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Department of Communications,
Climate Action & Environment

Method for Assessment of Financial Indemnity/Insurance of Petroleum Authorisation Holders

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Report for:

The Minister for Communications, Climate Action and Environment

Method for assessment of financial indemnity/insurance of petroleum authorisation holders

In association with:

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and

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1. Executive Summary

This report reviews the existing Irish regime for approving offshore exploration drilling and the requirements of other jurisdictions, with respect to ensuring the applicant has adequate financial provision to cover liabilities potentially deriving from the applicant's offshore activities, including effective emergency response and subsequent remediation and potential economic damages. (where such liability is provided for by national law) as required by EU Directive 2013/30 (Reference 2).

The report recommends an approach resulting from a review of other jurisdictions' approaches to assessing the suitability of applicants' proposed financial arrangements and discussions with the Department of Communications, Climate Action and Environment (DCCAE), Commission for Energy Regulation (CER), Irish Coast Guard (IRCG) and the Irish Offshore Operators Association (IOOA).

All currency amounts quoted by other countries' regulators have been given a euro equivalent using exchange rates prevailing on 1st May 2017.

2. Introduction

The Minister for Communications, Climate Action and Environment, Ireland wishes to establish a regime to implement the requirements of European Directive 2013/30/EU, in particular the requirements in Articles 4 and 7. Astrid Consulting Limited in association with NRG Well Management Limited and INDECS Consulting Limited has been commissioned to provide advice and guidance for the Department on the technical and financial appraisal of applicants for an exploration drilling licence.

This report comprises two parts:

A. Background Review (Section 3): Description of the relevant regulation, guidance and regulatory responsibilities in Ireland together with a review of approaches taken in other jurisdictions to ensure that the applicant has made or will make adequate provision to cover liabilities potentially deriving from the applicant's offshore oil and gas operations. In particular, that there are suitable financial arrangements in place to provide indemnity against damage caused by the uncontrolled release of hydrocarbons from oil and gas exploration and production activities. (The current work only relates to exploration activities and therefore focusses on prevention, emergency response, spill clean-up and damage arising from a well blow-out).
B. Requirements on applicants (Section 4.1) and proposed protocol to be used by DCCAE for assessment of financial indemnity/insurance of applicants (Section 4.2) which also provides guidance for applicants. The pro-forma record sheet showing the assessment protocol is reproduced in Appendix 5.

3. Review

3.1 Regulatory Background

The Department for Communications, Climate Action and Environment (DCCAE) is responsible for the issue of petroleum authorisations and carries out certain aspects of assessments of applications. Applications are also assessed by Commission for Energy Regulation (CER) – for safety / integrity measures to prevent major accidents affecting people and the environment.

The Petroleum (Exploration and Extraction) Safety Act 2015 (Reference 1) amends previous legislation, where sections of relevance to the current work include the following:

"(2) In Chapter III of Part II of the Petroleum and Other Minerals Development Act 1960 the following is inserted after section 9:

"Assessment of technical and financial capability of applicant for offshore petroleum authorisation

9A. (1) The Minister shall satisfy himself or herself as to the technical and financial capability of the prospective offshore petroleum authorisation holder to carry out the functions and obligations conferred by that offshore petroleum authorisation in determining whether to grant or transfer such an offshore petroleum authorisation.

(2) When assessing the technical and financial capability of a prospective offshore petroleum authorisation holder under subsection (1) to carry out any offshore petroleum activity pursuant to an offshore petroleum authorisation, the Minister shall consider, inter alia:

(a) the risk, hazards and other relevant information relating to the licensed area concerned including, where appropriate—

(i) the cost of degradation of the marine environment under the European Communities (Marine Strategy Framework) Regulations 2011 (S.I. No. 249 of 2011),

(ii) environmentally sensitive marine and coastal environments, and

(iii) marine protected areas, including special areas of conservation under the European Communities (Environmental Liability) Regulations 2008 (S.I. No. 547 of 2008) (as amended by the European Communities (Environmental Liability) (Amendment) Regulations 2011 (S.I. No. 307 of 2011)) and special protection areas under the European Communities (Marine Strategy Framework) Regulations 2011 (S.I. No. 249 of 2011);

(b) the particular stage of the offshore petroleum activity or activities;

(c) the ability of the prospective offshore petroleum authorisation holder—

(i) to meet the costs of carrying out the offshore petroleum activity or activities in question,

