# QUALITY REVIEW OF ENVIRONMENTAL STATEMENTS FOR OFFSHORE PETROLEUM PRODUCTION AND PIPELINE DEVELOPMENTS

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# Final Report

**For the Department for Business, Enterprise and Regulatory Reform**

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# 1 Introduction

The Department for Business, Enterprise and Regulatory Reform (BERR), formerly the Department of Trade and Industry (BERR), as regulator for the offshore oil and gas industry, commissioned the Environmental Impact Assessment Centre to undertake an independent research study to *"determine whether applicants and the Department are adopting a consistent and acceptable approach"* to the preparation and assessment of Environmental Statements (ESs) *"that fully meets the requirements of the Environmental Impact Assessment (EIA) Regulations and the related, parent, EU Directives*[1]*"*. The study focused on EIAs undertaken under the Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999 (SI 1999 No. 360) – the 'Regulations' - and covered the period 2002-2005.

The study had two objectives:

I. To evaluate the preparation and assessment of offshore ESs,

II. To identify and list potential adverse non-pollution effects and proposed mitigation measures.

The main body of this report focuses on presentation of the findings for the first objective, and refers to material relating to the second objective, particularly with regard to mitigation measures and alternatives. Appendix 3 provides a separate, more detailed, report on the adverse non-pollution effects identified and the mitigation measures proposed to address them.

# 2 Issues and Scope

Environmental impact assessment (EIA) has become a central component of development control in the UK, and has been the subject of a series of regulations covering a range of environmentally significant development activities. Most EIAs are conducted for onshore projects that require planning permission in order to proceed, and the regulations for EIA in respect of such projects fall within town and country planning legislation. In addition, there are other regulations for specific project types not covered by planning legislation, including offshore petroleum production and pipelines, where the decision rests with the Secretary of State. All regulations follow the framework of the parent EU Directives, and practice must comply with the requirements of these Directives.

EIA introduces information on the environmental consequences of a development proposal into the process of reaching a decision on whether or not permission should be granted. The identification of significant effects and proposals for their effective mitigation are crucial elements of the EIA process, and taken into account by decision-makers. In addition, the EIA process makes provision for transparency, by ensuring that information is made available for scrutiny and comment. Thus, it is important that the ES preparation process facilitates the production of a 'good' quality document for use both by decision-makers and consultees.

[1] European Commission (1985) Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment. *Official Journal of the European Communities* L175: 40, 5 July 1985, and European Commission (1997) Council Directive 97/11/EC of 3 March 1997 amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment. *Official Journal of the European Communities* L73: 5-15, 14 March 1997

This research project seeks evidence that the ESs submitted for offshore petroleum production and pipeline development applications are of the quality required for subsequent decision-making and that the evaluation process of BERR provides satisfactory 'checks and balances' in judging that quality. This project will indicate whether any changes in practice in either the preparation or the assessment of ESs are required. In addition, it will also consider the adverse non-pollution effects identified and the mitigation measures proposed to address them.

# 3 Methodology

At the study inception stage the study team met the BERR contract officer and other BERR personnel, to discuss the research approach, access to documentation (ESs), relevant personnel for interviews, and the identification of adverse non-pollution effects.

A sample of ESs submitted under the Regulations was selected for detailed review, and this sample was chosen to reflect:

- different timeframes since 1 January 2002 (year of submission)
- different types of project
- different levels of experience in preparing ESs for offshore projects, indicated by the relative numbers of ESs prepared by different operators, including those who had submitted five or more ESs (classed as 'major'), those that had submitted three to four ESs (classed as 'medium'), and those that had submitted only one or two (classed as 'small')
- different geographical zones

## 3.1 Sample selection

Data provided by the BERR confirmed that 82 ESs were submitted to BERR during the period 2002-2005. The intention was to analyse approximately 50% of the total of 82 ESs, depending upon availability, and the final sample constituted 43% (35) of the total. Projects that had not completed the application and determination process were excluded.

Table 1 shows the distribution of all ESs and the sample, according to year of submission, project type, operator experience and geographical zone. The same ESs were also used for the Objective II analysis of non–pollution effects (Appendix 3). All the sample ESs were obtained through the BERR, either as hard copy or in electronic format.

## 3.2 ES review

The review of the sample of ESs was conducted using a slightly modified version of the Lee & Colley ES Review Package[2]. This method has been an established means of analysing ESs for over 15 years and is applied in the UK and worldwide.

It has been used successfully to locate strengths and weaknesses of ESs for a wide range of project types.

[2] Lee, N & R. Colley, J. Bonde and J. Simpson, 1999. Reviewing the Quality of ESs and Environmental Appraisals. Occasional Paper Number 55 (1999). Planning & Landscape, School of Environment and Development, University of Manchester

*Table 1: Characteristics of all ESs submitted 2002-2005 and the sample*

| | Available ESs = 82 | | Sample of ESs = 35 | |
|---|---|---|---|---|
| **Year** | | | | |
| 2002 | 22 | 27% | 11 | 31% |
| 2003 | 13 | 16% | 7 | 20% |
| 2004 | 30 | 37% | 11 | 31% |
| 2005 | 17 | 21% | 6 | 17% |
| **Project type** | | | | |
| Exploration wells | 19 | 23% | 9 | 26% |
| Field developments | 61 | 74% | 24 | 69% |
| Pipelines | 2 | 2% | 2 | 6% |
| **Operator experience** | | | | |
| Major | 15 | 18% | 10 | 29% |
| Medium | 32 | 39% | 14 | 40% |
| Small | 35 | 43% | 11 | 31% |
| **Geographical zone** | | | | |
| North East North Sea | 40 | 49% | 16 | 46% |
| Southern North Sea | 26 | 32% | 11 | 31% |
| Eastern Irish Sea | 7 | 9% | 4 | 11% |
| West of Shetland | 9 | 11% | 4 | 11% |

An ES will usually contain a large amount of information about the form and consequences of a development. It is the purpose of the review to:

- provide the reviewers with a framework within which to interpret this information;
- enable reviewers to assess the quality and completeness of the information relatively quickly; and
- enable reviewers to make an overall judgement of the acceptability of the ES as a planning document.

It is not intended that reviewers should attempt to refute the findings presented in an ES or to supplant them with conclusions of their own. Reviewers should, rather, be alert to areas of weakness, omission or even concealment in the ES. These may, most often, occur when certain tasks are omitted; unsuitable or *ad hoc* methods are used; biased or inaccurate supporting data are introduced, often without references; or the rationale or justification for conclusions is not given. The Review Areas are intended to direct the Reviewers' attention to these areas. In this way sources of *potential* error are located which can be the subject of further, and if necessary specialist, investigation.

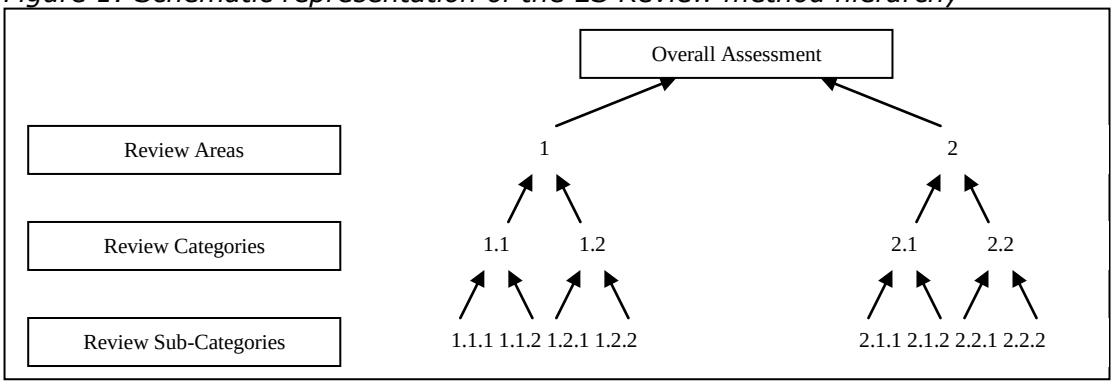
In the context of this research study some minor amendments were made to the Package to address the particular objectives and context of the research, and specifically the requirements of Schedule 2 of the Regulations. The *Guidance Notes on the Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999* were also used to ensure the review addressed issues of particular concern for offshore developments, e.g. cumulative effects. A copy of the version of the Review Package used in this study is in Appendix 1, which highlights the review categories/sub-categories that were specifically amended for this study.

The modified review package applied more than 50 sub-categories to each ES. The review sub-categories were grouped into 17 categories and then into four 'review areas' that broadly correspond to:

1. Description of the project and environment,
2. Identification and evaluation of impacts,
3. Treatment of alternatives and mitigation, and
4. Communication and presentation of the information.

The grades awarded for each sub category are combined to give a grade for each category and then for each Review Area, and finally to provide an overall grade for the ES (Figure 1). Six grades are available for each of the criteria, ranging from A (task well performed) to F (very unsatisfactory).

*Figure 1: Schematic representation of the ES Review method hierarchy*




Each ES was reviewed by two independent reviewers who then agreed final grades for the sub-categories, categories, review areas and the ES overall.

The final review therefore provides a broad view of the overall quality of the document, while also providing a narrower check on particular elements of the ESs and related EIA process.

All reviewers were briefed on the conduct of the review process for both the evaluation of ES quality, and the identification of non-pollution effects and mitigation measures. In addition, all members of the review team were supplied with copies of the amended Lee and Colley Review Package, the Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999 and the 'Guidance Notes on the Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999'.

### 3.3 Process review

An additional component of the research was the **evaluation of the current BERR process** and procedures for ES review. This was undertaken by a series of interviews with key personnel involved in this process as well as scrutiny of documents – both in relation to the procedure followed, e.g. the assessment matrix, and the reports published by the BERR on each project and its ES.

This part of the research established the approaches undertaken, their relationship with the requirements of the EU Directives and the Regulations, together with the experiences of those carrying out reviews.

A series of interviews was also undertaken with key stakeholders (including operators, consultancies and statutory consultees) concerned with the Regulations, both face-to-face and by email, to gauge the views of these stakeholders on the quality of information submitted in ESs. Appendix 2 contains the questions for the interviews and a list of those taking part.

### 3.4 Evaluation of non-pollution effects

The evaluation of non-pollution effects was undertaken by six selected postgraduate students undertaking the MA degree programme in EIA & Management at the School of Environment and Development, University of Manchester. Subsequent analysis of their findings was undertaken by members of the research team. The study of non-pollution effects was undertaken using a simple recording sheet, with supplementary questions relating to reference to relevant Strategic Environmental Assessment (SEA) studies also commissioned by the BERR. Each of the ESs was scrutinised for its coverage of potentially adverse non-pollution effects and associated mitigation measures, and this evaluation considered the following:

- Ecology
- Cultural heritage
- Economic
- Traffic (including fishing vessels)
- Other.

Each was then examined with regard to the following attributes:

- Physical presence
- Physical disturbance
- Visual
- Noise
- Vibration
- Waste
- Other.

### 3.5 Analysis

The 35 ESs reviewed for this research provided a representative sample for analysis based on the types of operator and their experience, together with different types of projects in relation to size, location, environmental sensitivity, etc. As well as a broader analysis of quality for the sample as a whole, further analysis explored trends in quality over time as well as in relation to the criteria indicated above. Given the small overall sample size, and therefore very small sub-sets of that sample, statistical analysis of the data is not presented.

This report contains an analysis of the quality of ESs based on the sample, together with an assessment of the process followed by BERR. The study also looked for linkages between the findings of the ES review exercise and BERR's internal procedures. The findings explore trends and are set in the context of similar review studies undertaken in the UK. The evaluation of non-pollution effects is presented in a separate section (Appendix 3) but has been used to support broader conclusions about the treatment of mitigation in ESs for offshore projects.

The report finally makes recommendations – where relevant – to improve practice for the preparation of ESs, and to improve the procedures followed by BERR.

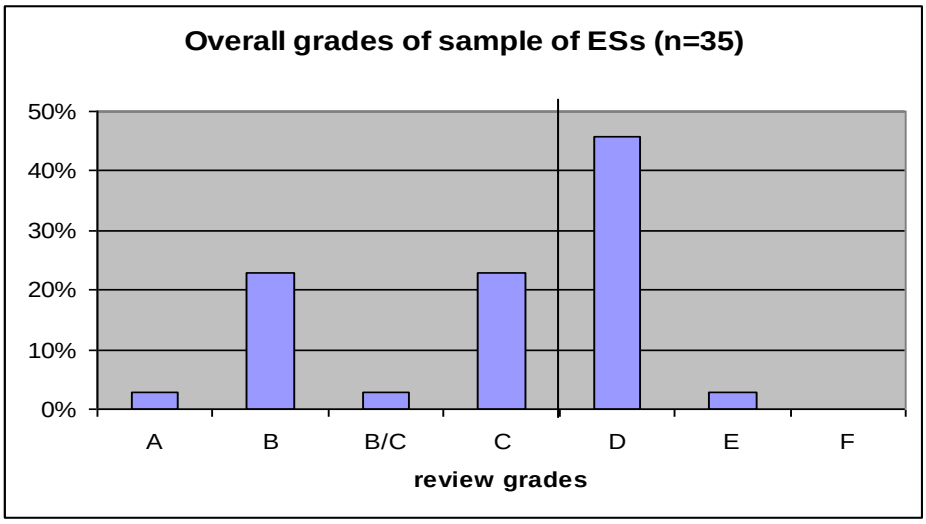
# 4 Findings

## 4.1 Overall ES quality

The analysis of the overall quality of the sample of 35 ESs (Figure 2) indicated that 51% were of a satisfactory quality (graded A, B or C) with the remainder of unsatisfactory quality (graded D or E). All but one of the unsatisfactory ESs were graded as D – just unsatisfactory, which was the most common grade, given to 16 (46%) ESs. None of the ESs reviewed in the sample received the lowest grade of F (very unsatisfactory). Only a small proportion of the sample (6% or one ES) received either the highest (A: 'well performed') or very low (E: 'not satisfactory') grades.

The average grade can be calculated by assigning numbers to the A-F grades. Sine the majority of the 35 ESs in the sample received grades of D and C, and overall the percentage of A-C and D-E grades were very similar, this pulls the average grade down to just below a C grade, i.e. nearly satisfactory.

*Figure 2: Overall quality of the sample of 35 ESs*



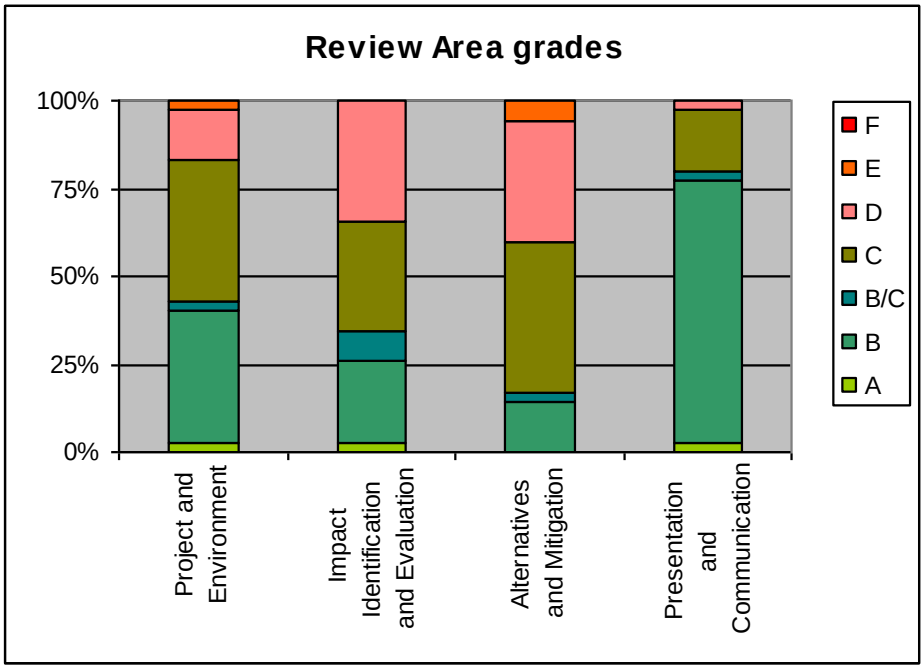

*Note: Line marks boundary between A-C and D-F grades, i.e. 'satisfactory' and 'unsatisfactory'*

Of the 17 ESs that did not achieve a satisfactory grade overall, just under half (47%) were regarded as unsatisfactory due to poor performance in one review area, 35% were unsatisfactory in two review areas, and 18% were unsatisfactory in three review areas. Unsatisfactory grades were mainly due to problems with the identification and evaluation of key impacts (review area 2 – see section 4.2.2), and the treatment of alternatives and mitigation (review area 3) (see section 4.2.3).

