Suggested contents of the Field Development Programme

# 1. Executive summary

The Executive Summary should state the essential features of the development including:

* A brief description of the hydrocarbon reservoirs, reserves, development strategy, facilities and pipelines.
* An outline map showing the field limits, Field Determination boundary, Development Area boundary, contours of fluid contacts, existing and proposed wells and license boundaries.
* A project schedule, total capital cost and a statement of license interests.
* An average estimate of ultimate recovery, and the minimum, average and maximum hydrocarbon production profiles of:
  + gas, in billion cubic feet per year
  + oil, in million US barrels per year
* A statement of intent towards any parts of the field not addressed by the programme including any commitment to later development of that area, or to the later stages of a phased development. Any provision for the development of other hydrocarbons in the area should also be identified.
* The essential elements of the Field Management Plan
* A statement of the provision for decommissioning and an undertaking that the field will be decommissioned in accordance with the requirements of the applicable international and domestic law in force at the time of decommissioning.
* A statement that the proposed development involves no significant transboundary environmental impact. In this context a "transboundary environmental impact" is an effect on an area outside the UK and areas designated under sI(7) of the Continental Shelf Act 1964

# 2 Field description

The purpose of this section is to present the description of the field on which the development has been based and so provide a baseline for future modifications as development proceeds.

The description should be in summary form and only a brief statement, table or map of the results provided with references to more detailed company-held data where appropriate.

## Figures, diagrams and data tables

Licensees are encouraged to submit only those maps, sections and tables necessary to define the field adequately but should include at minimum a table of in-place hydrocarbon volumes, a representative cross-section and top structure maps for each reservoir. Maps should be in subsea depth at appropriate scales and include co-ordinates in degrees of latitude and longitude and the standard U.T.M. grid, stating the central meridian used and datum.

### 2.1 Seismic interpretation and Structural Configuration

A brief summary of the extent and quality of the seismic survey and the structural configuration of the field should be presented using appropriate figures and maps.

### 2.2 Geological Interpretation and Reservoir Description

The stratigraphy of the reservoirs, facies variations, the geological correlation within the reservoir and any other relevant geological factors that may affect the reservoir parameters (both vertically and horizontally) and thereby influence reservoir continuity within the field should be described in summary form. Figures and maps should be provided where appropriate.

The geological data provided should reflect the basis of reservoir subdivision. and correlations within the reservoir and should include the relevant reservoir maps on which the development is based.

### 2.3 Petrophysics and Reservoir Fluids

A brief summary of the key field petrophysical parameters should be presented incorporating log, core and well test data.

A summary of the field PVT description should be included.

### 2.4 Hydrocarbons-In-Place

The volumetric and any material balance estimates of hydrocarbons-in-place for each reservoir unit should be stated together with a description of the cause and degree of uncertainty in these estimates.

The basis of these estimates should be available and referenced.

### 2.5 Well Performance

The assumptions used in the Field Development Programme for the productivity and injectivity of development wells should be stated. Where Drill Stem or Extended Well Tests have been performed the implications of these on production performance should be given the potential for scaling, waxing, corrosion, sand production or other production problems should be noted and suitable provision made in the Field Management Plan (Section 3.7).

### 2.6 Reservoir Units and Modelling Approach

Where the reservoir has been subdivided for reservoir analysis into flow units and compartments the basis for division should be stated. A description of the extent and strength of any aquifer(s) should be given.

The means of representing the field, either by an analytical method or some form(s) of numerical simulation or by a combination of these should be briefly described.

### 2.7 Improved Recovery Techniques

A summary of the alternative recovery techniques considered and the reasons for the final choice is required. For ail oil or condensate reservoirs the potential for application of Improved recovery techniques beyond conventional methods should be described. Where firm conclusions cannot be reached a programme for addressing these issues during production should be given in the Field Management Plan (Section 3.7).

### 2.8 Reservoir Development and Production Technology

The chosen recovery process should be described and the optimization method summarized, including reference to the potential for artificial lift and stimulation. Any limitations on recovery imposed by production technology or by the choice of production facility or location should be indicated.

Remaining uncertainties in the physical description of the field which may have material impact on the recovery process should be described and a programme to resolve these should appear in the Field Management Plan (Section 3.7).

## 3. Development and management plan

The purpose of this section is to set out the form of the development, describe the facilities and infrastructure, and establish the basis for field management during the construction and production phases. For every element of the plan the description should be brief and related to the complexity of the facility or strategy concerned. Where a particular topic is not relevant to a development it should be omitted.

The general requirements for the section are set out below. Where an aspect of a development is simple the text should be correspondingly short and the entire section no more than five pages of text in length. Figures and tables should be used where appropriate and the referencing of existing documents is encouraged providing these are made available

A statement confirming that all installations will be completely removed to shore for reuse, recycling or final disposal on land is required in accordance with the UK’s international decommissioning obligations.