(ii) to meet the costs for the immediate launch and uninterrupted continuation of all measures for effective emergency response and subsequent remediation in the event of a major accident, and

(iii) to have or to put in place appropriate insurance, indemnity provision or other financial assurance instruments to cover liabilities potentially deriving from the particular petroleum activity or activities in question;

(d) available information relating to the safety and environmental performance of the prospective offshore petroleum authorisation holder, including in relation to major accidents, as may be appropriate to the offshore petroleum activity or activities for which the offshore petroleum authorisation is to be granted or transferred;

(e) the procedures proposed by the prospective offshore petroleum authorisation holder in the event of a major accident for ensuring prompt and adequate handling of appropriate compensation claims including in respect of appropriate compensation payments for transboundary incidents potentially deriving from the particular petroleum activity or activities in question.

(3) Prior to the grant of an offshore petroleum authorisation, the Minister shall consult, where relevant, with the Commission for Energy Regulation and the Minister for the Environment, Community and Local Government in relation to considerations made under subsection (2)(a), and any other person considered necessary.

(4) The Minister shall only grant or transfer an offshore petroleum authorisation to a prospective offshore petroleum authorisation holder where satisfied with the technical and financial capability of the prospective offshore petroleum authorisation holder to carry on the offshore petroleum activity or activities pursuant to the offshore petroleum authorisation and in accordance with the conditions of that offshore petroleum authorisation.

(5) It shall be a condition of an offshore petroleum authorisation that the procedures proposed by the prospective offshore petroleum authorisation holder under subsection (2)(e) are established and remain in place for the duration of the offshore petroleum authorisation."

The EU Offshore Safety Directive 2013/30/EC Article 4.2(c) states that when assessing an applicant for a licence due account shall be taken of ...."the applicant's financial capabilities, including any financial security, to cover liabilities potentially deriving from the offshore oil and gas operations in question including liability for potential economic damages where such liability is provided for by national law". The PEES Act (Reference 1), enacts the OSD Article 4 into Irish law as shown above. Furthermore - see paragraph 9A.(2)(a)(i), whilst the Minister is required to consider the cost of degradation of the marine environment (under the Irish Regulations S.I.249 of 2011, which implement the EU Marine Strategy Framework (MSF) Directive 2008/56/EC) - this refers to the initial assessment of Ireland's marine waters, which was then used to develop an overall marine strategy for Ireland, as required by the MSFD, and is therefore on a strategic level and not directly relevant to this report. The initial assessment includes "an economic and social analysis of the use of

those waters and the cost of degradation of the marine environment" and was due to be completed by 2012 and reviewed every 6 years. These activities are coordinated on a regional scale for the NE Atlantic by OSPAR, who has published a report on the various approaches taken by Member States (Reference 44, 45). Ireland has published economic data in "Ireland's Ocean Economy" (Reference 15). Thus, this report is concerned with the ability of the applicant to meet the costs of effective emergency response and liabilities potentially deriving from the petroleum activities in question - parts 9A.(2)(c)(ii) & (iii) as shown above. In addition, the OSD, Article 7 requires Member States to ensure that the licensee is financially liable for the prevention and remediation of environmental damage as defined by the Environmental Liability Directive 2004/35/EC, caused by their oil and gas operations. However, for this to be relevant offshore, a pollution event would have to affect the "environmental status" of a regional scale water body, which is generally considered highly unlikely. However, it is possible to envisage an oil spill causing significant damage to protected species and habitats on the shoreline and this possibility should be considered.

The Commission for Energy Regulation specify safety case requirements with respect to well work and incident mitigation and response. The latest **Safety Case Requirements** are described in (Reference 6.) where relevant sections include:

Section 4 – Requirements for Well Work Safety Cases – general relevance and

Section 14 – Emergency Response Offshore Major Environmental Incident
The key sections, which mirror the Irish Coast Guard Guidelines are:
- *14.4 Oil Spill Modelling and Effectiveness*
- *14.5 Emergency Response Plan*
  - *14.5.1 Strategy*
  - *14.5.2 Implementation Plan*
  - *14.5.3 Mitigation Measures*
    - *14.5.3.1 Relief Well*
    - *14.5.3.2 Well Capping*
    - *14.5.3.3 Dispersants*

The Irish Coast Guard (IRCG) has responsibility for marine emergency management in Ireland's Exclusive Economic Zone (EEZ). It is responsible for response to, and coordination of, maritime accidents which require Search & Rescue and Counter Pollution & Salvage operations. It also has responsibility for vessel traffic monitoring. Hence, specifically for petroleum exploration and extraction the IRCG has a role with regard to the safety and pollution control of any facilities, ships, vessels and activities undertaken in the exploitation of petroleum reserves. Specifically, the IRCG approve Oil Spill Contingency Plans (OSCP) and emergency response plans covering pollution control. The Environmental Protection Agency (EPA) has responsibility for pollution affecting the shoreline and landward of it.