## 4.2 Quality of Review areas

The four review areas showed some marked differences as indicated in Figure 3. The communication and presentation of the information were graded as particularly high. This review area showed a high percentage of B grades and only one of the ESs obtained an unsatisfactory grade (grade D). The description of the project and environment was also performed well with 83% of the ESs achieving satisfactory grades, divided mainly between B and C.

*Figure 3:Quality of review areas*




*Note: Grades A-C - 'satisfactory'; grades D-F - 'unsatisfactory'*

The weakest review area was that dealing with the treatment of alternatives and mitigation, with only 60% of the ESs achieving satisfactory grades, mainly C, and two ESs being assigned grade E – 'not satisfactory'. The identification and evaluation of impacts was also a weaker review area, with 66% of the ESs achieving satisfactory grades.

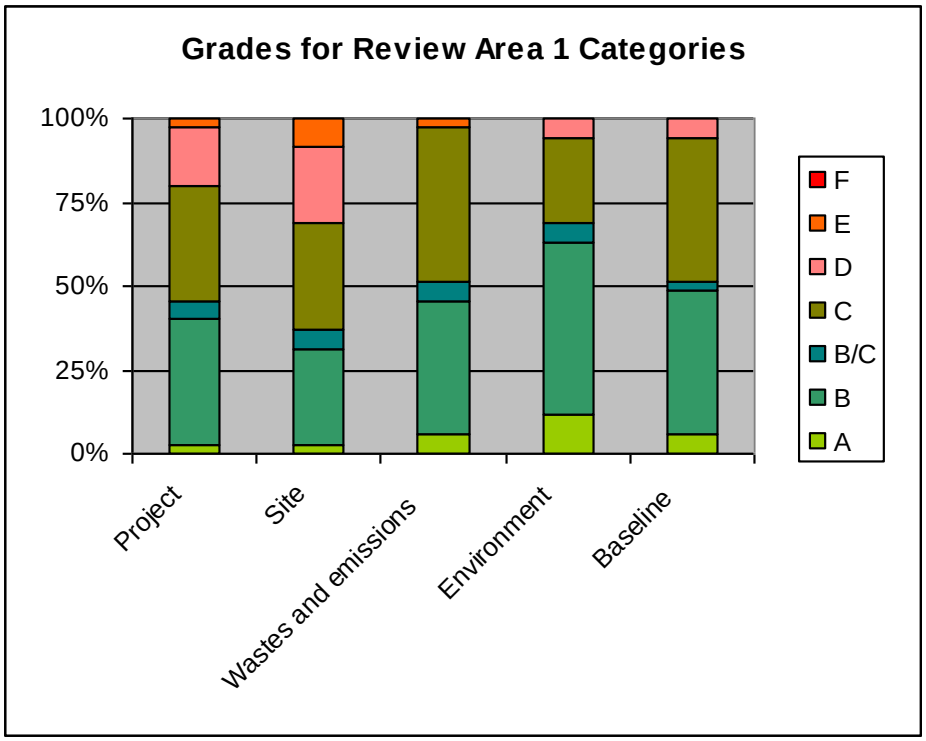
### 4.2.1 Review area 1 – Description of the project and environment

This review area covered issues relating to the project and its surrounding environment, through analysis of five categories:

- Project
- Site
- Wastes and emissions
- Environment
- Baseline.

The categories for wastes and emissions, the environment, and the baseline were all performed well with more than 94% of the 35 ESs graded as satisfactory (Figure 4). The other two categories – the project and the site – were performed slightly less well in comparison, but nevertheless 69% of the ESs still achieved a satisfactory grading for coverage of the site, and 80% achieved a satisfactory grading for coverage of the project.

*Figure 4: Quality of review area 1*




*Note: Grades A-C - 'satisfactory'; grades D-F - 'unsatisfactory'*

The reviewers noted that weaker elements dealing with the description of the project included inadequate attention to the purpose and design of projects; the interpretation of the design of the project; and the use of general, rather than project specific, illustrative material. It was also noted that the description of the baseline was variable in quality, with often an unbalanced reliance on existing knowledge (i.e. a failure to collect new data).

Since 2000, the BERR has undertaken **strategic environmental assessment (SEA) studies** for key areas of the waters around the British Isles. Of the 35 ESs analysed, 14 (40%) made no reference to these studies in establishing the baseline for their assessments. (It should be noted that no relevant SEA study existed for the four Eastern Irish Sea projects when the ESs were prepared.) 16 ESs (46%) made reference to one of these SEAs, and five ESs (14%) drew on more than one SEA. The SEA referenced most frequently (68% of the 25 references to SEA studies) was 'SEA2' (first prepared in 2001) which covers the majority of the UK's North Sea oil and gas fields. While just under half (44%) of the ESs prepared in 2002 that could have referred to a SEA made no such reference, it was noted that all of the ESs prepared in 2005 that could have referred to an SEA did refer to the BERR studies.

### 4.2.2 Review area 2 – Impact identification and evaluation of key impacts

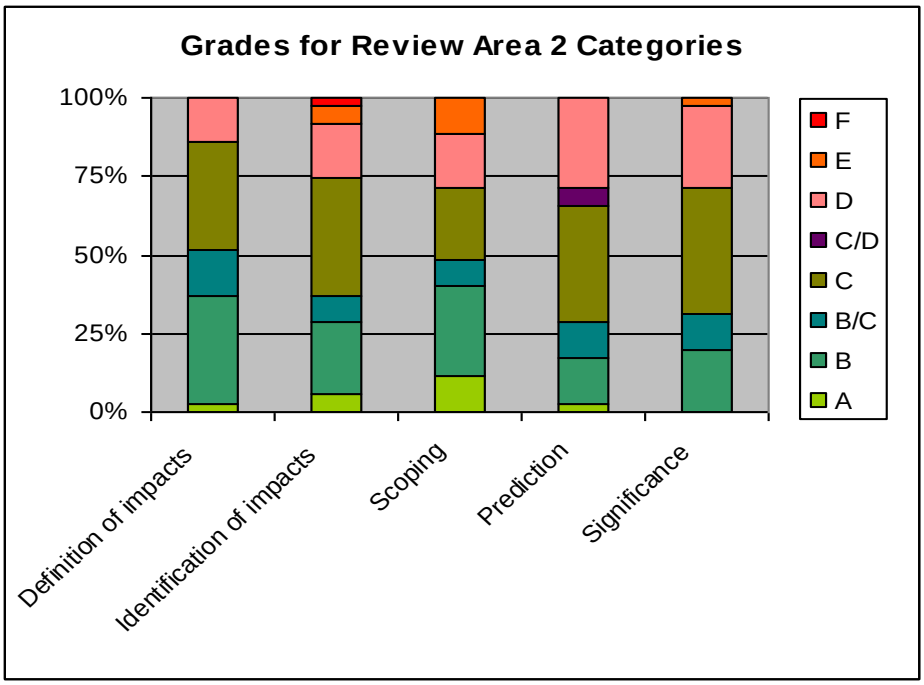
The review area dealing with the identification and evaluation of key impacts covered five categories:

- Definition of impacts
- Identification of impacts
- Scoping

- Prediction of impacts
- Significance of impacts.

All the categories were generally performed well with satisfactory grades being achieved for more than 70% of the ESs (Figure 5). The definition of impacts was the best performed category (86% satisfactory) and the prediction of impacts was comparatively the weakest (66% satisfactory and 6% borderline or C/D).

*Figure 5: Quality of review area 2*




*Note: Grades A-C - 'satisfactory'; grades D-F - 'unsatisfactory'*

Comments from the ES reviewers highlighted that methods and approaches used in the assessment were not always explained in detail. Also, scoping was often poor, with impacts identified at this stage not always clearly relevant to the subsequent assessment. It was also noted that the magnitude and significance of impacts tended to be confused in the ESs. The methods of estimating magnitude were not explained and the prediction of impacts was not always linked very clearly to the baseline environment. Significance tended to be based on the degree of environmental change or standards, with no justification of value judgements.

The sample ESs indicated that consultation undertaken by operators during the EIA process, particularly during scoping, tended, often of necessity, to be with a relatively limited and focussed set of stakeholders[3], with wider public or NGO groups rarely included. These stakeholders tended to be mainly statutory consultees together with specific focus groups, e.g. those representing fishing interests.

The evaluation of **non-pollution effects** (see Appendix 3) showed that the identification and evaluation of impacts tended to focus on a limited range of impact types. Whilst this might have been the outcome of the scoping, the sample of ESs reviewed did not make this clear, and the limited range of impacts

[3]All ESs in the sample were checked to establish the various consultees and other stakeholders listed, in particular when drawing up the list of potential interviewees.

identified seemed to be based on a standard list related to the type of project. Ecological effects were addressed most frequently, and mainly in relation to the physical presence of projects, their physical disturbance, noise and waste emissions. Economic and traffic effects were addressed less often and cultural heritage was rarely addressed. Visual impacts and vibration were rarely addressed in relation to any of the non-pollution effects. Where vibration was addressed, it was in relation to ecology. Overall, non-pollution effects did not tend to be regarded as significant, other than for impacts on ecology, particularly in relation to the physical presence and any physical disturbance caused by the project.

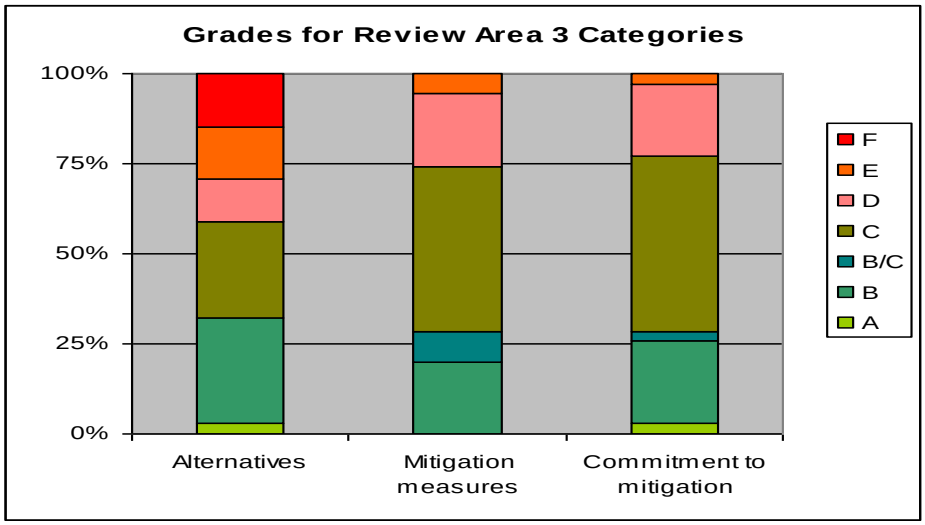
### 4.2.3 Review area 3 – Treatment of alternatives and mitigation

This review area covered the treatment of alternatives in relation to the project and the proposals for the mitigation of impacts, through analysis of three categories:

- Alternatives
- Mitigation measures
- Commitment to mitigation.

The treatment of alternatives (Figure 6) was the weakest category with 59% of the ESs achieving satisfactory grades, and just under one third (29%) being graded as E (not satisfactory) or F (very unsatisfactory).

*Figure 6: Quality of review area 3*




*Note: Grades A-C - 'satisfactory'; grades D-F - 'unsatisfactory'*

The coverage of mitigation measures and the commitment of operators to implementing these mitigation measures were comparatively better performed with 74% and 77% respectively achieving satisfactory grades.

Weaker elements noted by the reviewers included the limited coverage given to alternative sites, and a justification of alternative methodologies based mainly on cost. The likely effectiveness of any mitigation measures was rarely covered, as were any likely residual impacts. Monitoring proposals were weak and rarely linked to environmental management systems (EMSs) - although such systems were mentioned in many of the ESs.

The analysis of the **non-pollution effects** showed that whilst the majority of the ESs (89%) addressed alternatives, there was a particular focus on alternative designs (81% of the ESs), followed by alternative processes (61%) and then alternative sites (39%); confirming the observations of the reviewers summarised above.

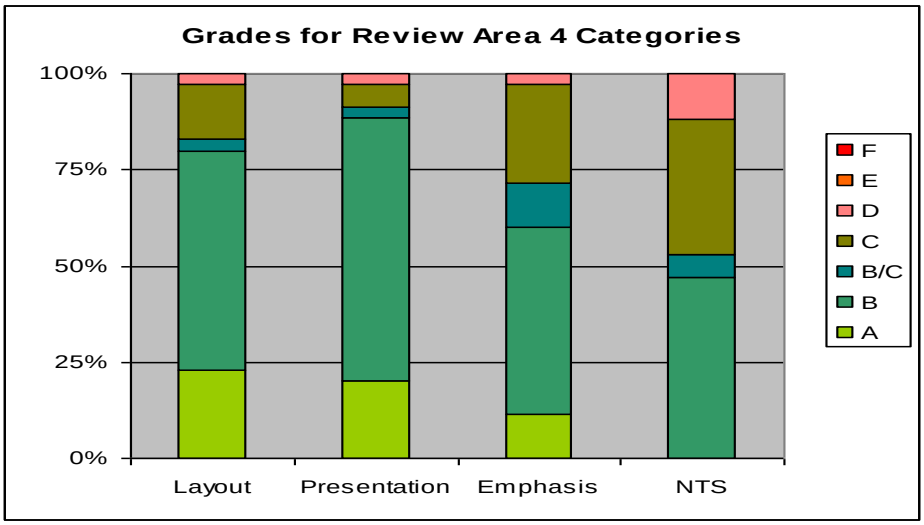
### 4.2.4 Review area 4 –Communication and presentation of the information

The review area dealing with the communication and presentation of the information in the ESs covered four categories:

- Layout
- Presentation
- Emphasis
- Non-technical summary (NTS).

All categories performed well (Figure 7), although the NTS was comparatively the weakest with 88% achieving satisfactory grades compared to 97% for the other categories.

*Figure 7: Quality of review area 4*




*Note: Grades A-C - 'satisfactory'; grades D-F - 'unsatisfactory'*

A point noted by the reviewers was that the NTSs were often not totally consistent with the main body of the ESs. This related mainly to the coverage of the project; for example, the detailed description of the project was sometimes only contained in the NTS, together with detailed diagrams relating to the project and its operation. In addition, the NTSs rarely covered the assessment methods and approaches used to evaluate the likely impacts.

## 4.3 Key strengths and weaknesses

The 17 review categories within each of the four review areas allowed further observations to be made regarding the key strengths and weaknesses of the ESs and, by inference, the performance of the EIA process tasks underlying these aspects.

Categories which achieved the highest grades of A or B for 50% or more of the 35 ESs in the sample were regarded as key strengths (Table 2), while those

categories which only achieved the lowest grades of E or F for 50% or more of the ESs were regarded as key weaknesses; no such identified weaknesses were apparent.

*Table 2: Key strengths of the sample of 35 ESs*

| Review Areas | Strengths |
|---|---|
| 1. Description of the project and environment | • Environment<br>• Baseline |
| 2. Identification and evaluation of impacts | |
| 3. Treatment of alternatives and mitigation | |
| 4. Communication and presentation of the information | • Layout<br>• Presentation<br>• Emphasis |

Table 2 indicates that only five of the 17 categories were performed to a relatively high standard and these were divided between review areas 1 and 4. These two review areas relate to the rather more straightforward elements of the information to be provided in an ES, and thus the simpler tasks within the wider EIA process. However, it is also clear that there were no categories which could be regarded as clear areas of weakness. This reflects the large number of C (just satisfactory) and D (just unsatisfactory) grades indicated in Figures 4-7, and the relatively small proportion of very low grades within the overall rating of unsatisfactory.

