field was submitted to the DTI in September 2004 and accepted by them in 2004. This programme comprises a phased approach to the end of field life, including further improvements in efficiency on the platforms and alternative use of some structures for a period by the MOD.

The present operators, Talisman Energy (UK) Limited, have undertaken several initiatives to extend the life of the field, and hence the life of the Nigg oil terminal from where crude from Beatrice is exported. These initiatives have included the Beatrice optimisation project (January 1999), Beatrice life extension project (2000) and the Beatrice pipeline replacement programme (May 2001).

Talisman reviewed this Beatrice redevelopment programme in 2001, and screened a range of future options to identify how they could reduce operating costs, increase production, and extend economic life. The studies revealed that finding re-use opportunities for the existing field infrastructure would contribute to these goals, and indicated that there was the potential for the generation of wind energy at Beatrice. This potential exists because Beatrice has a significant wind resource and has a substantial existing infrastructure which could be re-used in a wind farm development.

As a result of this screening study, Talisman conducted a further feasibility study to quantify the development potential. This showed that it could be commercially viable to create a large-scale offshore wind farm at the site using the main Beatrice infrastructure as a hub, but that further detailed evaluation would be required.

The creation of a large offshore wind farm at the Beatrice location could provide up to 1GW of installed capacity for supply to the national grid. This would be equivalent of up to 20% of Scotland's present electricity demand. However, the development of wind farms at more distant locations in deeper water presents significant additional technical challenges for the design, installation, operation and maintenance of facilities and infrastructure. These must be overcome if the potential for commercial, non-visually intrusive offshore wind energy in northern Europe is to be realised. In the north east of Scotland the offshore oil and gas industry is uniquely placed to contribute experience, expertise and resources to further advance the development of commercial wind energy in offshore waters.

The feasibility study also showed that a successful development would require a new range of skills, combining expertise from the offshore oil and gas industry with those of utility businesses. Consequently, Talisman Energy (UK) Limited has partnered with Scottish and Southern Energy (SSE), a major UK utility, to examine the potential of creating a deepwater wind farm at the Beatrice site in the Moray Firth. The companies have co-funded a series

of studies to investigate the potential of deepwater offshore wind farms on the UKCS. These consisted of a Design, Fabrication and Installation study, Front End Engineering Design (FEED) study, and Operations and Maintenance (O&M) analysis. The studies, funded in part by grants from the UK public sector, sought to develop an improved definition of the structure, technology and installation process for deepwater wind farms, develop a scope and cost estimate for a demonstrator programme, and develop base line O&M solutions and cost models for a full-scale development. These studies and models are now complete and Talisman now proposes to undertake a demonstrator programme consisting of two wind turbine generators (WTGs).

## **2.2 SCOPE OF THE ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL STATEMENT**

Talisman and Scottish and Southern Energy intend to construct, install and operate two 5MW wind turbine generators near to the Beatrice field in Block 11/30a of the UK central North Sea. The turbines will be approximately 1.6km and 2.3km away from the existing Beatrice Alpha production platform (Beatrice "AP"), and approximately 22km offshore from Helmsdale on the northern coast of the Moray Firth. The turbines will be linked to Beatrice AP by a buried subsea electrical cable, and electricity from the turbines will be used to power the Beatrice platforms, and thus extend the economic life of the Beatrice field.

Turbine units will be assembled onshore in Scotland, and taken to the site on barges, where they will be installed on the seabed using cranes and other support vessels. Installation offshore is likely to begin in June 2006 and will take approximately six weeks. The substructures for the turbines will be fixed to the seabed by conventional steel piles driven into the seabed. It is planned that piling operations at each WTG would take no more than two days in total. Subsea cables will be installed and buried by deploying a water jetting ROV to fluidise the surface sediments, in an operation that should take about three to four days. Some internal modifications will be made to equipment and facilities on the Beatrice AD platform to import power from the turbines.

It is planned that this Demonstrator Project would last for approximately five years. At the end of this period, the turbines could remain in use until the final decommissioning of the Beatrice platforms, or they may be incorporated into a commercial scale wind farm in the Beatrice area (for which a new consent and ES would be prepared). Alternatively, if the Demonstrator Project proved unsuccessful, the structures would be decommissioned and removed. Any decommissioning activities would comply with relevant legislation applicable at the time, and might be part of a larger decommissioning programme developed for other assets in the Beatrice field.