The approvals process is summarised by CER in CER 1476 (Reference 7) and summarised in APPENDIX 1 Process Map for Offshore Well Work Activities. CER is primarily responsible for reviewing the technical measures to ensure well integrity and prevent loss of containment of hydrocarbons. However, the IRCG has responsibility for assessing the Emergency Procedures Manual and Oil Spill Contingency Plan.

The review in Section 3.2 , seeks to identify whether the information in the Safety Case / Emergency Procedures Manual and Oil Spill Contingency Plan is sufficient to form the basis for costing the proposed incident response measures and liability for clean-up and damage, in addition to

demonstrating that the measures reduce the risk of an MEI (Major Environmental Incident) to as low as reasonably practicable (ALARP), the assessment of which is the responsibility of CER.

3.2 Incident Prevention, Response and Pollution Damage

CER regulatory arrangements are the primary mechanism for controlling well operations offshore Ireland. The CER's Safety Case and assessment regime has been reviewed following comparison with other regulatory approaches and the requirements of the European Offshore Safety Directive. NRG has reviewed CER16024 - Safety Case Requirements, CER 16016 - Compliance Assurance System, and CER16015 - CER Audit and Inspection System and compared them to other regimes, concluding that the system is comprehensive. There are a few minor points, that may need greater clarity for the purposes of assessing financial indemnities to cover the major environmental incidents being considered here (see section 4.1.1). However, it would appear to be unnecessary duplication to expect the DCCAE to replicate what CER are already doing.

The Irish Department of Transport, Tourism & Sport, the managing agency for the Irish Coast Guard (IRCG), is the primary agency for managing oil spill response and for coordinating the national spill response plan (the Irish National Plan) with arrangements put in place by offshore applicants. NRG has compared these arrangements with other regimes. These arrangements are broadly consistent with the requirements in other countries. The only area for potential improvement in relation to well related spill response planning is the need for more guidance on spill modelling.

A key element of determining suitable FR levels, is to determine the liability which would arise from the oil and gas operations. Whilst an oil spill could cause both "environmental damage" and "economic damage", it is important to define these with respect to the Irish legal situation (see Section 3.3.11 Pure economic loss). The current internationally established spill compensation funds only cover claims for direct measurable economic losses, scientific studies of environmental damage for the purposes of selecting suitable remediation options, and actual remediation carried out. The stance taken by the tanker industry is that whilst serious economic impacts can occur, natural systems are resilient to short-term adverse changes and that, as a consequence, a major oil spill will rarely cause serious long-term damage to the marine environment.

In 2012, direct economic losses for a variety of potential scenarios in UK offshore areas were reviewed under the international compensation scheme applicable to exploration and production applicants (Reference 30). This work was used by the UK offshore industry to develop a simple scoring system for calculating blowout spill-related financial liabilities and hence demonstrating financial responsibility to the regulator (2012 Method) (Reference 31). On the one hand this approach is more specific than the use of a simple 'cost per gallon of oil spilled' figure. On the other hand, it does not require extensive modelling and estimation work by the applicant which in any case is unlikely to address all potential spill scenarios. The OGUK FR 2012 Methodology is currently undergoing revision, following extensive additional spill modelling and it is understood that this has allowed the cost model to be simplified, with FR calculations based on location and amount of oil spilled.

Other jurisdictions (e.g. Australia) have decided to use a scoring system similar to the OGUK 2012 Method. We believe that adopting the OGUK 2012 Method in Ireland might be appropriate

provided certain adjustments are made as required but development of an Ireland – specific cost model is not appropriate at this stage.

These conclusions are explored in more detail in the following two sections. Section 3.2.1 **Well-related Elements** addresses the well-related elements whereas section 3.2.2 Oil Spill Response addresses oil spill response elements.