The top six categories having the highest proportion of A or B grades were:

1. Presentation (4.2) (**best performed**)
2. Layout (4.1)
3. Environment (1.4)
4. Emphasis (4.3)
5. Baseline (1.5)
6. NTS (4.4)

And the bottom six categories having the lowest proportion of A or B grades were:

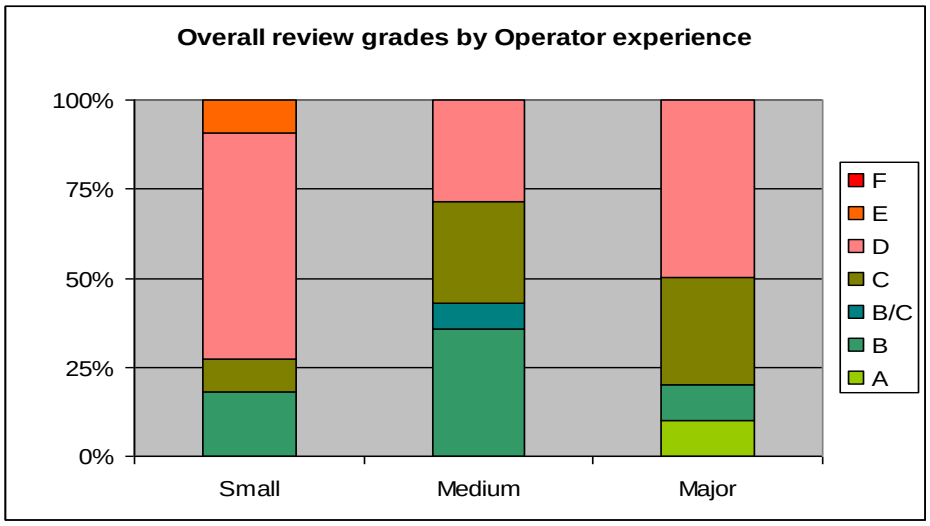
12. Site (1.2)
13. Identification of impacts (2.2)
14. Commitment to mitigation (3.3)
15. Significance (2.5)
16. Mitigation measures (3.2)
17. Prediction (2.4) (**worst performed**)

This ordering confirms the better performance of tasks related to the description of the project and environment (review area 1), and the communication and presentation of the information (review area 4), as opposed to the weaker performance of tasks associated with the more difficult elements of the EIA process in identifying, predicting and mitigating impacts and the consideration of alternatives (review areas 2 and 3).

### 4.4 Influence of operator experience

The experience of operators in preparing ESs for offshore oil and gas projects seemed broadly to relate to the **overall ES quality** (Figure 8), with medium experience operators producing the most ESs with satisfactory grades, and those with least experience producing the fewest ESs with satisfactory grades.

*Figure 8: Overall quality of ESs by operator experience*



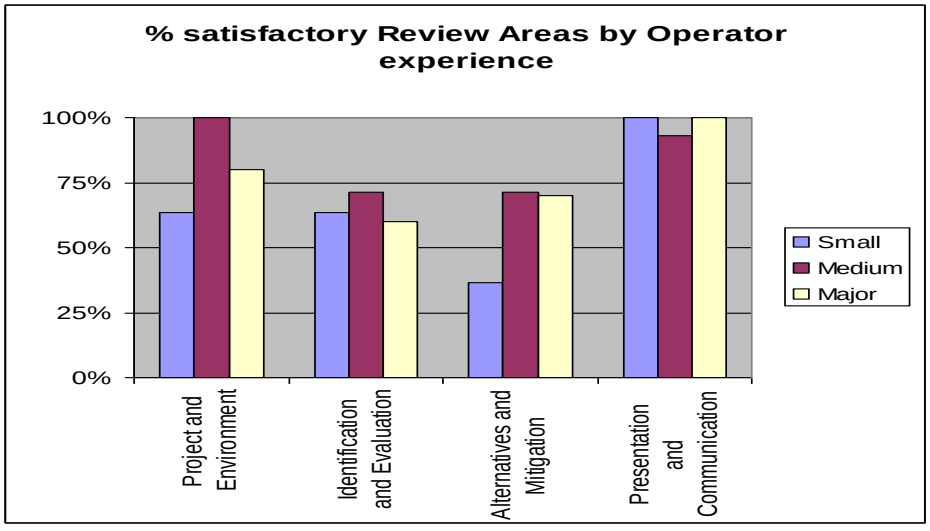

*Note: Grades A-C - 'satisfactory'; grades D-F - 'unsatisfactory'*

Only 27% of ESs submitted by operators with relatively little experience were satisfactory, with the majority (64%) being graded as D (just unsatisfactory). The one ES to obtain an E grade (not satisfactory) was from a relatively inexperienced operator.

Those operators having a medium level of experience had the highest proportion (71%) of satisfactory ESs. The ESs submitted by more experienced operators were equally divided in terms of being satisfactory/unsatisfactory. However, the only ES to obtain the highest grade of A (well performed) was submitted by a major experience operator.

The relationship between the experience of the operators and ES quality indicated above was also seen when considering individual **review areas**. The communication and presentation of the information in the ESs (review area 4) was undertaken well regardless of operator experience. Medium experience operators produced the highest percentage of satisfactory ESs in each of the other three review areas (Figure 9).

*Figure 9: Quality of review areas by operator experience*



Those with least experience were the weakest in describing the project and environment, and also the treatment of alternatives and mitigation. The operators with most experience were the weakest in dealing with the identification and evaluation of impacts.

Analysis of the **review categories** showed that the medium experience operators had consistently submitted ESs with the highest percentage of satisfactory review grades (minimum of 71% satisfactory), and that the operators with least experience were invariably the weakest (Table 3).

*Table 3: Percentage satisfactory review categories by operator experience*

| | Operator experience | | |
|---|---|---|---|
| **Review categories** | **Small** | **Medium** | **Major** |
| Project (1.1) | 55% | 100% | 80% |
| Site (1.2) | 64% | 71% | 70% |
| Wastes and emissions (1.3) | 91% | 100% | 100% |
| Environment (1.4) | 91% | 100% | 90% |
| Baseline (1.5) | 91% | 100% | 100% |
| Definition of impacts (2.1) | 82% | 93% | 80% |
| Identification of impacts (2.2) | 64% | 79% | 80% |
| Scoping (2.3) | 64% | 79% | 70% |
| Prediction (2.4) | 64% | 79% | 50% |
| Significance (2.5) | 73% | 71% | 70% |
| Alternatives (3.1) | 45% | 79% | 44% |
| Mitigation measures (3.2) | 55% | 79% | 90% |
| Commitment to mitigation (3.3) | 55% | 86% | 90% |
| Layout (4.1) | 91% | 100% | 100% |
| Presentation (4.2) | 100% | 100% | 90% |
| Emphasis (4.3) | 100% | 93% | 100% |
| NTS (4.4) | 90% | 93% | 80% |

In particular, the least experienced operators experienced most problems with:

- Project (1.1)
- Site (1.2)
- Identification of impacts (2.2)
- Scoping (2.3)
- Alternatives (3.1)
- Mitigation measures (3.2)
- Commitment to mitigation (3.3)

Major experience operators generally performed well, but seemed to have specific difficulties when predicting impacts (2.4), and in dealing with alternatives (3.1).

The difference in performance between operators in relation to their experience was less marked in terms of the proportion of ESs having the highest grades (A and B) for the review categories. Nevertheless, it was clear that the least experienced operators produced the fewest high quality grades.

The operators with least experience were most likely to utilise the BERR **SEA studies** (71% of ESs), followed by those with medium experience (64% of ESs), with the most experienced operators least likely to draw on the SEA studies (55% of ESs).

Of the 35 ESs in the sample, 26 indicated the **use of consultancies**. The remaining nine ESs were presumed to have been prepared solely by the operator (in the absence of any indication to the contrary) and showed a much lower proportion of satisfactory ESs (33%) than that found for the overall sample (51%).

### 4.5 Influence of project type

In terms of **overall ES quality**, the ESs for the 24 field developments showed higher overall satisfactory grades (54% graded A-C) than the nine ESs for the exploration wells (44% graded A-C). For the two pipeline ESs, one was satisfactory and the other was unsatisfactory.

The grades for the **review areas** also showed some variation based on project type (Table 4).

*Table 4: Percentage satisfactory ESs by review areas*

| Review Areas | Field development | Exploration well | Pipeline |
|---|---|---|---|
| 1. Description of the project and environment | 79% | 89% | 100% |
| 2. Identification and evaluation of impacts | 67% | 67% | 50% |
| 3. Treatment of alternatives and mitigation | 63% | 44% | 100% |
| 4. Communication and presentation of the information | 96% | 100% | 100% |

Exploration wells and field developments were broadly similar for identification and evaluation of key impacts (review area 2), with 67% 'satisfactory'; and for communication and presentation of the information (review area 4), with more than 95% 'satisfactory'. However, field developments were less satisfactory than exploration wells when describing the project and environment, and the position was reversed for the treatment of alternatives and mitigation with less than half of the exploration wells graded as satisfactory. The two pipeline projects in the sample both showed satisfactory performance across the review areas apart from one which was unsatisfactory in the identification and evaluation of impacts.

Analysis of the **review categories** showed that there was little overall difference between field developments and exploration wells in terms of the percentage of satisfactory review grades (Table 5).

Pipelines showed the highest number of categories with a percentage satisfactory rating, but also had the lowest rating for four of the categories. However, only two pipeline ESs were included in the sample, as these were the only pipeline ESs submitted during the period 2002-2005.

When comparing the percentage satisfactory grades for field developments and exploration wells there was little difference in performance. However, exploration wells seemed to be stronger in dealing with prediction (2.4) and particularly mitigation measures (3.2). Conversely, field developments seemed much stronger when covering alternatives (3.1).

*Table 5: Percentage satisfactory review categories by project type*

| | Project type | | |
|---|---|---|---|
| **Review categories** | **Field development** | **Exploration well** | **Pipeline** |
| Project (1.1) | 79% | 78% | 100% |
| Site (1.2) | 71% | 67% | 50% |
| Wastes and emissions (1.3) | 96% | 100% | 100% |
| Environment (1.4) | 92% | 100% | 100% |
| Baseline (1.5) | 92% | 100% | 100% |
| Definition of impacts (2.1) | 83% | 89% | 100% |
| Identification of impacts (2.2) | 75% | 78% | 50% |
| Scoping (2.3) | 75% | 67% | 50% |
| Prediction (2.4) | 58% | 78% | 100% |
| Significance (2.5) | 75% | 67% | 50% |
| Alternatives (3.1) | 63% | 38% | 100% |
| Mitigation measures (3.2) | 67% | 89% | 100% |
| Commitment to mitigation (3.3) | 75% | 78% | 100% |
| Layout (4.1) | 96% | 100% | 100% |
| Presentation (4.2) | 96% | 100% | 100% |
| Emphasis (4.3) | 96% | 100% | 100% |
| NTS (4.4) | 79% | 78% | 100% |

The difference in performance relating to project types was more marked in terms of the proportion of ESs having the highest grades (A and B) for the review categories. Key strengths for the two main project types in comparison with each other were:

**Field developments**
- Project (1.1)
- Definition of impacts (2.1)
- Identification of impacts (2.2)
- Significance (2.5)
- Alternatives (3.1)
- NTS (4.4)

**Exploration wells**
- Site (1.2)
- Wastes and emissions (1.3)
- Environment (1.4)
- Prediction (2.4)
- Layout (4.1)
- Presentation (4.2)

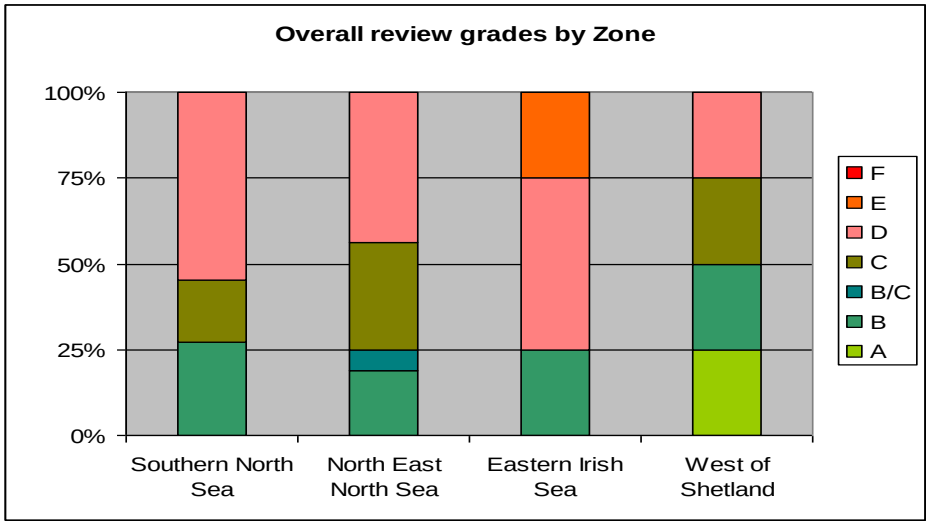
The analysis of **non-pollution effects** showed that pipelines were more likely to consider alternative locations; exploration wells were more likely to consider alternative processes, and field developments were more likely to consider alternative designs.

Exploration wells (70% of ESs) were more likely to refer to **SEA studies** when dealing with baseline studies than field developments (59% of ESs). Both the pipeline ESs also made reference to SEA studies.

### 4.6 Influence of geographical zone

The **overall ES quality** showed no major differences between the two North Sea zones - which represent most activity for offshore oil and gas development. They showed broadly similar proportions of satisfactory ESs (Figure 10). Just over half of the ESs (56%) from the North East North Sea were graded as satisfactory, and just under half (45%) from the Southern North Sea were satisfactory.

*Figure 10: Overall quality of ESs by geographical zone*

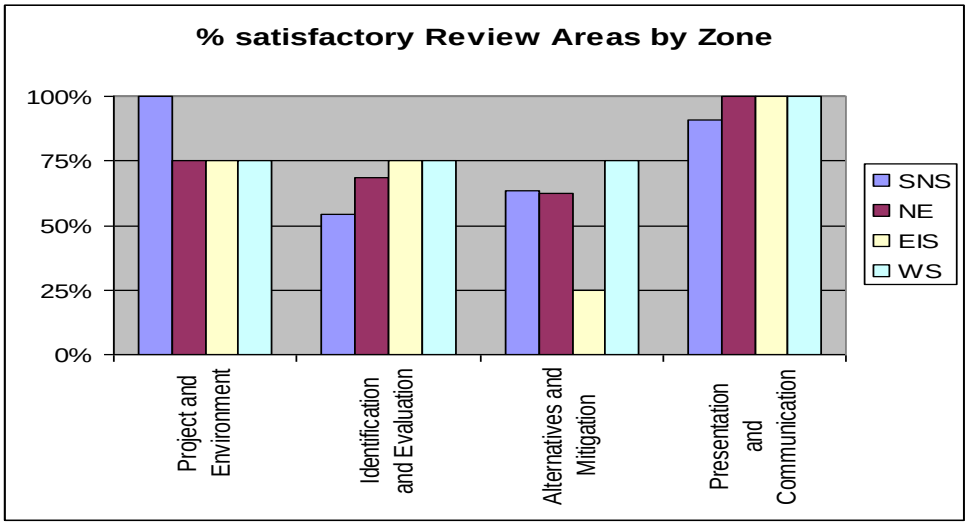



*Note: Grades A-C - 'satisfactory'; grades D-F - 'unsatisfactory'*

Only one ES submitted from the Eastern Irish Sea zone was graded as 'satisfactory', and only one ES from the West of Shetland was 'unsatisfactory'. However, care needs to be exercised in interpreting this data as the sample only contained four ESs from each of these two zones.

Some differences between the geographical zones was noted when considering the **review areas**, with 75% or more of the ESs for each zone graded as 'satisfactory' for description of the project and environment, and for the communication and presentation of the information (see Figure 11). The Southern North Sea showed the weakest performance in identification and evaluation of impacts (55% satisfactory), with the North East North Sea somewhat higher (69% satisfactory). Both the North Sea zones were similar for the treatment of alternatives and mitigation with just under two-thirds graded as satisfactory. However, only one of the four Eastern Irish Sea ESs achieved a satisfactory grade for this review area.

*Figure 11: Quality of review areas by geographical zone*



Analysis of the **review categories** showed that the four ESs from the West of Shetland zone performed particularly well, with at least three of the four ESs always achieving satisfactory grades. The non-pollution effects data highlighted that the 75% satisfactory coverage of alternatives in the West of Shetland zone had given particular attention to alternative processes.

The four Eastern Irish Sea ESs also achieved a high number of satisfactory grades, but a particular weakness was apparent in the coverage of alternatives (category 3.1) (Table 6).