The wind farm Demonstrator Project will test the technology, and verify the technical and commercial viability, of a full-scale development. Significantly, however, the electricity supplied by the turbines will replace some of the power purchased from the national grid, and this will reduce operating costs and extend the life of the Beatrice field by at least 1.5 years.

The Demonstrator Project will be part of a pan-European initiative called DOWNVIND (Distant Offshore Wind farms with No Visual Impact in Deepwater), comprising 18 different organisations from six European countries, which has been established as a catalyst for commercialising deepwater wind farm technology. It will cost approximately £32 million to develop. The European Commission, the UK Department of Trade and Industry, and the Scottish Executive will provide grant assistance totalling £10.1 million and proposed contributions from other participants total £3.7 million resulting in net costs to Talisman and SSE of approximately £18 million.

## 2.3 PURPOSE OF THE ENVIRONMENTAL STATEMENT

This environmental statement (ES) presents the findings of an environmental impact assessment for the proposed wind farm Demonstrator Project in Block 11/30a of the UK North Sea. The environmental impact assessment is an evaluation process which enables the team responsible for the project (the developer), persons with an interest in the project (stakeholders), and the statutory authorities to:

- *identify and understand the significant environmental impacts and risks of the project*
- *develop plans or procedures for mitigating or reducing significant risks*
- *appreciate the benefits that would be derived as a result of the implementation of the project.*

The structure of the ES, and the process undertaken by Talisman to complete the assessment, aligns fully with the requirements of the Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999, and the appropriate DTI guidelines. It has also taken into account guidelines, best practice, and information relating to the particular potential impacts of offshore wind farms.