### 3.1 Preferred Development Programme. Reserves and Production Profiles

This section should describe the proposed reservoir development indicate the drilling programme, well locations, expected reservoir sweep and any provision for a better than expected geological outcome.

An estimate of the range of reserves for each reservoir should be given (excluding fuel and flare) with a brief explanation of how the uncertainty was determined and explicit statements of probability where appropriate. The assumed economic cut-off should be stated.

Expected production profiles for total liquids, oil, gas, gas usage and flare, associated gas liquids and produced water for the life of the field are required. Where fluids are to be injected, annual and cumulative injection profiles should be provided. Quantities can be provided in either metric units or in standard oilfield units (with conversions to metric equivalents provided). Information to allow calculation of sales quantities should be provided.

The anticipated date for Cessation-of-Production together with the underlying assumptions, should be provided.

### 3.2 Drilling and Production Facilities

The drilling section should briefly describe the drilling package and well workover capability and should include a description of the proposed well completion.

The production facilities section should describe the major equipment and infrastructure items and identify the design and operating parameters used as the basis of design. A clear indication of system bottle-necks and limitations that can give rise to production constraints should also be given together with details of the contingencies available to maintain production in the event of major equipment failure(s).The scope and flexibility for future modification and expansion to address any potential for upside, incremental and satellite field development should also be identified, including any spare capacity designed-in to the facilities/pipelines to allow for future development or third part

tie-ins. The studies forming the basis for the selection of the proposed development option should be referenced.

The section should include a diagram of the structures for the development, whether fixed, floating or subsea and should also include a description of the proposed hydrocarbon transportation system including, where appropriate, any onshore terminal facilities. Any Imitations on offshore production resulting from constraints in the transportation and terminal facilities should be identified.

New transportation systems are often designed to service more than one development and may have a longer expected life than the originating field. in this instance a separate Field Development

Programme for the transportation system may be necessary.

### 3.3 Process Facilities

A brief description of the operating envelope and limitations of the process plant should be provided. The use and disposal of separator gas should be described.

The section should also include:

A summary of the main and standby capacities of major utility and service systems, together with the limitations and restrictions on operation.

A summary of the method of metering hydrocarbons produced and utilized.

A brief description of systems for collecting and treating oil, water and other discharges.

A brief description of any fluid treatment and injection facilities.

A brief description of the main control systems and their interconnections with other onshore or offshore facilities.

### 3.4 Project Planning

Commissioning plans will be discussed in greater detail as the project develops, but it should be noted that the commissioning programme will need to demonstrate a commitment to preventing the unnecessary and wasteful flaring of associated gas.

### 3.5 Decommissioning

A very brief description of the proposed methods of decommissioning should be Included to show the basis for the decommissioning expenditure estimates Steps taken in the design to facilitate eventual decommissioning of the production facilities should be identified.

### 3.6 Costs

Cost information is required by the Department to assess the economics of the development and to allow forecasting of North Sea expenditure.

Capital (Capex) and Operational (Opex) expenditure profiles are required. phased by year, to a defined monetary base in UK pounds sterling.

Capex and Opex tabulations should be subdivided into:

* Pre-Project Costs (Seismic. Exploration Drilling, Appraisal, Drilling. Studies: money of the day costs are acceptable here)
* Drilling Capex
* Facilities Capex
* Decommissioning expenditure
* Field Opex, excluding Tariffs
* Tariff Opex

Details are required of the tariffing arrangements and gas contracts where applicable and if these are different to those previously notified to the Department. Where these arrangements are commercially sensitive, a limited circulation 'side letter' will be acceptable.

The information on tariffs should include:

Total fixed and variable costs for the use of Facilities or Pipelines, phased annually.

Base cost per barrel, escalation factors, and escalation lags.

The information on Gas Contracts should include:

Base gas price (pence/therm), the escalation factors, the lag period. the base values for escalation factors and the contract duration.

### 3.7 Field Management Plan

A Field Management Plan is required that sets out clearly the principles and objectives that the Licensees will hold to when making field management decisions and conducting field operations and, in particular, how economic recovery of oil and gas will be maximized over field life.

The rationale behind the data gathering and analysis proposed in order to resolve the existing uncertainties set out in Section 2 and understand dynamic performance of the field during both the development, drilling and production phases should be outlined.

The use of unmanned or subsea facilities may set restrictions on data gathering, these should be identified.

The potential for workover, re-completion, re-perforation and further drilling should be described. Where options remain for improvement to the development (Section 2.7) or for further phases of appraisal or development, the criteria and timetable for implementing these should be given.

Some developments will include common user facilities and may have capacity constraints: the methods to be used to set production priorities should be given for gas reservoirs the criteria for installation of additional compression should be identified.