*Table 6: Percentage satisfactory review categories by geographical zone*

| | **Geographical zone** | | | |
|---|---|---|---|---|
| **Review categories** | **Southern North Sea** | **North East North Sea** | **Eastern Irish Sea** | **West of Shetland** |
| Project (1.1) | 100% | 75% | 50% | 75% |
| Site (1.2) | 73% | 63% | 75% | 75% |
| Wastes and emissions (1.3) | 100% | 100% | 75% | 100% |
| Environment (1.4) | 100% | 88% | 100% | 100% |
| Baseline (1.5) | 100% | 88% | 100% | 100% |
| Definition of impacts (2.1) | 82% | 81% | 100% | 100% |
| Identification of impacts (2.2) | 73% | 75% | 75% | 75% |
| Scoping (2.3) | 64% | 69% | 100% | 75% |
| Prediction (2.4) | 55% | 69% | 50% | 100% |
| Significance (2.5) | 73% | 81% | 50% | 50% |
| Alternatives (3.1) | 60% | 63% | 25% | 75% |
| Mitigation measures (3.2) | 82% | 69% | 50% | 100% |
| Commitment to mitigation (3.3) | 82% | 69% | 75% | 100% |
| Layout (4.1) | 100% | 94% | 100% | 100% |
| Presentation (4.2) | 100% | 94% | 100% | 100% |
| Emphasis (4.3) | 91% | 100% | 100% | 100% |
| NTS (4.4) | 81% | 84% | 80% | 96% |

Of the remaining 27 ESs from the North Sea, those from the Southern North Sea performed marginally better than those from the North East North Sea. The weakest category for the Southern North Sea ESs was prediction (2.4) with just over half achieving satisfactory grades for this category.

This marginal difference in performance relating to geographical zones was reinforced by the proportion of ESs having the highest grades (A and B) for the review categories. Key strengths derived from a comparison of the two North Sea zones were:

**Southern North Sea**
- Site (1.2)
- Environment (1.4)
- Baseline (1.5)
- Prediction (2.4)
- Mitigation measures (3.2)
- Commitment to mitigation (3.3)

**North East North Sea**
- Significance (2.5)
- Emphasis (4.3)

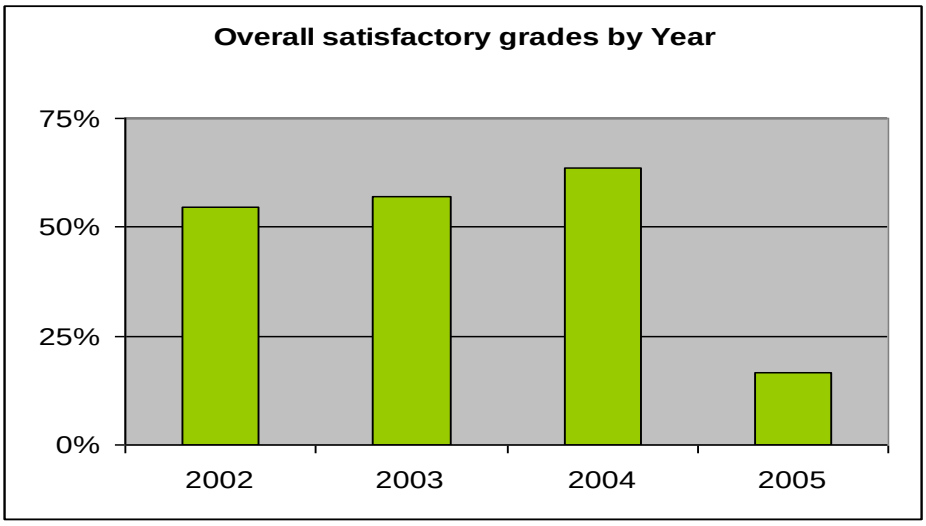
The non-pollution effects data highlighted that the consideration of both alternative designs and processes seemed to be associated with projects in the North East North Sea zone.

The majority of the ESs in the sample were submitted for projects in the North Sea, with those from the Southern North Sea more likely (83% of ESs) to refer to an **SEA study**. ESs from the North East North Sea only referred to SEA studies in 65% of cases. Three of the four ESs from West of Shetland referred to 'SEA1' (2000) which specifically covered the waters to the north and west of Shetland. For the four ESs from the Eastern Irish Sea, no relevant SEA study existed when the ESs were prepared.

### 4.7 Influence of Year of ES submission

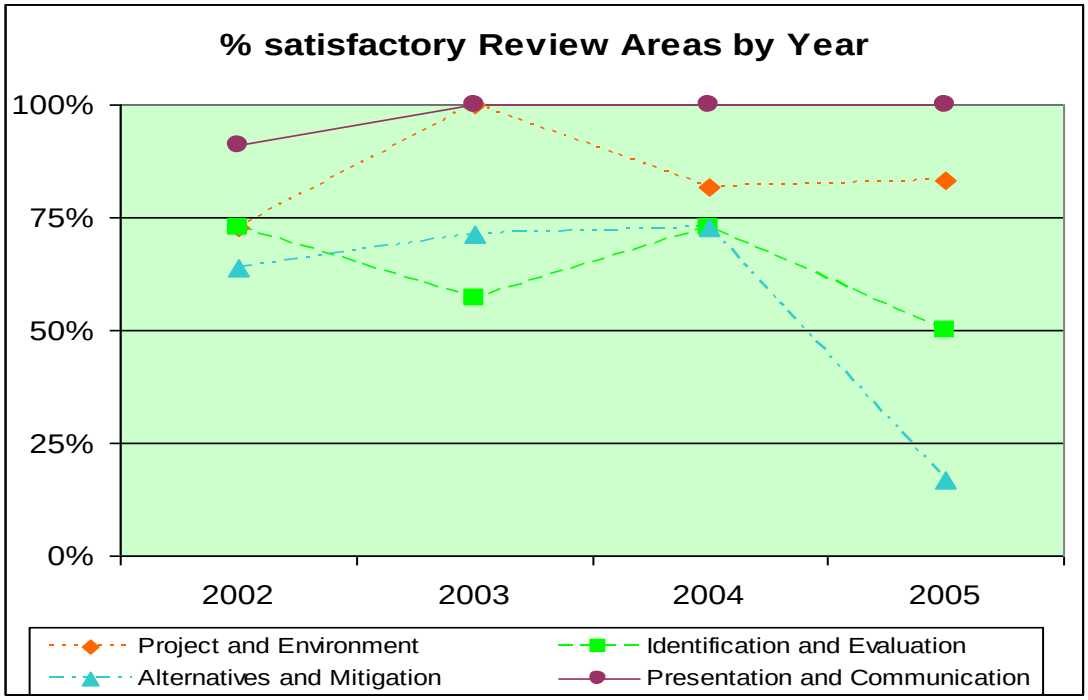
There seemed to be slight trend of **overall ES quality** improvement from 2002 to 2004 (Figure 12) with the proportion of satisfactory ESs increasing from 55% to 64%. However, a dramatic fall in quality was seen in 2005, with less than 20% graded A-C, and the average grade also fell slightly from 2002 to 2004, from grade C to just below grade D. This was due to the increasing number of grade C ESs and a broadly consistent number of grade D ESs.

*Figure 12: Overall quality of ESs by year*




The **review areas** showed differing patterns over time, but the communication and presentation of the information achieved consistently satisfactory grades across the time period (Figure 13). The description of the project and environment fluctuated over time but remained over 70% satisfactory and showed a slight improvement over time. However, the other two review areas – identification and evaluation of impacts and the treatment of alternatives and mitigation – both showed a decrease in the percentages of satisfactory grades by 2005; contributing to the decline in the overall ES quality over the time period. Prior to 2005, the treatment of alternatives and mitigation seemed to be showing steady, if slight, improvement.

*Figure 13: Quality of review areas by year*




Analysis of the **review categories** showed that the grades tended to fluctuate over the period 2002-2005 (Table 7). The more general decline in performance during 2005 is apparent in relation to the treatment of alternatives (3.1). which was particularly weak in 2005 with only one third of ESs achieving satisfactory grades.

*Table 7: Percentage satisfactory review categories by year*

| Review categories | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|
| Project (1.1) | 73% | 100% | 82% | 67% |
| Site (1.2) | 64% | 86% | 64% | 67% |
| Wastes and emissions (1.3) | 91% | 100% | 100% | 100% |
| Environment (1.4) | 91% | 100% | 91% | 100% |
| Baseline (1.5) | 91% | 100% | 91% | 100% |
| Definition of impacts (2.1) | 91% | 86% | 82% | 83% |
| Identification of impacts (2.2) | 73% | 86% | 73% | 67% |
| Scoping (2.3) | 91% | 86% | 73% | 67% |
| Prediction (2.4) | 64% | 71% | 73% | 50% |
| Significance (2.5) | 64% | 86% | 73% | 67% |
| Alternatives (3.1) | 50% | 86% | 64% | 33% |
| Mitigation measures (3.2) | 82% | 71% | 82% | 50% |
| Commitment to mitigation (3.3) | 82% | 86% | 64% | 83% |
| Layout (4.1) | 100% | 100% | 91% | 100% |
| Presentation (4.2) | 100% | 100% | 100% | 83% |
| Emphasis (4.3) | 91% | 100% | 100% | 100% |
| NTS (4.4) | 70% | 100% | 100% | 83% |

The difference in performance over time was also apparent when considering the proportion of ESs having the highest grades (A and B) for the review categories. During both 2002 and 2003 an average of approximately half of the review

categories achieved grades A and B, whereas during 2004 and 2005 this proportion had fallen to an average of approximately one third.

There was increasing reference to the **SEA studies** when dealing with baseline information, from 56% of the ESs in 2002 to all of the ESs in 2005; reflecting the consultation and publication schedules for the SEAs.

### 4.8 Business, Enterprise and Regulatory Reform evaluation process

The evaluation of the current BERR process and procedures for ES review involved interviews with key personnel involved in this process (see Appendix 2) and scrutiny of documents.

Staff in the Environmental Management Team (EMT) at BERR who are involved in the evaluation of ESs provide a wide range of experience, but mainly in relation to the oil and gas sector and with backgrounds as biologists, chemists, marine specialists, and environmental management.

The assessment matrix, prepared within the EMT to guide staff in the evaluation of information in ESs, tends to be used when staff join the unit. However, as experience develops – of the EIA process and the oil and gas sector, and also in relation to the history of individual projects - there is less emphasis on a routine checklist approach using the assessment tables. This experience is a key factor in the evaluation of information, with most staff remaining in post for six years. The focus of the evaluation is on ensuring all relevant major concerns are included in the ESs, with a best practice approach in their treatment. Minor issues are less of a concern and covered in less detail. In addition, EMT staff draw on the statutory consultees and other specialists for advice and views when evaluating the ESs.

The main weaknesses in the ESs noted by EMT staff are: the lack of clear connections between the assessment of impacts and the individual project and the baseline; the interpretation of information and drawing of conclusions about the impacts of the project in its particular context; and the inclusion of assumptions about likely consequences without reference to supporting evidence (which often does exist). This latter point is particularly true when dealing with the significance of impacts, where the terms 'minor' and 'major' are often used without clear explanation and justification. In addition, the treatment of cumulative and transboundary issues is often quite cursory. The review of ESs also noted these shortcomings. One particular difficulty experienced in dealing with information in the ESs concerns the lack of site specific data provided and, although this is not a major issue, it corresponds with the slightly weaker performance in dealing with the site that was noted during the ES reviews (see section 4.2.1).

The main strengths of ESs observed by EMT staff are descriptions of projects, the use of existing biological data, and the structure and style of ESs. Again, this broadly matches the findings of the review of ESs (see section 4.2). The indicators of a good quality ES for EMT staff are: concise and succinct documents, with accurate data and provision of evidence to support statements and assertions. A good NTS is also important (it is therefore relevant to note the inconsistencies between the ES and its NTS in some instances – see section 4.2.4)

Some of the aspects of the projects and the information contained in the ESs are related to operations or activities requiring permits at later stages in the project cycle (if projects go ahead), e.g. atmospheric emissions and chemical use and

discharge. It therefore seemed to be accepted that these aspects might be poorly addressed in the ES.

It was also acknowledged that links between EIA and to EMSs have been weak, but this is now starting to be addressed. This echoes the lack of links between monitoring and the EMS found during the review process. In this context. OSPAR has now introduced a requirement for an EMS, and BERR has introduced an independent accreditation process; however, it was still acknowledged that this does not necessarily imply that the EMS performed a useful purpose from the point of view of supporting the EIA. In relation to this aspect, BERR has therefore requested that ESs should contain a specification of commitments, which would be taken forward as 'conditions' in the 'sign-off' letters.

EMT staff noted the need to reinforce the point that a better standard of ES quality will inevitably take less time to approve – time often being a critical factor in this industry sector. The role of scoping is therefore particularly important, and the usual industry model is to request a 'kick-off' meeting involving BERR and the relevant principal consultees, when key issues can be flagged; information made available; and approaches to the assessment discussed in broad terms.

The EMT is currently revising best practice guidance for operators that will incorporate procedures for evaluating ESs. The use of an assessment matrix and the inclusion of a commitments table will be specifically highlighted.

### 4.9 Views of stakeholders

A total of ten stakeholders were interviewed (see Methodology, 3.3, and Appendix 2) to seek their views on the quality of ESs submitted for offshore oil and gas developments, together with issues relating to the EIA process and the role played by their organisation. These stakeholders represented three operators, three consultancies and four statutory consultees. The experience of these individuals was primarily in the oil and gas sector and varied from two to 13 years. Each dealt with from two to 30 ESs per year, with the consultees inevitably dealing with a higher number per year.

Varied views were expressed on the role of scoping and the involvement of the stakeholder organisation. Operators regard the process as one that involves consultation and links to the ENVID[4] process, to ensure that all relevant aspects are covered in the subsequent assessment. Interestingly, one respondent did indicate readiness to scope issues out at this stage. Consultancies reported informal approaches to scoping with a focus on internal discussions and attention mainly to the issues to be addressed, occasionally with some discussion of specific methods with, for example, JNCC. Statutory consultees provided specific information during the scoping in relation to their organisational remit and also mentioned the role of the ENVID process at this stage in EIA.

The issue of gaps in the data constraining an assessment was not regarded as a problem by the respondents (compared with the EMT, above) and no common themes were apparent, other than that there was some mention of the use of dated baseline data and incomplete descriptions of projects.

Operators and consultancies usually undertake an internal review of ESs prior to their submission, often involving senior staff. Operators will call on the expertise

[4] ENVID is an Environmental Impact Identification screening process, that operators undertake when preparing the scoping for a proposed EIA. It is not a formal process, and operators and consultants tend to use their own screening methodologies, which are developed to take account of changes in information, guidance etc, They are not used by BERR.

of specialists to assess particular impacts, such as noise and the modelling of marine ecosystems, atmospheric emissions and discharges. The consultancies tend to rely solely on their in-house expertise.

The views as to what constituted a 'good quality' ES were wide ranging and varied. However, a concise format with easy-to-read contents was highlighted by both the operators and statutory consultees. In terms of the coverage of the ESs, all respondents indicated the importance of focussing on all potential key impacts using sound methodologies to evaluate likely risks to the environment. These views are generally in accord with the EMT. In addition, it was considered important that ESs made commitments regarding future mitigation and also met the requirements of legislation.

Statutory consultees evaluate the submitted ESs by undertaking a review that draws on their own expertise and that of others in their organisation, to assess both the 'quality' and to perform a compliance check. The expertise of relevant experts in other statutory consultees is used occasionally. Past ESs are used as learning for future practice, although this 'learning' is not always passed back to the authors of ESs. When reviewing ESs, statutory consultees acknowledged difficulties with particular impacts, notably from chemical discharges and atmospheric emissions. Wider issues relate to the concept of feasible mitigation for certain impacts, such as rock dumping; cumulative and synergistic impacts; climate change; and the problem of data not being available.

The main strength of the EIA process identified by the majority of the statutory consultees was consultation; with ESs generally having good coverage of project elements (also highlighted by the EMT), and survey work where it had been undertaken.

The main weaknesses experienced by statutory consultees included:

- lack of surveys,
- out-of-date baseline data,
- lack of sample replication,
- lack of justification for statements of significance, particularly where there is evident uncertainty,
- lack of industry memory regarding good or bad practice,
- the layout of ESs, and
- insufficient editing of 'template' ESs.