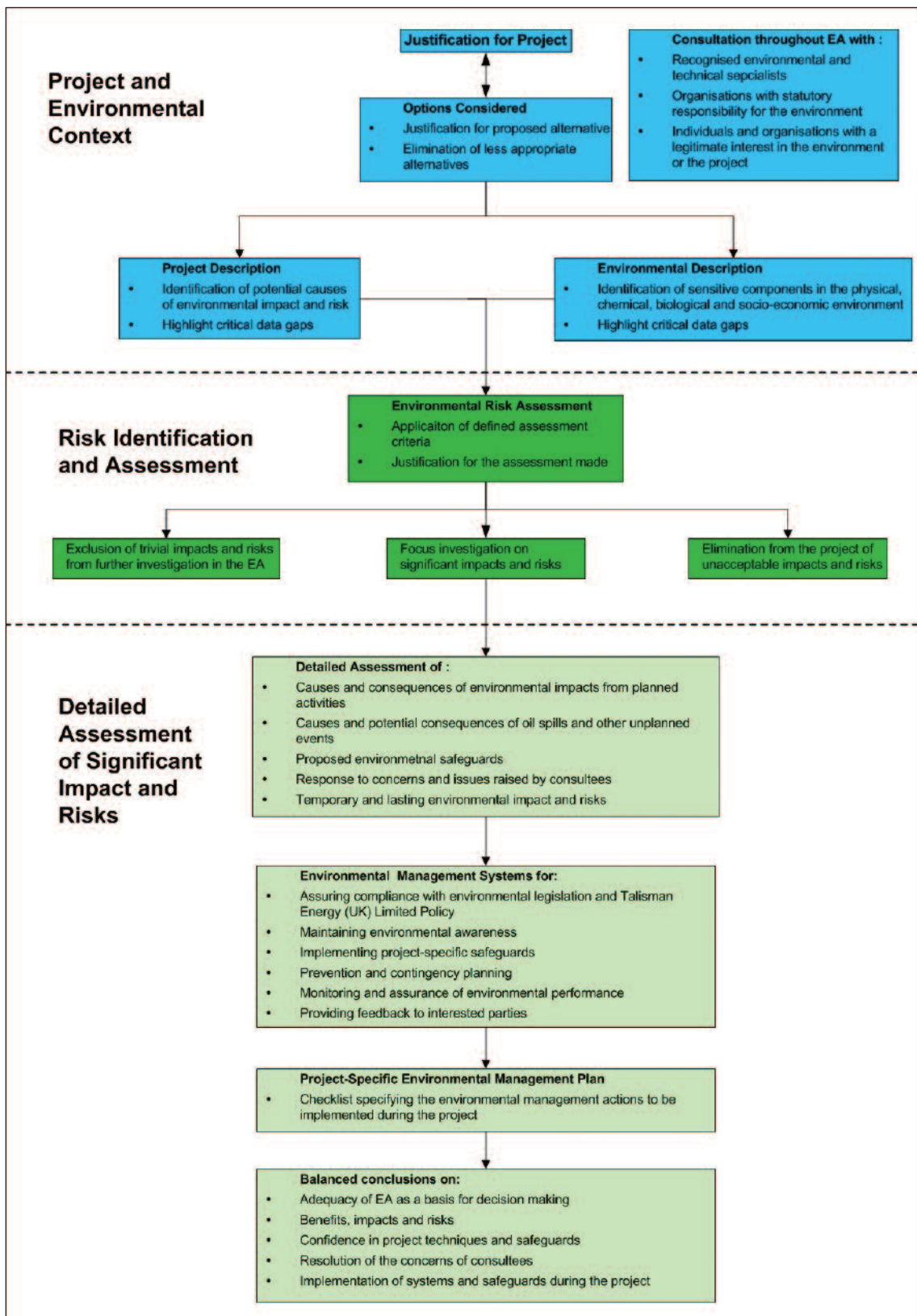
## 2.4 STRUCTURE OF THE ENVIRONMENTAL STATEMENT

The main sections of the environmental statement, and their purpose, are shown in Table 2.1, and the main stages of the environmental impact assessment process are shown in Figure 2.1.

Table 2.1 Main sections of the environmental statement.

SECTION	CONTENT AND PURPOSE
<b>1. Non-technical summary</b>	<ul style="list-style-type: none"> <li>Provides a clear description of the project, its impacts, and the measures that Talisman will take to reduce or eliminate impacts.</li> </ul>
<b>2. Introduction</b>	<ul style="list-style-type: none"> <li>Sets the scene and describes the process of undertaking an EIA and preparing the formal environmental statement.</li> <li>Summarises the purpose and benefits of the project.</li> <li>Outlines the regulatory context for the project.</li> </ul>
<b>3. Project description</b>	<ul style="list-style-type: none"> <li>Describes the project, from construction to decommissioning.</li> <li>Describes any alternatives to the project or specific elements of its design, giving reasons for the selections made.</li> </ul>
<b>4. Environment description</b>	<ul style="list-style-type: none"> <li>Describe the environment(s) that may be affected during construction and operation.</li> <li>Provides the information with which to assess the significance of potential effects of the project.</li> </ul>
<b>5. Scoping potential impacts</b>	<ul style="list-style-type: none"> <li>Identifies all the potential impacts that could arise as a result of planned or unplanned activities, and emergency or accidental situations, associated with the project.</li> </ul>
<b>6. Consultations</b>	<ul style="list-style-type: none"> <li>Describes the process of consultation undertaken by Talisman to identify issues of concern to stakeholders.</li> <li>Identifies and summarises the main concerns identified during both the scoping exercise and the consultation programme.</li> <li>Indicates how Talisman intends to address these concerns.</li> </ul>
<b>7-12. Significant environmental risks</b>	<ul style="list-style-type: none"> <li>Describes each of the significant environmental risks.</li> <li>Describes the mitigation measures that Talisman intends to enact to eliminate or reduce those risks.</li> <li>Describes and, as far as possible, quantifies the risk that would remain after implementation of mitigation measures.</li> </ul>
<b>13. Effects on status of conservation areas</b>	<ul style="list-style-type: none"> <li>Summary of each of the potential effects that any aspect of the Demonstrator Project could have on any of the offshore or coastal conservation areas adjacent to the Beatrice field.</li> </ul>
<b>14. Environmental management, research and monitoring</b>	<ul style="list-style-type: none"> <li>Summarises the way that environmental risks will be managed.</li> <li>Describes the continuing programme of research and monitoring that Talisman will undertake during the Demonstrator Project.</li> </ul>