3.2.1 Well-related Elements

A. Executive Summary: This section is a summary of existing requirements with commentary on where additional information or activities might be required to ensure satisfactory financial measures are in place:

1. *Organising for the Planned Activity*

The requirement for notifications to relevant authorities is similar across European countries and not very dissimilar in many other locations around the world. What differs in some cases is where the independent well examination and verification fits into the overall workflow.

In the case of the Irish notification and consents process it is apparent that the review of the design and programming for well work is included in the CER 16016 - Compliance Assurance System (Reference 5).

Additionally, CER16024 - Safety Case Requirements (Reference 6) and CER16015 - CER Audit and Inspection System (Reference 4) provide a comprehensive oversight of the design and planning elements at or prior to Notification being submitted.

Additionally, an applicant or its insurers may commission an Insurance Risk Review. These reviews are explained in this report but form no part of the regulatory requirement. (See APPENDIX 3 – Guidance on Insurance Risk Reviews)

2. *Management of Contractors*

Contracting and Procurement policies and standards within the Applicant and/or Well Management Company management systems should be designed to ensure that contracts are awarded to contractors who can provide fit for purpose equipment and services. The tender evaluation process should explicitly provide for assessment of the competency of the equipment and services to perform the well work.

Once contracts are awarded bridging documents should be developed to manage the interfaces between the various Applicant and Contractors management system. This is especially important between the Applicant and/ or Well Management Company and the Drilling Contractor who owns and operates the well control equipment.

Management system Interfacing requirements are described in CER16024 - Safety Case Requirements (Reference 6).

There are possibly some areas in CER16015 - CER Audit and Inspection System (Reference 4) when considering Well Work, and in particular Exploration well activity, where additional requirements could be discussed; for example, there is no mention of readiness to operate or competence which

in the context of management of contractors seems a little light. It also has some bearing on capping stack arrangements discussed in a later section of this report, Item 4. Capping Device / Relief Well Planning / Cost Estimation.

3. *Well Design Review / Well Examination*

The CER 16016 - Compliance Assurance System (Reference 5) makes it clear that an ICB must first be approved by the CER and will then provide the review of the design and programming phase of any well work at or prior to notification being submitted.

Additionally, it is suggested that it would be worth determining:

- What level of Partner Scrutiny has taken place and are the partners competent?
- Have the Applicant's insurers commissioned an Insurance Risk Review assessment?

4. *Capping Device / Relief Well Planning / Cost Estimation*

There are a number of providers of Capping Devices globally and at least two with capabilities in Europe. Their business models and modes of operation differ and need to be assessed in relation to the competency of the Applicant and/or Well Management Company. These are discussed in this report.

CER16024 - Safety Case Requirements (Reference 6) states the requirements for capping stack arrangements.

Relief well planning is well understood and there are good industry guidance documents available. A planned relief well has become quite a common element for exploration wells and should facilitate timely deployment, drilling and well kill operations. A planned relief well will also have associated with it budgetary estimates or an approved AFE, and reasonably accurate mobilisation / demobilisation times and time/depth/kill curves. Such time estimates provide a basis for how long source control may take and feed into the other cost estimates for pollution control etc.

CER16024 - Safety Case Requirements (Reference 6) states the requirement for relief well planning.

5. *Conclusion*

Comparing the Irish regime for notifications and consents with other similar regimes it is apparent that the Irish system is quite comprehensive and robust. Very little else is required from a safety case perspective to form a platform for the estimates of financial liability created by a loss of well control.

Areas where more information would be helpful, to demonstrate that adequate technical measures have been taken to prevent pollution from wells, include:

- A clear statement that Well Examination, rather than just verification, is required.
- Additional guidance on the information required in relation to key safety critical elements. For example, in relation to BOP's, such guidance might include the need to confirm that shear rams are capable of shearing all tubulars planned for use in the well. In general, the demonstration should explain how the applicant has satisfied themselves that safety functions (in relation to well control) will be performed when required.

- Within the review of the Applicants management systems, the assessment of the contracting and procurement policies and standards to ensure that fit for purpose goods and services are procured.
- Determination of probable reservoir fluid types in an exploration scenario, and probable uncontrolled flow rate.

However, the points above would not inhibit the estimation of financial liability created by a loss of well control. An outcome of the process is sight of relief well planning that should provide a duration for mobilisation, drilling, and well kill operations that will form the probable time basis for the duration of the loss of well control.

Capping stack provisions are also reviewed within the Safety Case Review process.

B. Consideration for assessment of an application:

1. *Organising for the Planned Activity*

It is common practice across the various regulatory regimes that have been reviewed prior to this report for there to be a detailed notification requirement.