Applications for offshore oil and gas licensing are subject to a range of legislative requirements of which EIA is only one. Consultancies tend to concentrate on the requirements of the EIA and Habitats Directives in their work, and statutory consultees focus on their own particular remit in relation to whatever legislation is being addressed. It is the operators who must draw on their experience to deal with any potential conflicts and overlaps. Respondents regarded the relationship between EIA and EMS as insufficiently integrated (as yet) to ensure that adequate review and monitoring arrangements are in place for projects following EIA approval (as did the EMT). The responsibility for such integration falls inevitably to the operators, who of necessity manage EMSs for their organisations.(now that all have an EMS in place).

In terms of the capacity of the respective stakeholders to deliver their roles in addressing quality issues within EIA, there was a uniform response that the necessary expertise existed within their respective organisations. On-the-job training was a universal means of developing expertise, with recruitment of staff with relevant qualifications and knowledge also being important. More formal

specific training tended to be patchy, and more likely within the consultancies and statutory consultees.

A range of other comments were made concerning the EIA process and ES quality, including:

- little emphasis on benefits of projects,
- EIA not often accorded sufficient importance given the crucial role it plays,
- operators tend to engage in EIA as a matter of compliance with legislation rather than embracing a broader commitment to environmental sustainability,
- little learning from past experience, and
- the potential benefit of establishing a virtual/actual forum or committee to share experiences and discuss current and likely future issues of concern.

# 5 Conclusions

## 5.1 Key findings

Of the 35 ESs analysed, just over half (51%) were of satisfactory **overall quality** (although the average grade was just below the C grade, reflecting the number of ESs that were graded D or just unsatisfactory). None were of very poor quality, and a few were of the highest quality. Of the 49% of ESs that were regarded as unsatisfactory overall, this was mainly due to weaker performance in just one review area.

The strongest **review areas** were those concerned with communication and presentation of information and in describing the project and its surrounding environment. The other two review areas - alternatives and mitigation (60% ESs satisfactory) and impact identification and evaluation (66% ESs satisfactory) - were relatively weaker but most ESs still achieved satisfactory grades. This finding is consistent with similar studies on ES quality in the UK and elsewhere.

The categories assessed when **describing the project and its surrounding environment** were all generally performed well and 60% of the ESs made reference to SEA studies, mainly SEA2 (2001) which covers the mature areas of the North Sea.

Although **impact identification and evaluation** was one of the comparatively weaker aspects of the ESs, none of categories associated with this review area showed clear weaknesses. The weaker elements reflected in the review process and in comments from reviewers tended to relate mainly to impact identification, scoping and, particularly, prediction of impacts. The non-pollution effects study highlighted the limited range of impact types typically addressed in the ESs, and the tendency to regard most impacts as insignificant.

Analysis of the **treatment of alternatives and mitigation** in the ESs and the detailed examination of non-pollution effects showed that alternatives tended to focus on designs and processes rather than sites, and that the justification for choices was mainly related to cost. This more limited coverage of alternatives may be related to the types of projects, which by their nature can restrict the range of alternatives available for consideration. In addition the consideration of alternatives was regarded as most appropriate where sensitive habitats or species had been identified. The effectiveness of mitigation measures and residual impacts were also covered less often. Although many ESs highlighted the EMSs of the operators, these were rarely linked to the review and monitoring of impacts

and the effectiveness of the mitigation measures at the operational stage – an issue already being dealt with more generally by BERR (see 4.8).

The **communication and presentation of information** was consistently performed well in all the ESs in the sample.

The **key strengths** of the ESs were the coverage of the environment and baseline of the project area, together with good quality layout, presentation and lack of bias. **Weaker elements**, in terms of the least number of high grades, were the project site, the identification of impacts, the commitment to mitigation, the coverage of the significance of impacts, the proposals for mitigation measures and the prediction of impacts.

In terms of **operator experience**, those with medium experience produced the most ESs with satisfactory grades, and also performed best for the four review areas, although all operators performed well on communication and presentation of information in the ESs. It seems that operators with relatively little experience often struggle to deal with the requirements of the EIA process, and that the medium experience operators are perhaps making an extra effort in order to raise their profile in the sector. The **use of consultants** in preparing the ES appeared to lead to a better quality ES.

Analysis of the data relating to the **type of project** showed that the field development ESs were generally of higher overall quality than exploration wells and pipelines ESs. This may reflect the more transient nature and limited area involved for exploration wells, and that most wells are usually dealt with under the PON15 system. In addition, exploration wells were much weaker when dealing with alternatives and mitigation, and tended to focus mainly on alternatives processes, perhaps not surprising given the extent and timescale of such projects. Interpretation of the data for pipelines – permanent linear structures occupying a large area – is difficult, as only two such projects were represented in the ES sample.

The **geographical zones** in which the project were proposed showed some minor differences in ES quality with overall ES quality being slightly higher in the North East North Sea than the Southern area – most ESs being prepared for these two zones. Conversely, the North East North Sea showed less of a range in quality with fewer very well performed categories.

Over **time**, the overall quality of ESs rose from 2002 to 2004 but then showed a sharp decline in 2005. However, the average grade was falling slightly during 2002-2004 due to an increasing number of just satisfactory ESs and a fairly consistent number of just unsatisfactory ESs. This fall in overall quality during the period 2000 to 2005 was due to weaker performances in identifying and evaluating impacts and also in the treatment of alternatives (particularly weak in 2005) and mitigation. In addition, about an average of half of the 17 review categories achieved the highest grades in 2002 and 2003 but this fell to an average of approximately one third in 2004 and 2005.

## 5.2 Conclusions and recommendations

In conclusion, it appears that most of the ESs submitted for offshore petroleum production and pipeline development applications are generally of sufficient quality for subsequent decision-making, but that a significant proportion – just under half - are not quite satisfactory. In addition, this review study suggests that there is scope for improvement in many of those ESs currently graded as satisfactory.

Other UK studies indicate a rising trend in ES quality as practice develops and experience is gained by all stakeholders involved in EIA[5]. A study of a small sample of UK ESs submitted between 1990 and 1996 indicated nearly two-thirds of ESs (62%) achieving a satisfactory grade[6]. In addition, a more recent study of 37 ESs submitted between 1998 and 2004 for development consent in Scotland under Part II of the Environmental Impact Assessment (Scotland) Regulations 1999 and the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000 (the 1999 and 2000 Regulations) also showed that nearly two-thirds (65%) achieved satisfactory grades[7].

Most of these other studies tend to relate to a broader cross-section of project types, generally in the planning sector – not just one sector as in the case of this evaluation – involving a range of operators, consultancies and competent authorities. The relatively lower grades seen in this evaluation of offshore oil and gas ESs probably reflects the more limited overall context of the assessment; a sector driven by short time scales; and a familiarity with a system and practice that broadly delivers outputs satisfactory to all stakeholders.

However, the relatively better overall performance in terms of describing the project and surrounding environment, and presentational aspects of ESs is consistent with other studies of this type[8]. This is not particularly surprising given the nature of the largely descriptive process being employed to deal with these areas, in comparison with the inherent difficulties in covering prediction, mitigation and alternatives.

The BERR guidance for the regulations is currently being up-dated, and the review will include consideration of the conclusions of this study. BERR intends to consult widely on the revised guidance, and a formal consultation with all interested parties will be initiated during Q1 2008

### 5.2.1 Recommendations

In order to address some of the shortcomings found during this study, the following recommendations are suggested:

1) The 'Assessment Tables for Oil and Gas Environmental Impact Assessments' prepared by the BERR should normally be used in assessing the quality of information submitted in ESs, although care should be taken that this use does not become a mechanical 'tick box' exercise.

2) The current (2004) BERR Guidance to Industry, should be amended to highlight the following areas for improvement:
    - More information on the purpose of projects.

[5] Lee, N and Brown, D (1993) Quality control in environmental assessment *Project Appraisal 7*(1): 41-45; Impacts Assessment Unit (1996) *Changes in the Quality of ES for Planning Projects* Research Report, Department of the Environment, HMSO, London; Barker, A and Wood, C (1999) An evaluation of EIA system performance in eight EU countries *Environmental Impact Assessment Review 19*: 387-404.

[6] Barker, A and Wood, C (1999) An evaluation of EIA system performance in eight EU countries *Environmental Impact Assessment Review 19*: 387-404.

[7] ENVIRON UK Limited (2006) *The Use of Environmental Impact Assessment in the Planning System and Electricity Act Applications*, Scottish Executive Social Research, Edinburgh.

[8] Lee, N and Brown, D (1993) Quality control in environmental assessment *Project Appraisal 7*(1): 41-45; Barker, A and Wood, C (1999) An evaluation of EIA system performance in eight EU countries *Environmental Impact Assessment Review 19*: 387-404; ENVIRON UK Limited (2006) *The Use of Environmental Impact Assessment in the Planning System and Electricity Act Applications*, Scottish Executive Social Research, Edinburgh.

- Clearer interpretation of the design of projects using material specific to the project concerned.
- Ensure that a full description of the project is included in the ES, with a summary in the NTS.
- Specific examination of existing baseline information (including any relevant SEA studies) and critical judgement as to whether it is sufficient.
- Detailed coverage of assessment methods and approaches used.
- Clear distinction between the magnitude of impacts which should be predicted in relation to the baseline, and the significance of impacts which should be evaluated using standards and values.
- Justification of alternatives on environmental grounds as well as cost and operational issues.
- Coverage of the likely effectiveness of mitigation measures and any residual impacts.
- Linkage of monitoring of impacts and mitigation measures to existing company EMS.

3) The 'kick-off' meetings should be regarded as playing a key role in encouraging a more thorough scoping of impacts – identifying key potential impacts for further detailed assessment and the elimination of impacts that are not relevant. A broader involvement of stakeholders should also be considered to ensure that the impact studies are not limited in range – as is often the case for non-pollution effects.

4) Explore the possibility of setting up a virtual/actual discussion forum to share experiences and ensure that lessons learnt during an individual EIA are not lost to wider practice.

The main focus should be on building on existing practice to raise the standard and adopting a best practice approach, rather than the more minimalist approach that tends to prevail at present.

# APPENDIX 1:

**Review Package for ES quality evaluation**

**REVIEW OF THE QUALITY OF ENVIRONMENTAL STATEMENTS SUBMITTED UNDER THE OFFSHORE PETROLEUM PRODUCTION (ASSESSMENT OF ENVIRONMENTAL EFFECTS) REGULATIONS 1999**

**(24 April 2006)**

***Review categories/sub-categories specifically amended for the purposes of this study are highlighted***

## LIST OF REVIEW TOPICS

This is a list of hierarchically arranged topics for reviewing the quality of environmental statements submitted in response to UK regulations implementing EC Directive 85/337.
There are four areas for review.

1. Description of the development, the local environment and the baseline conditions.
2. Identification and evaluation of key impacts.
3. Alternatives and mitigation of impacts.
4. Communication of results.

In each of these areas there are several categories of activity which must be completed if the area is to be dealt with in a satisfactory manner. Similarly, each Category contains several Sub-categories. Below is a list of these topics arranged in a hierarchy. Review Areas are designated by a single digit, e.g. 1.; within these are Review Categories, designated by two digits, e.g. 1.1; and within each Review Category are Review Sub-categories, designated by three digits, e.g. 1.1.1.

### 1. DESCRIPTION OF THE DEVELOPMENT, THE LOCAL ENVIRONMENT AND THE BASELINE CONDITIONS

**1.1 Description of the development: The purpose(s) of the development should be described as should the physical characteristics, scale and design *of all its elements and its relationship with associated developments*. Quantities of materials needed during construction and operation should be included and, where appropriate, a description of the production processes.**

1.1.1 The ***ownership***, purpose(s) and objectives of the development should be explained together ***with its relationship to associated developments. An indication should be provided of the relevant industry experience of the project operator***.

1.1.2 The design and size of the development should be described. Diagrams, plans or maps will usually be necessary for this purpose.

1.1.3 There should be some indication of the physical presence and appearance of the completed development within the receiving environment.

1.1.4 Where appropriate, the nature of the production processes intended to be employed in the completed development should be described with the expected rate of production ***and any appropriate legislative and/or licensing requirements governing those processes***.

1.1.5 The nature and quantities of raw materials needed during both the construction and operational phases should be described.

**1.2 Site description: The on site land requirements of the developments should be described and the duration of each land use.**

1.2.1 The ***location and extent*** of the development should be defined and clearly shown on a map. ***Appropriate sector/block numbers should be specified***.

1.2.2 ***Any*** uses to which ***both surface and seabed*** will be put should be described and the different ***areas of use*** demarcated ***on a scaled map/diagram.***

1.2.3 The estimated duration of the construction phase, operational phase and, where appropriate, decommissioning phase should be given.

1.2.4 The numbers of workers and/or visitors ***to the*** site during both construction and operation should be estimated. Their access to the site and likely means of transport should be given.

1.2.5 The means of transporting raw materials and products to and from the site and the approximate quantities involved, should be described.

**1.3 Wastes *and emissions*: The types and quantities of wastes *and emissions* which might be produced should be estimated, and the proposed disposal routes to the environment described.**

[NB: ***this*** includes all residual process materials and effluents. Waste energy, waste heat, noise etc, should also be considered.]

1.3.1 The types and quantities of waste matter, energy and other residual materials, and the rate at which these will be produced, should be estimated.

1.3.2 The ways in which it is proposed to handle and/or treat these wastes and residuals should be indicated, together with the routes by which they will eventually be disposed of to the environment.

1.3.3 The methods by which the quantities of residuals and wastes were obtained should be indicated. If there is uncertainty this should be acknowledged and ranges of confidence limits given where possible.

**1.4 Environment description: The area and location of the environment likely to be affected by the development proposals should be described.**

1.4.1 The environment, ***including that of the seabed***, expected to be affected by the development ***and any associated pipeline corridors*** should be indicated with the aid of a suitable map of the area.

1.4.2 The affected environment should be defined broadly enough to include any potentially significant effects occurring away from the immediate construction site. These may be caused by, for example, the dispersion of pollutants, infrastructural requirements of the project, ***air and sea*** traffic, etc.

**1.5 Baseline conditions: A description of the affected environment as it is currently, and as it could be expected to develop if the project were not to proceed, should be presented.**

1.5.1 The important components of the affected environments should be identified and described. The methods and investigations undertaken for this purpose should be disclosed and should be appropriate to the size and complexity of the assessment task. Uncertainty should be indicated.

1.5.2 Existing data sources should have been searched and, where relevant, utilised. These should include ***government*** records and studies carried out by, or on behalf of, conservation agencies and/or

special interest groups. ***Factors relating to other use of the sea area in question (e.g. for defence purposes, telecommunications infrastructure, fishing etc.) should, in particular, be described.***

1.5.3 ***Appropriate governmenta***l plans and policies, should be consulted and other data collected as necessary to assist in the determination of the "baseline" conditions, i.e. the probable future state of the environment, in the absence of the project, taking into account natural fluctuations and human activities (often called the "do-nothing" scenario).

## 2. IDENTIFICATION AND EVALUATION OF KEY IMPACTS

**2.1 Definition of impacts: Potential impacts of the development on the environment should be investigated and described. Impacts should be broadly defined to cover all potential effects on the environment and should be determined as the predicted deviation from the baseline state.**

2.1.1 A description should be given of the direct effects and any indirect, secondary, short, medium and long-term, permanent and temporary, positive and negative effects of the project. ***Consideration should be given to the potential cumulative effects of the development with other activity, whether existing or potential, and to the possibility of transboundary impacts.***

2.1.2 The above types of effect should be investigated and described with particular regard to identifying effects on or affecting; human beings, flora and fauna, ***seabed, geology,*** water, air, climate, material assets, cultural heritage (including ***wrecks***) and the interactions between these.

2.1.3 Consideration should not be limited to events which will occur under design operating conditions. Where appropriate, impacts which might arise from non-standard operating conditions, due to accidents, should also be described, ***with reference to a proper assessment of risk***.

2.1.4 The impacts should be determined as the deviation from baseline conditions, i.e. the difference between the conditions which would obtain if the development were not to proceed and those predicted to prevail as a consequence of it.

**2.2 Identification of impacts: Methods should be used which are capable of identifying all significant impacts.**

2.2.1 Impacts should be identified using a systematic methodology such as project specific checklists, matrices, panels of experts, consultations, etc. Supplementary methods (e.g. cause-effect or network analyses) may be needed to identify secondary impacts.