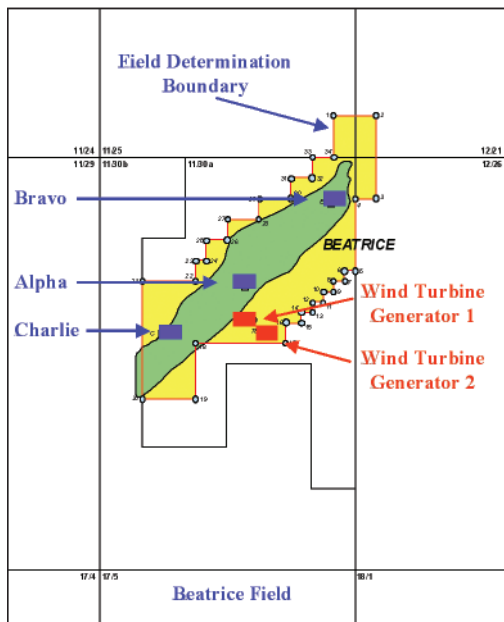
Figure 2.1 A flow diagram of the EIA process.



## 2.5 LEGISLATION

A consent for the building and operation of the Beatrice Demonstrator Project is being sought by Talisman Energy (UK) Limited as an addendum to the existing field development consent for the Beatrice field operations. The two wind turbines will be located wholly within the area covered by the existing Beatrice field development consent (the Field Determination Boundary, Figure 2.2) and will provide power to the field, facilitating the extraction of hydrocarbons. The addendum will be supported by this formal environmental statement (ES) prepared under the Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999. The ES also conforms with the requirements of the EU Habitats Directive (92/43/EEC).

Figure 2.2 The Beatrice Field Determination Boundary.



All of the operations and activities associated with the installation and operation of the wind turbines will take place offshore; no new structures, facilities or cables will be installed onshore. The Demonstrator Project will be managed by means of a project-specific environmental protection plan, under the auspices of Talisman's existing Safety, Health and Environmental Policy (Appendix 1). A summary of the legislation that may have a bearing on the proposed project is given in Appendix 2.

## 2.6 THE DEMONSTRATOR PROJECT, ITS PURPOSE AND POTENTIAL BENEFITS

### 2.6.1 INTRODUCTION

This initiative has received funding from the Scottish Executive, the UK Department of Trade and Industry, and the European Commission. The purpose of the Beatrice Demonstrator Project is to:

- *better understand the environmental impact of deepwater wind farms*
- *prove the concept of a deepwater wind farm*
- *explore the cost-effectiveness of deepwater sites*
- *share knowledge and experience across Europe*
- *pioneer the development of deepwater wind farms*
- *improve and commercialise the technology*
- *extend the commercial life of the Beatrice field.*

In the short term the Demonstrator Project will have an immediate impact on the future of the Beatrice field. The energy generated by the turbines will be used to power the platform, and this will contribute to Talisman's strategy of reducing its emissions and minimising the environmental impact of its operations. The Demonstrator Project also aligns with Talisman's programme for the decommissioning of the Beatrice field, which seeks to extend the useful life of the field by finding alternative uses for some of the main facilities and infrastructure (Talisman, 2004).

The entire Demonstrator Project will cost about £32 million and will bring significant benefits to Scotland and the rest of the UK. The design and development, and a substantial part of the research programme, will be undertaken in the UK. The location and management of one of Europe's premier research programmes in the north east of Scotland will provide a unique opportunity for Scottish companies to demonstrate their technology and capabilities.

### 2.6.2 ECONOMIC JUSTIFICATION

The Demonstrator Project will comprise two REpower 5M turbines each with a nominal output of 5MW. They will supply approximately a third of the Beatrice field's power demand on average over the year.

The purchase of electricity from the grid is the largest single component of Beatrice operating costs and are estimated to account for up to a third of the total Beatrice operating expenditure (OPEX) in 2006. The energy supplied by the Demonstrator Project should result in an annual saving of circa £2.5 million dependant on turbine performance and electricity prices.

Talisman has analysed the future of the Beatrice field based on a range of oil prices and operating scenarios. These have shown that the electricity cost savings resulting from the Demonstrator Project will increase field life by at least 1.5 years under realistic oil price forecasts.

## **2.7 ALTERNATIVES TO THE DEMONSTRATOR PROJECT**

For the Beatrice field, alternatives to the wind farm Demonstrator Project include the various initiatives either undertaken, or considered and rejected by Talisman, as part of the major Beatrice redevelopment initiative described in Section 1. Alternatives considered for the siting and structure of the demonstrator wind turbines themselves are discussed in Section 3.