2.2.2 A brief description of the impact identification methods should be given as should the rationale for using them.

**2.3 Scoping: Not all impacts should be studied in equal depth. Key impacts should be identified, taking into account the views of interested parties, and the main investigation centred on these.**

2.3.1 Arrangements should be made to ***inform and to*** collect the opinions and concerns of relevant public agencies, special interest groups, and the general public. ***The results of such consultation should be described and details given of how the opinions expressed have been taken into account.***

2.3.2 Key impacts should be identified and selected for more intense investigation. Impact areas not selected for thorough study should nevertheless be identified and the reasons they require less detailed investigation should be given.

**2.4 Prediction of impact magnitude: The likely impacts of the development on the environment should be described in exact terms wherever possible.**

2.4.1 The data used to estimate the magnitude of the main impacts should be sufficient for the task and should be clearly described or their sources be clearly identified. Any gaps in the required data should be indicated and the means used to deal with them in the assessment should be explained.

2.4.2 The methods used to predict impact magnitude should be described and be appropriate to the size and importance of the projected impact.

2.4.3 Where possible, predictions of impacts should be expressed in measurable quantities with ranges and/or confidence limits as appropriate. Qualitative descriptions, where these are used, should be as fully defined as possible (e.g. 'insignificant means not perceptible from more than 100m distance').

**2.5 Assessment of impact significance: The expected significance that the projected impacts will have for society should be estimated. The sources of quality standards, together with the rationale, assumptions and value judgements used in assessing significance, should be fully described.**

2.5.1 The significance to ***the affected environment*** and to society in general should be described and clearly distinguished from impact magnitude. Where mitigating measures are proposed, the significance of any impact remaining after mitigation, should also be described.

2.5.2 The significance of an impact should be assessed, taking into account appropriate national and international quality standards where available. Account should also be taken of the magnitude, location and duration of the impact in conjunction with societal values.

2.5.3 The choice of standards, assumptions and value systems used to assess significance should be justified and any contrary opinions should be summarised.

## 3. ALTERNATIVES AND MITIGATION

**3.1 Alternatives: Feasible alternatives to the proposed project should have been considered. These should be outlined in the Statement, the environmental implications of each presented, and the reasons for their rejection briefly discussed, particularly where the preferred project is likely to have significant, adverse environmental impacts.**

3.1.1 Alternative sites should have been considered where these are practicable and available to the developer. The main environmental advantages and disadvantages of these should be discussed and the reasons for the final choice given.

3.1.2 Where available, alternative processes, designs and operating conditions should have been considered at an early stage of project planning and the environmental implications of these investigated and reported where the proposed project is likely to have significantly adverse environmental impacts.

3.1.3 If unexpectedly severe adverse impacts are identified during the course of the investigation, which are difficult to mitigate, alternatives rejected in the earlier planning phases should be re-appraised.

**3.2 Scope and effectiveness of mitigation measures: All significant adverse impacts should be considered for mitigation. Evidence should be presented to show that proposed mitigation measures will be effective when implemented.**

3.2.1 The mitigation of all significant adverse impacts should be considered and, where practicable, specific mitigation measures should be put forward. Any residual or unmitigated impacts should be indicated and justification offered as to why these impacts should not be mitigated.

3.2.2 Mitigation methods considered should include modification of the project, compensation and the provision of alternative facilities as well as pollution control.

3.2.3 It should be clear to what extent the mitigation methods will be effective when implemented. Where the effectiveness is uncertain or depends on assumptions about operating procedures, climatic conditions, etc., data should be introduced to justify the acceptance of these assumptions.

3.2.4 ***The adverse environmental effects of proposed mitigation measures should be investigated and described.***

**3.3 Commitment to mitigation: Developers should be committed to, and capable of, carrying out the mitigation measures and should present plans of how they propose to do so.**

3.3.1 There should be a clear record of the commitment of the developer to the mitigation measures presented in the Statement. Details of how the mitigation measures will be implemented and function over the time span for which they are necessary should also be given.

3.3.2 Monitoring arrangements should be proposed to check the environmental impacts resulting from the implementation of the project and their conformity with the predictions within the

Statement. Provision should be made to adjust mitigating measures where unexpected adverse impacts occur. The scale of these monitoring arrangements should correspond to the likely scale and significance of deviations from expected impacts.

3.3.3 ***Where mitigation and monitoring proposals are to be implemented through integration into management plans or an Environmental Management System, these should be fully described and adequate for the purpose. The corporate health, safety and environment policy should be reproduced.***

## 4. COMMUNICATION OF RESULTS

### 4.1 Layout: The layout of the Statement should enable the reader to find and assimilate data easily and quickly. External data sources should be acknowledged.

4.1.1 There should be an introduction briefly describing the project, the aims of the environmental assessment and how those aims are to be achieved.

4.1.2 Information should be logically arranged in sections or chapters and the whereabouts of important data should be signalled in a table of contents or index. ***The authorship of the ES should also be made clear.***

4.1.3 Unless the chapters themselves are very short, there should be chapter summaries outlining the main findings of each phase of the investigation.

4.1.4 When data, conclusions or quality standards from external sources are introduced, the original source should be acknowledged at that point in the text. A full reference should also be included either with the acknowledgement, at the bottom of the page, or in a list of references.

### 4.2 Presentation: Care should be taken in the presentation of information to make sure that it is accessible to the non-specialist.

4.2.1 Information should be presented so as to be comprehensible to the non-specialist. Tables, graphs and other devices should be used as appropriate. Unnecessarily technical, obscure ***or ambiguous*** language should be avoided.

4.2.2 Technical terms, acronyms and initials should be defined, either when first introduced into the text or in a glossary. Important data should be presented and discussed in the main text.

4.2.3 The Statement should be presented as an integrated whole. Summaries of data presented in separately bound appendices should be introduced in the main body of the text.

### 4.3 Emphasis: Information should be presented without bias and receive the emphasis appropriate to its importance in the context of the ES.

4.3.1 Prominence and emphasis should be given to potentially severe adverse impacts as well as to potentially substantial favourable environmental impacts. The Statement should avoid according space

disproportionately to impacts which have been well investigated or are beneficial.

4.3.2 The Statement should be unbiased; it should not lobby for any particular point of view. Adverse impacts should not be disguised by euphemisms or platitudes.

**4.4 Non-technical summary: There should be a clearly written non-technical summary of the main findings of the study and how they were reached.**

4.4.1 There should be a non-technical summary of the main findings and conclusions of the study. Technical terms, lists of data and detailed explanations of scientific reasoning should be avoided.

4.4.2 The summary should cover all main issues discussed in the Statement and contain at least a brief description of the project and the environment, an account of the main mitigation measures to be undertaken by the developer, and a description of any significant residual impacts. A brief explanation of the methods by which these data were obtained, and an indication of the confidence which can be placed in them, should also be included.

**COLLATION SHEET**

**1. ASSESSMENT SYMBOLS:** Use the following symbols when completing the Collation Sheet below.

| Symbol | Explanation |
|---|---|
| A | Relevant tasks well performed, no important tasks left incomplete. |
| B | Generally satisfactory and complete, only minor omissions and inadequacies. |
| C | Can be considered just satisfactory despite omissions and/or inadequacies. |
| D | Parts are well attempted but must, as a whole, be considered just unsatisfactory because of omissions or inadequacies. |
| E | Not satisfactory, significant omissions or inadequacies. |
| F | Very unsatisfactory, important task(s) poorly done or not attempted. |
| NA | Not applicable. The Review Topic is not applicable or it is irrelevant in the context of this Statement. |

**2. COLLATION SHEET**

**Overall assessment .....**

| **1** | **.....** | **2** | **.....** | **3** | **.....** | **4** | **.....** |
|---|---|---|---|---|---|---|---|
| **1.1** | ..... | **2.1** | ..... | **3.1** | ..... | **4.1** | ..... |
| 1.1.1 | ..... | 2.1.1 | ..... | 3.1.1 | ..... | 4.1.1 | ..... |
| 1.1.2 | ..... | 2.1.2 | ..... | 3.1.2 | ..... | 4.1.2 | ..... |
| 1.1.3 | ..... | 2.1.3 | ..... | 3.1.3 | ..... | 4.1.3 | ..... |
| 1.1.4 | ..... | 2.1.4 | ..... | | | 4.1.4 | ..... |
| 1.1.5 | ..... | | | | | | |
| **1.2** | ..... | **2.2** | ..... | **3.2** | ..... | **4.2** | ..... |
| 1.2.1 | ..... | 2.2.1 | ..... | 3.2.1 | ..... | 4.2.1 | ..... |
| 1.2.2 | ..... | 2.2.2 | ..... | 3.2.2 | ..... | 4.2.2 | ..... |
| 1.2.3 | ..... | | | 3.2.3 | ..... | 4.2.3 | ..... |
| 1.2.4 | ..... | | | 3.2.4 | ..... | | |
| 1.2.5 | ..... | | | | | | |
| **1.3** | ..... | **2.3** | ..... | **3.3** | ..... | **4.3** | ..... |
| 1.3.1 | ..... | 2.3.1 | ..... | 3.3.1 | ..... | 4.3.1 | ..... |
| 1.3.2 | ..... | 2.3.2 | ..... | 3.3.2 | ..... | 4.3.2 | ..... |
| 1.3.3 | ..... | | | 3.3.3 | ..... | | |
| **1.4** | ..... | **2.4** | ..... | | | **4.4** | ..... |
| 1.4.1 | ..... | 2.4.1 | ..... | | | 4.4.1 | ..... |
| 1.4.2 | ..... | 2.4.2 | ..... | | | 4.4.2 | ..... |
| | | 2.4.3 | ..... | | | | |
| **1.5** | ..... | **2.5** | ..... | | | | |
| 1.5.1 | ..... | 2.5.1 | ..... | | | | |
| 1.5.2 | ..... | 2.5.2 | ..... | | | | |
| 1.5.3 | ..... | 2.5.3 | ..... | | | | |

**Overall Quality**
Assign an assessment symbol (A, B, C, D, E or F) to the Statement as a whole and summarise, in one or two paragraphs, the key factors which have determined your overall assessment.

**Names of Reviewers**

1.

2.

# APPENDIX 2:

## Interview questions and interviewees

**INTERVIEWEES**

**Environmental Management Team, BERR** (15 January 2007)

- Phil Bloor – Senior Environmental Manager (and BERR Contract Manager)
- Derek Saward – Senior Environmental Manager
- Inger Soderstrom – Environmental Manager

**Consultancies**

- Susannah Charlesworth, Rudall Blanchard Associates (March 2007)
- Gordon Picken, BMT Cordah Limited (15 January 2007)
- Lorraine Shellard, Genesis Oil and Gas Consultants Ltd (15 January 2007)

**Consultees**

- Steve Benn, Natural England (April 2007)
- Zoë Crutchfield, Joint Nature Conservation Committee (15 January 2007)
- Derek Moore, Fisheries Research Service (March 2007)
- Karema Warr, Centre for Environment, Fisheries and Aquaculture Science (March 2007)

**Operators**

- Gordon Harvey, BP Exploration Limited (March 2007)
- Iain Park, Total E&P UK plc (March 2007)
- Ron Reid, Applied Drilling Technology International (15 January 2007)

In addition, replies were received from:

- Dominic Counsell, Scottish Natural Heritage (April 2007 – unable to respond as relevant staff member had left)
- Lisa Palframan, Royal Society for the Protection of Birds (March 2007 – unable to respond as RSPB rarely involved in offshore oil and gas projects)

**INTERVIEW QUESTIONS**

| Questions | Preparers (operators/ consultants) | BERR-EMT | Consultees (statutory/ other) |
|---|---|---|---|
| 1. What is your experience in preparing/undertaking reviews of ESs? Oil and gas sector only? Other sectors? Years? No. ESs? | ✓ | ✓ | ✓ |
| 2. What guidance or approaches do you adopt when evaluating the quality of information in an ES?<br>a. Do you undertake an internal review of the ES prior to submission? | ✓ | ✓ | ✓ |
| 3. How do you address quality aspects with regard to compliance with different legislation?<br>a. Is the relationship between EMAS and EIA sufficiently integrated to ensure adequate monitoring arrangements are in place? | ✓<br>✓ | ✓<br>✓ | ✓<br>✓ |
| 4. Which aspects of review do you experience most difficulty with? E.g. impacts, project aspects…. | | ✓ | ✓ |
| 5. Do you assess 'quality' or undertake more of a compliance check? | | ✓ | ✓ |
| 6. What are the main weaknesses in ESs/EIA that you routinely experience? And/or that cause most concern to you/your organisation | | ✓ | ✓ |
| 7. What are the main strengths of ESs/EIAs that you routinely experience? | | ✓ | ✓ |
| 8. What constitutes a good quality ES for you/your organisation? | ✓ | ✓ | ✓ |
| 9. Which impacts – or other aspects – are more difficult to address, in terms of obtaining data? Where are the main gaps? | ✓ | ✓ | ✓ |
| 10. Do you use other specialists to assess/review particular impacts? | ✓ | ✓ | ✓ |
| 11. How do you deal with deficiencies in ESs? | | ✓ | |
| 12. What is your role in scoping? What issues are covered - information, areas of concern, methods to be used… | ✓ | ✓ | ✓ |
| 13. What training or specific guidance have you received/or is provided by your organisation?<br>a. Is there sufficient expertise within your organisation to adequately address quality issues | ✓ | ✓<br>✓ | ✓<br>✓ |
| 14. Are there any other issues you would like to raise with regard to ES quality or the EIA process? | ✓ | ✓ | ✓ |

# APPENDIX 3

## Assessment of Adverse Non-Pollution Effects for Offshore Petroleum Production and Pipeline Developments

**February 2007**

# CONTENTS

# ASSESSMENT OF ADVERSE NON-POLLUTION EFFECTS

## 1. Introduction

The Department for Business, Enterprise and Regulatory Reform (BERR), formerly the Department of Trade and Industry (BERR), as regulator for the offshore oil and gas industry, commissioned the Environmental Impact Assessment Centre to undertake an independent research study to *"determine whether applicants and the Department are adopting a consistent and acceptable approach"* to the preparation and assessment of Environmental Statements (ESs) *"that fully meets the requirements of the Environmental Impact Assessment (EIA) Regulations and the related, parent, EU Directives*[1]*"*. The study focused on EIAs undertaken under the Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999 (SI 1999 No. 360) and covered the period 2002-2005.

The study had two objectives:

I. To evaluate the preparation and assessment of offshore ESs,

II. To identify and list potential adverse non-pollution effects and proposed mitigation measures.

This report focuses on Objective II and considers the adverse non-pollution effects identified and the mitigation measures proposed to address them.

## 2. Methodology

At the study inception stage the study team met the BERR contract officer and other BERR personnel, to discuss the identification of adverse non-pollution effects. In order for the analysis to be consistent and systematic, it was important that the study of non-pollution effects followed a common format. This related both to the types of effects covered by the objective, and recording them and their associated mitigation measures – including the assessment of alternatives. A simple recording sheet was prepared, supplemented by a list of the types of effects; see Appendix A. (Supplementary questions relating to relevant Strategic Environmental Assessment (SEA) studies, also commissioned by the BERR, were also appended to this form.)

A sample of ESs submitted under the Regulations was selected for detailed review of the adverse non-pollution effects. This sample was chosen to reflect:

- different timeframes since 1 January 2002 (year of submission)
- different types of project
- different levels of experience in preparing ESs for offshore projects, indicated by the relative numbers of ESs prepared by different operators, including those who had submitted five or more ESs (classed as 'major'), those that had submitted three to four ESs (classed as 'medium'), and those that had submitted only one or two (classed as 'small')
- Different geographical zones

[1] European Commission (1985) Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment. *Official Journal of the European Communities* L175: 40, 5 July 1985, and European Commission (1997) Council Directive 97/11/EC of 3 March 1997 amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment. *Official Journal of the European Communities* L73: 5-15, 14 March 1997

Data provided by the BERR confirmed that 82 ESs were submitted to BERR during the period 2002-2005. The intention was to analyse approximately 50% of the total of 82 ESs, depending upon availability, and the final sample constituted 43% (35) of the total. Projects that had not completed the application and determination process were excluded. Table 1 shows the distribution of all ESs and the sample, according to year of submission, project type, operator experience and geographical zone. The same ESs were also used for the Objective I review of ES quality.

**Table 1: Characteristics of all ESs and the sample**

| | **Available ESs = 82** | | **Sample of ESs = 35** | |
|---|---|---|---|---|
| **Year** | | | | |
| 2002 | 22 | 27% | 11 | 31% |
| 2003 | 13 | 16% | 7 | 20% |
| 2004 | 30 | 37% | 11 | 31% |
| 2005 | 17 | 21% | 6 | 17% |
| **Project type** | | | | |
| Exploration wells | 19 | 23% | 9 | 26% |
| Field developments | 61 | 74% | 24 | 69% |
| Pipelines | 2 | 2% | 2 | 6% |
| **Operator experience** | | | | |
| Major | 15 | 18% | 10 | 29% |
| Medium | 32 | 39% | 14 | 40% |
| Small | 35 | 43% | 11 | 31% |
| **Geographical zone** | | | | |
| North East North Sea | 40 | 49% | 16 | 46% |
| Southern North Sea | 26 | 32% | 11 | 31% |
| Eastern Irish Sea | 7 | 9% | 4 | 11% |
| West of Shetland | 9 | 11% | 4 | 11% |

The evaluation of non-pollution effects was undertaken by six selected postgraduate students undertaking the MA degree programme in EIA & Management at the School of Environment and Development, University of Manchester. Subsequent analysis of their findings was undertaken by members of the research team.

Each of the ESs was scrutinised for its coverage of adverse non-pollution effects and associated mitigation measures. During the study inception stage, a protocol was developed for this evaluation, including guidance as to what constitutes a 'non-pollution effect'. The evaluation therefore considered the following:

- Ecology
- Cultural heritage
- Economic
- Traffic (including fishing operations)
- Other.

Each was then examined with regard to the following attributes:

- Physical presence
- Physical disturbance
- Visual
- Noise
- Vibration

- Waste
- Other

## 3. Analysis

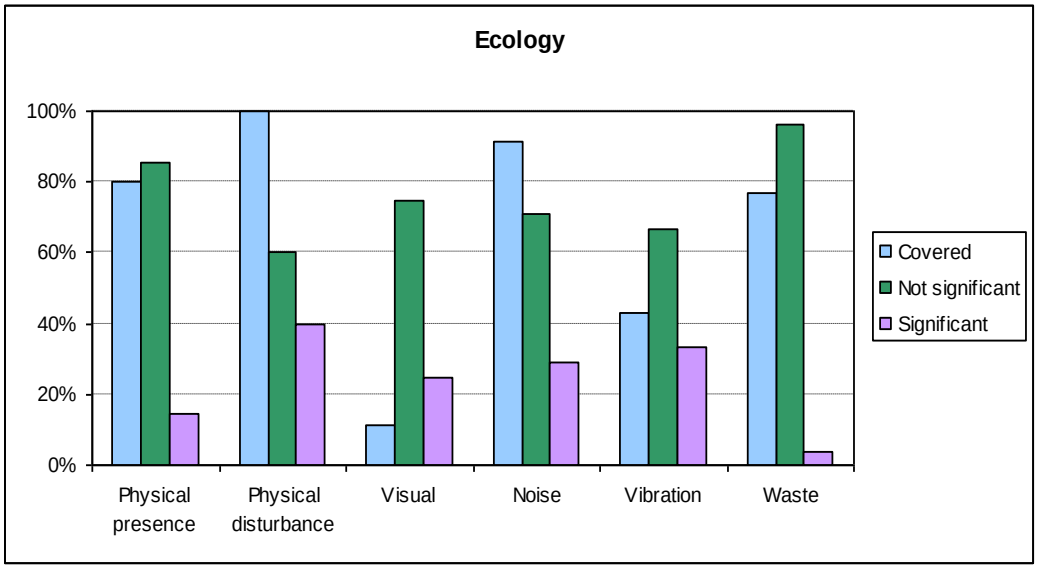
The 35 ESs analysed provided a representative sample for the evaluation of non-pollution effects. In addition to indicating how the various non-pollution effects were addressed, the analysis also explored the treatment of mitigation measures, including the consideration of alternatives.

### 3.1 Non-Pollution Effects

#### 3.1.1 Ecology

Ecology includes both the habitat and the flora and fauna which may be affected either directly or indirectly by the projects. It can relate to habitats and populations *in situ* (for example, *Sabellaria* reefs), and to pelagic organisms such as cetaceans and fish.

**Figure 1**




Impacts on ecology were always addressed in relation to the potential physical disturbance, although in most ESs (60%) it was concluded that these effects were unlikely to be significant. In the majority of ESs the impacts of noise (91% of ESs), physical presence (80% of ESs) and waste (77% of ESs) upon ecological receptors were also assessed and again effects were regarded as unlikely to be significant (71% of ESs for noise; 86% of ESs for physical presence; and 96% of ESs for waste). Vibration was considered in less than half of the ESs (43%), and regarded as potentially significant in one third of these ESs. Visual impacts on ecological receptors were assessed in only four of the ESs, and in only one were effects regarded as likely to be significant.

Other possible impacts on ecology were considered, including those from spills (four cases), air quality (three cases), lighting, flaring and dropped objects, and in the context of cumulative and transboundary impacts.

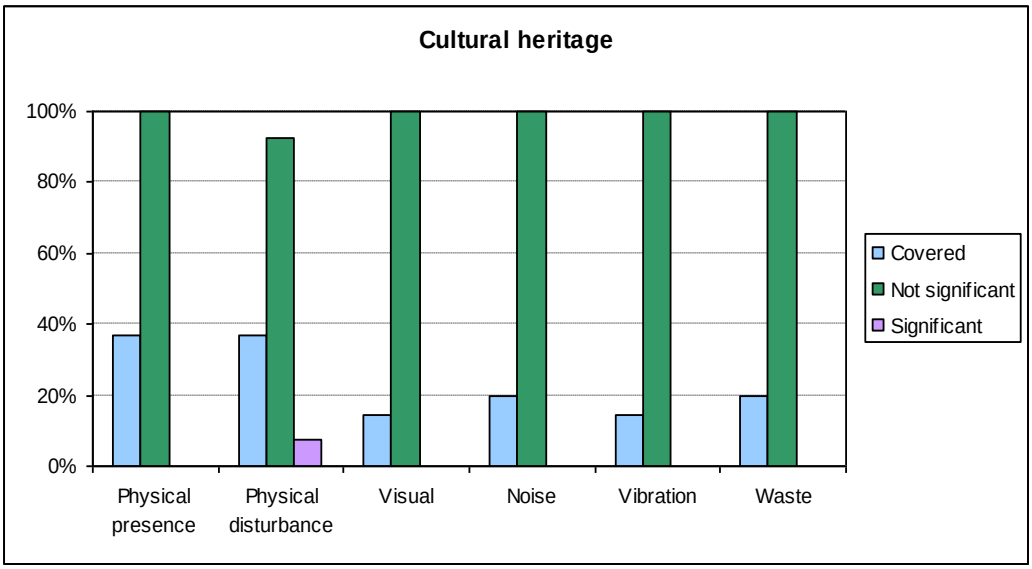
Effects on ecology were considered to be most relevant during the construction phase, followed by the operation phase, and more rarely during decommissioning. The exception was the likely impact of waste on ecology,

which was normally considered, implying a greater relevance, for the operation phase.

### 3.1.2 Cultural heritage

Cultural heritage includes architectural and archaeological features of importance, and relates primarily to wrecks that may be damaged or disturbed.

**Figure 2**

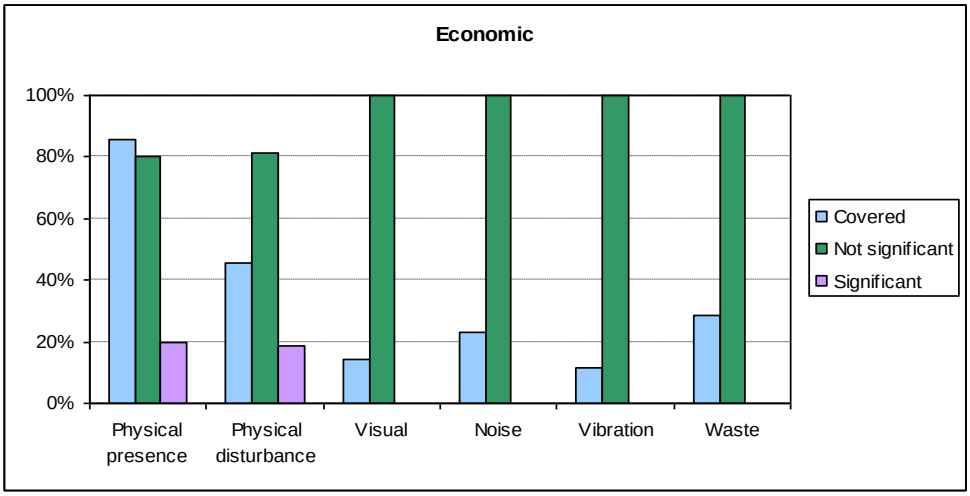



Impacts on cultural heritage were more rarely addressed, and then mainly in relation to physical presence and physical disturbance (37% of the ESs) during both the construction and operation phases. In only one project were such effects on cultural heritage regarded as likely to be significant. The effects on cultural heritage of visual impacts, noise, vibration and waste were only addressed in approximately one fifth of the ESs, and in all cases the potential impacts were regarded as unlikely to be significant.

### 3.1.3 Economic

Economic factors relate primarily to socio-economic impacts, including effects on fishing and other activities.

**Figure 3**



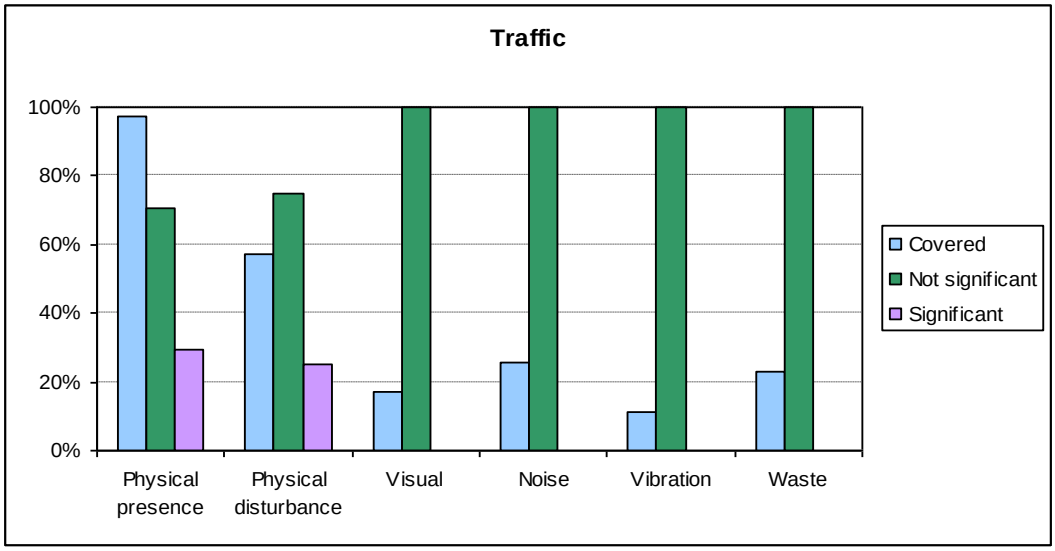
Impacts on economic factors were addressed in the majority of the ESs (86%), primarily in relation to the physical presence during the construction and operation phases, but in one fifth of ESs they were also assessed in relation to the decommissioning stage. Only in a minority of ESs (20%) were effects regarded as potentially significant.

Physical disturbance impacts were assessed in just under half of the ESs (46%) and, again, in approximately one fifth of the ESs the impacts were regarded as potentially significant. Where the effects on the economy of noise and waste were considered (23% and 29% of ESs respectively), none of the effects were regarded as potentially significant. Visual impacts and vibration were rarely considered (14% and 11% of ESs respectively), but were again not regarded as significant.

### 3.1.4 Traffic

Traffic effects include impacts on shipping and fishing traffic.

**Figure 4**




Only one ES did not cover the impact of the project on shipping and/or fishing traffic caused by the physical presence. Of the remainder, approximately one third of the ESs anticipated significant potential impacts. Physical disturbance effects on traffic were addressed in over half of the ESs (57%), with one quarter of the impacts considered to be potentially significant. The physical impacts identified were mainly related to the construction phase, followed by those related to the operation phase. Just under one fifth of the ESs considered the impacts related to decommissioning.

The noise and wastes impacts on traffic were covered in approximately one quarter of the ESs, with visual and vibration impacts covered more rarely. None of these impacts were considered likely to be significant.

### 3.1.5 Other effects

Very few 'other' non-pollution effects were identified in the ESs. The impacts considered were the:

- consequences of land disposal of waste; highlighted in six ESs,
- impact of physical disturbance on sediments,

- visual and noise impacts on the coastal population.

In only one third of cases were these additional impacts considered likely to be significant.

## 3.2 Project attributes

In addition to drawing out the possible areas of impact of the projects, the ES review also shows which attributes of the projects were considered likely to have most impact.

The **physical presence** of projects was addressed in the majority of ESs, although comparatively few considered its effect on cultural heritage, but the effects were generally judged as not significant. However, it was accepted that there could be an effect on shipping and/or fishing traffic, with significant impacts on traffic predicted for just under one third of the projects.

**Physical disturbance** was always considered for its impact on ecology, and significant effects on ecology were predicted for 40% of the projects. Impacts on cultural heritage, economic issues and traffic were only addressed in approximately half the ESs, with very few potential impacts regarded as significant.

The **visual** impact of projects was considered in only a handful of ESs, and was only regarded as potentially significant for one project - a field development project in 2002.

The **noise** during construction, and also during the operational phase, was assessed in relation to effects on ecology, with significant impacts predicted for a quarter of the projects. The impact of noise on cultural heritage, economic issues and traffic was considered for just under a quarter of the projects.

**Vibration** was rarely addressed; and only tended to be covered in relation to ecology, with few significant impacts predicted.

The impact of **waste** again focused on effects for the ecology, although these were only regarded as significant for one project – an exploration well drilled in 2002. The impact of waste on cultural heritage, economic issues and traffic was only considered for approximately one quarter of the projects.

## 3.3 Consideration of alternatives

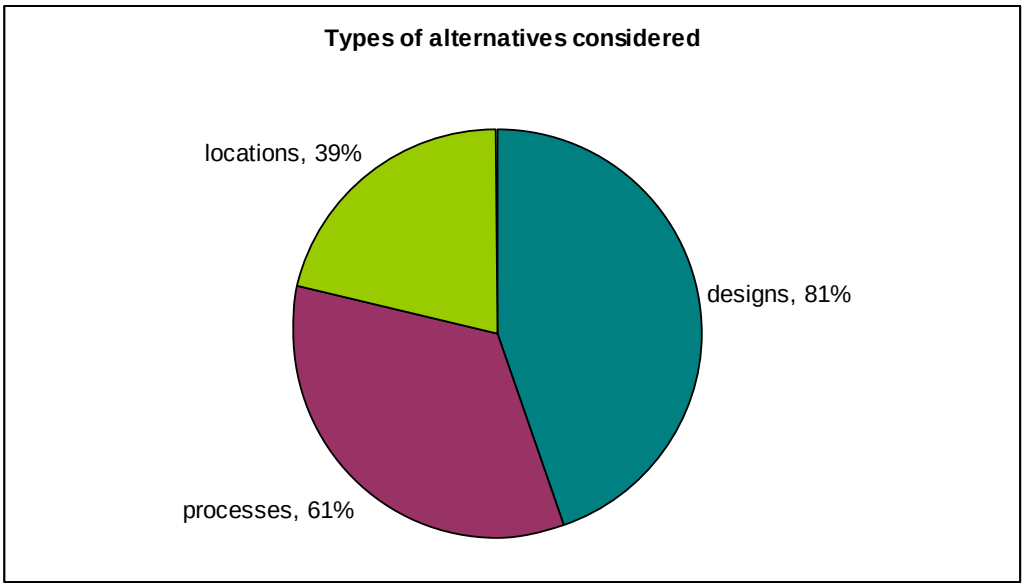
The consideration of alternatives is a key part of the early stages of the assessment process and should be linked to project design. The choice of alternatives sites, designs, processes, etc, can also be an important means of minimising impacts, and thus merits consideration as a mitigation measure.

### 3.3.1 Types of alternatives

Only four of the 35 ESs made no mention of any type of alternative. Three of these ESs were produced in 2005, three were for exploration wells. Two were submitted by 'small' and two were submitted by 'medium' experience operators. There was no consistent pattern in relation to geographical zone, although two of the four ESs relating to the Eastern Irish Sea, and one of the four ESs relating to the West of Shetland, did not cover any alternatives.

Alternative designs were considered most often – twice as frequently as alternative locations. Just under half of the ESs considered both alternative designs and processes, just under one third both designs and locations, and just under one fifth both locations and processes. Only five ESs included coverage of all types of alternatives, and all were for field development projects (by two medium and three major experience operators). Of the 11 ESs that only considered one type of alternative, just over half focussed on alternative designs.

**Figure 5**




Particular project types were generally associated with certain types of alternative. Pipelines were more likely to consider alternative locations; exploration wells were more likely to consider alternative processes, and field developments were more likely to consider alternative designs.

There was no apparent pattern in relation to the consideration of particular types of alternatives over time, although the majority of the 11 projects which considered only one type of alternative – whether location, design or process – were submitted during the early years of the study sample, with six examples from 2002, and three from 2003. However, in addition, it was noted that no alternative locations were considered in 2005.

Relationships were noted between the consideration of particular types of alternatives and the geographical zone in which the projects were located. ESs for projects in the North East North Sea were more likely to consider alternative designs, and eight of the ten ESs that explored both alternative designs and processes were located in the North East North Sea. Similarly, three of the six ESs that focussed solely on design alternatives were in the Southern North Sea. Alternative processes appeared to be considered more often for the West of Shetland zone.

### 3.3.2 Resolution of choices between alternatives

Where projects considered alternative locations, there was broadly widespread use of environmental (67% of ESs), technical (75%) and economic (75%) factors in making the choices. A similar trend was noted for choices between alternative designs; environmental (60%), technical (68%) and economic (60%). However, technical factors were dominant for both alternative locations (75% of ESs) and alternative designs (68% of ESs). Where choices between alternative processes

were considered, again these were more likely to be resolved on technical grounds (79% of the ESs) as opposed to environmental (53%) or economic (58%) grounds.

Trends in the use of environmental, technical or economic grounds for the different **types of project** were more difficult to discern, due to the high proportion of field developments in the sample (reflecting the overall population of ESs). Nevertheless, it was clear that pipelines tended to resolve choices based on technical and economic grounds, whereas choices for exploration wells were predominantly resolved on environmental grounds. Field development choices used all three factors, with technical and economic grounds being the most popular.

Trends over **time** showed that both technical and economic grounds were used more consistently during the sample period, but environmental grounds were used intermittently.

**Operator experience** seemed to play a role in choosing between different types of alternatives. Operators with relatively less experience generally used a combination of environmental, technical and economic grounds when considering alternative locations, designs and processes; although environmental grounds were less prevalent in relation to alternative process choices. Operators with 'medium' and 'major' experience were more likely to use technical grounds when making choices. Economic grounds were used more rarely when 'medium' experience operators were choosing between designs, and when 'major' experience operators were choosing between processes. 'Medium' experience operators also rarely used environmental grounds when choosing between different processes.

Consideration of the **geographical zone** in which the projects were located indicated that environmental, technical and economic grounds were used fairly consistently in the Southern North Sea when choosing between alternatives. Environmental grounds were used less often in both the North East North Sea and West of Shetland. Technical grounds were rarely used in the Eastern Irish Sea. Economic grounds were used less in the West of Shetland zone than in the other geographical zones.

## 3.4 Mitigation measures

The mitigation measures proposed in the ESs were analysed in relation to the six project attributes, namely physical presence, physical disturbance, visual impacts, noise, vibration and waste. In addition, mitigation measures proposed for other impacts were also analysed. The mitigation measures proposed for each attribute are indicated, together with any trends noted by year of submission, project type, operator experience and geographical zone. The most commonly proposed mitigation measures are listed, and additional mitigation measures for each attribute are included in Appendix B.

### 3.4.1 Physical presence

An overwhelming majority of the ESs in the sample (94% or 33 of the 35 ESs) proposed mitigation measures in relation to the physical presence of the projects. No trends in terms of the year, type of project, operator experience or geographical zone were noted.

The most commonly proposed mitigation measures were:

- 500m exclusion zone patrolled by a vessel and/or radar (26 ESs, plus one ES proposing a 3km$^2$ exclusion zone;
- Notification of, and consultation with, other sea users, including marking position of infrastructure on charts, and producing charts and reporting vessel movements (19 ESs);
- Fishing-friendly design to ensure free movement of trawlers over pipelines and umbilicals (11 ESs - mainly field developments);
- Continuous monitoring of vessels (7 ESs).

3.4.2 Physical disturbance

Twenty six of the ESs (74%) proposed mitigation measures in relation to the physical disturbance caused by the projects. There were no trends over time, but exploration wells appeared less likely (56%) to incorporate mitigation measures for physical disturbance than both field developments (79%) and pipelines (100%). Projects in the Southern North Sea (55% of ESs) and Eastern Irish Sea (25% of ESs) also appeared to be less likely to incorporate proposed mitigation measures than projects in the North East North Sea (81%) and West of Shetland (100%). Those operators with 'medium' experience seemed less likely (64%) to propose mitigation measures for any physical disturbance caused by the projects than those with 'major' experience (80%) and relatively less experience (91%).

The most frequently stated mitigation measures to minimise physical disturbance were:

- Working areas and corridors minimised (9 ESs);
- Reducing anchor mound formation and management of use of anchors (7 ESs);
- Use of dynamically positioned vessels to avoid seabed scars (7 ESs – 6 field developments and 1 exploration well);
- Post lay/trench pipeline survey or decommissioning surveys (6 ESs);
- Rock dumping restricted to small areas (4 ESs);
- Using charts, notification, liaison with sea users (4 ESs);
- Application of various pipeline laying techniques (4 ESs);
- Use of alternative chemicals and muds (4 ESs).

3.4.3 Visual impacts

None of the 35 ESs in the sample contained any mitigation measures in relation to potential visual impacts arising from any of the projects.

3.4.4 Noise

A minority of 14 ESs (40%) proposed mitigation measures in relation to noise impacts. Again no trends over time were apparent. In terms of the project types, just over half (56%) of the exploration wells included noise mitigation measures, followed by over one third (38%) of the field developments, and none of the pipelines. All four projects West of Shetland proposed mitigation measures as opposed to none of the four projects in the Eastern Irish Sea. Projects in the North East North Sea and Southern North Sea proposed noise mitigation measures in 38% and 45% of ESs respectively. There were no trends relating to the relative experience of the operators concerned.

The main mitigation measures for noise impacts included:

- Minimise duration of works and movement of vessels (5 ESs);
- Operation of well maintained vessels and equipment (4 ESs);
- Regulation of vessels' stationing, speed and course (4 ESs).

3.4.5 Vibration

Only two ESs proposed mitigation measures in relation to vibration impacts, and they were for more recent projects, namely a field development in 2005, and an exploration well in 2004. The projects were located in the North East North Sea and the Southern North Sea respectively. Interestingly, the operator in each case was regarded as having relatively less experience.

3.4.6 Waste

Thirty ESs (86%) included mitigation measures for waste impacts, with an increase in inclusion over time from 73% of the ESs in 2002 to all of the ESs in 2005. The majority of the field development ESs (92%) contained mitigation measures for waste, with just over three quarters of the exploration wells (78%), and only half of pipelines. There was no apparent trend in relation to the geographical zones or operator experience.

The most commonly proposed mitigation measures were:

- Disposal onshore at designated landfills (15 ESs);
- Waste management systems/plans (11 ESs);
- Re-use/recycle (11 ESs);
- Treatment on-board ship or onshore (7 ESs);
- Treatment prior to discharging to sea (6 ESs);
- Audits and compliance with regulations (5 ESs).

3.4.7 Other impacts

Just over one third of the ESs (34%) included mitigation measures to deal with other impacts. There was no trend over time and no clear differences between the project types. However, projects in the Eastern Irish Sea were least likely to include such mitigation measures for other impacts, whilst those from West of Shetland were more likely to propose such mitigation measures. There was also a slight trend for more experienced operators to propose mitigation measures for such impacts (27% of operators with less experience; 36% of 'medium' experience operators; 40% of 'major' experience operators).

Mitigation measures mentioned for other impacts included:

- Oil spill contingency plans (5 ESs);
- Environmental, Health and Safety Management System (3 ESs);
- Monitoring plans (for pipelines, wells and flaring) (3 ESs).

## 4. Conclusions

The second objective of the study of EIAs undertaken under the Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999, was to identify and list potential adverse non-pollution effects and associated mitigation measures.

## 4.1 Non-pollution effects

A sample of 35 ESs (representing 43% of the 82 ESs submitted between 2002-2005) was evaluated to establish the types of non-pollution effects being assessed, the associated mitigation measures and the consideration of alternatives. The findings were considered in relation to trends by date of ES, geographical zone, and operator experience.

The main non-pollution effects identified were:

- Ecology
- Cultural heritage
- Economic
- Traffic
- Other, such as
    - Land disposal of waste
    - Impacts on sediments
    - Impacts (visual and noise) on coastal population

Ecological effects were addressed most frequently, and mainly in relation to the physical presence of projects, their physical disturbance, noise and waste emissions. Economic and traffic effects were addressed less often and usually in relation to the physical presence and physical disturbance. Cultural heritage was rarely addressed. Of the 'other' effects, the consequence of land disposal of waste was the most commonly considered issue (but in only six of the 35 ESs).

Visual impacts and vibration were rarely addressed in relation to any of the non-pollution effects. Where vibration was addressed, it was in relation to ecology.

Overall, non-pollution effects did not tend to be regarded as significant, other than for impacts on ecology, particularly in relation to the physical presence and any physical disturbance caused by the project.

## 4.2 Alternatives

The majority of the ESs (89%) addressed alternatives, with a particular focus on alternative designs (81% of the ESs), followed by alternative processes (61%) and then alternative locations (39%). Only five of the ESs considered alternatives in all three areas.

Particular project types were generally associated with certain types of alternative. Pipelines were more likely to consider alternative locations; exploration wells were more likely to consider alternative processes, and field developments were more likely to consider alternative designs.

The consideration of both alternative designs and processes seemed to be associated with projects in the North East North Sea zone, whilst alternative processes were considered more often in the West of Shetland zone.

Perhaps unsurprisingly, the choice between alternative processes tended to be made on technical grounds, whereas a more balanced approach – using technical, environmental and economic grounds - was used for choices between alternative locations or alternative designs.

### 4.3 Mitigation

The identification of common mitigation measures for particular non-pollution effects proved difficult as, generally, mitigation was proposed in relation to particular project attributes. Thus nearly all the ESs (94%) proposed mitigation measures in relation to the physical presence of the projects, and the measures proposed included exclusion zones, consultation with other sea users, design changes, and monitoring. Measures relating to physical disturbance and waste were reasonably common (74% and 86% of ESs respectively), but measures relating to noise and 'other' impacts were less common. Only a few mitigation measures were proposed for vibration and none at all for visual impacts.

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**Overall, there appeared to be a focus on impacts on ecology due to the physical characteristics of projects, with more limited consideration of other non-pollution effects and implications of the projects.**

**Some differences and trends related to project types, operator experience, geographical zone of operation and timescale were apparent, but overall the approach to EIA was not markedly different.**

**Mitigation measures proposed were usually related to specific project characteristics.**

**APPENDIX A – NON-POLLUTION EFFECTS RECORDING FORM**

# BERR Offshore Oil and Gas EIA Research Study

***Checklist for Non-pollution Effects, Alternatives and Links to SEA***

ES Reference:

ES Title:

Reviewer:

**1. Coverage of Alternatives**

a. Are alternatives discussed in the ES? (tick as appropriate)

- No alternatives
- Locations
- Designs
- Processes

b. How are the choices between alternatives resolved (tick as appropriate)?

Alternative locations:

- On environmental grounds
- On technical grounds
- On economic grounds
- Not clearly resolved

Alternative designs:

- On environmental grounds
- On technical grounds
- On economic grounds
- Not clearly resolved

Alternative processes:

- On environmental grounds
- On economic grounds
- On technical grounds
- Not clearly resolved

**2. Does the ES refer to any SEA reports? If so please note below the section of the ES containing the reference, and the title of the SEA study involved.**

**3. Non-pollution significant adverse effects and associated mitigation**

a. Coverage of impact areas (NC= not covered; NS=no significant impact; S=significant impact; C=construction; O=operation ; D=decommissioning)

| | ***Ecology*** | ***Cultural Heritage*** | ***Economic*** | ***Traffic*** | ***Other(specify)*** | ***Mitigation proposed (specify)*** |
|---|---|---|---|---|---|---|
| Physical presence | | | | | | |
| Physical disturbance | | | | | | |
| Visual | | | | | | |
| Noise | | | | | | |
| Vibration | | | | | | |
| Waste | | | | | | |
| Other (specify) | | | | | | |

## APPENDIX B – OTHER MITIGATION MEASURES

See Section 3.4 for key mitigation measures proposed.

Physical presence

- All vessels/installations associated with projects to carry relevant navigational and communication aids (4 ESs, only for field developments);
- Maximum use of existing infrastructure and already developed areas, sharing of vessels, helicopters and other facilities (3 ESs);
- Management of traffic (3 ESs);
- Collision risk management (3 ESs);
- Short time period for work (2 ESs);
- Post-installation surveys (2 ESs);
- Post-construction or decommissioning removal of debris and structures (2 ESs);
- Compensation for loss of earning of commercial fisheries (1 ES);
- Seabed survey to avoid environmentally sensitive areas (1 ES);
- Subsea equipment within 'dropped object zones' protected by concrete mattresses where not trenched (1 ES);
- Survey of ship position during works (1 ES);
- Laying pipeline on sea bed (not trenching) (1 ES);
- Use of a fall pipe on the dump vessel and a Remotely Operated Vehicle (ROV) to ensure accurate placement (1 ES).

Physical disturbance

- Decommissioning considered (3 ESs);
- Transportation, treatment and disposal of cuttings and muds on-shore (3 ESs);
- Supervision of operations, including rock dumping (3 ESs);
- Best practice methods employed (2 ESs);
- Avoidance of environmentally sensitive areas (2 ESs);
- Minimisation of movements (2 ESs);
- Control/removal of dropped objects (2 ESs);
- Dispersion of cuttings (2 ESs);
- Minimal time period for work (2 ESs);
- Obtaining licenses (1 ES);
- Re-injection of cuttings (1 ES);
- Avoidance of pipelines (1 ES);
- Avoidance of pockmarks (1 ES);
- Post-lay intervention work through chain drags (1 ES);
- Timing of works (1 ES).

Noise

- Helicopters to maintain a minimum altitude, avoid circling and hovering over marine mammals (2 ESs);
- Observation of marine mammals (2 ESs;
- Utilisation of established routes (1 ES);
- Timing of works (1ES);
- Number of vessels kept to a minimum (1 ES);
- Use of submerged turret loading system will minimise the use of 'dynamic positioning' for vessel (1 ES);
- Use of sunken (drilled) piles (not pile driving) (1 ES).

Waste

- Use of low toxicity chemicals (3 ESs);
- Well maintained and operated equipment (2 ESs);
- Bunding of liquid storage containers (2 ESs);

- Awareness raising (1 ES);
- Use of low-sulphur fuel (1 ES);

Flaring excess gas rather than venting (1 ES);

- Bunding of oil/separated from waste water (1 ES);
- Discharge in small volume batches (1 ES);
- Risk assessment for waste disposal (1 ES);
- Hazardous wastes carefully stored and used and detailed inventory kept (1 ES);
- Use of on-board shale shakers (1 ES);
- Careful calculation of volumes of chemicals (1 ES);
- Surveys (1 ES);
- Separation of drainage water (1 ES).

Other

- European EMAS standard certification (1 ES);
- Use of self-isolating facilities (1 ES);
- Application of procedures to minimise emissions and duration of well test (1 ES);
- Avoid transfer of utility fluids (1 ES);
- Re-fuelling only in daylight and in good weather conditions (1 ES);
- Use/implement dedicated well engineering info systems (1 ES);
- Adherence to procedures and use of certified equipment (1 ES);
- Retrieval of major items of debris from seabed (1 ES).