A good example with regard to exploration wells is the UK Oil and Gas Authority (OGA) document entitled "Requirements for exploration applicants" (Reference 41). The opening two paragraphs of this document are as follows:

> ***"Key Requirements***
>
> - *Capability to plan, supervise, manage and undertake the proposed exploration operations including interfaces with contractors.*
> - *Arrangements for pollution liability.*
> - *Details of the management of environmental responsibilities (including the company's environmental policy and environmental management system).*
> - *Details of past record of compliance with environmental legislation.*
> - *Insurance coverage.*
>
> ***Information Requirements***
>
> *There is no fixed amount of information the OGA requires to be satisfied of a proposed applicant's competence. Clearly a very small company with little experience should expect to come under greater scrutiny and provide more information than an established applicant with a good record. Where the company has limited experience of planning, organising or supervising exploration activity, we will require a detailed understanding of the applicant-contractor relationship and the in-house management responsibilities and control of the contracted support."*

The document goes on to provide a checklist of information the Applicant should assemble. This detailed list is not dissimilar to the Irish notification requirements

At the time of such a notification submission it would be normal for the well design and programming, even if the programmes are not finalised, to have been subject to independent well examination (WellEx) commissioned by the Applicant.

The Applicants insurers may also commission an Insurance Risk Review (IRR), see APPENDIX 3 – Guidance on Insurance Risk Reviews. An IRR is not required by the Regulator and is given here as an example of how a formal review of management arrangements can be carried out, particularly in relation to well design and oil spill response planning.

Documents Required

The documentation made available for such WellEx and/or IRR should include the following:

Regulatory Compliance & Consents

- *Emergency Response Plan (ERP) / Oil Spill Contingency Plan (OSCP).*
- *Blow Out Relief Plan (BORP).*
- *Regulatory compliance Register.*

Spill Response Planning

- *Emergency Response Plan.*
- *Oil Spill Contingency Plan.*
- *Blow-out Relief Plan.*

Internal Compliance & Planning

- *Well System.*
- *Well Design Standards.*
- *Procurement Policy.*

Design and Programming

- *Geological Prognosis*
  - *Detailing the expected geological environment and the pore pressure, fracture gradient and temperature gradient predictions.*
- *Offset Well Analysis.*
- *Review of Hazard Identification and Risk Assessment.*
- *Basis of Design Document.*
- *Detailed Design Document:*
  - *Casing Design and design standards.*
  - *Completion design and well test string design documents (as appropriate) showing the clients design standards and the comparison of this design to those standards.*
  - *Kick tolerance calculations (often included with the tubular design documents but may appear later in the detailed programme for the well).*
- *Site Survey Document(s) and Shallow Hazard Assessment:*
  - *If not included in the Geotechnical document.*
- *Conductor / Riser Analysis*
- *Drilling, completion and well testing programmes (as appropriate):*

  - *In addition to describing the method of construction and operation these normally provide information regarding the key contractors and their contribution in the areas of cementing, drilling fluids, directional control, and if applicable well testing.*
- *Rig specification and equipment inventory:*
  - *For offshore rigs this is generally available over the internet but this is rarely the case for land rigs.*
  - *Last certifying Authority Inspection.*
- *Well Control Equipment and capability including shearing capability of the BOP shear rams in relation to the planned use of tubulars.*
- *Bridging Documents between Applicant & Drilling Contractor.*
- *Document Control and Management of Change process / procedure.*

Competency

- *The Applicant:*
  - *Key personnel CVs.*
- *Applicant and Drilling Contractor:*
  - *Evidence of current IWCF well control certification for key supervisor personnel.*

Assuming the Notification to DCCAE is required at least 21 days prior to activity commencing and that the safety case submissions to CER require a similar lead time, then any assessment by an ICB would have to take place prior to the 21 days to enable the interim report required by the European Directive, and any such assessment by an ICB would need to be completed in detail prior to the end of the 21 day period.

2. Management of Contractors

The activity of assessing contractors for competency and for the appropriateness of their equipment and services is normally part of the Applicant's contracting and procurement process.

To reveal what scrutiny was applied at the time of tendering and award of contracts it is necessary to include the contracting and procurement process in the review of the Applicants management systems. If a well management company is employed to take on much of the contracting and procurement for well work then that well management company's management systems must also be assessed.

Once appropriate contracts have been awarded there is a requirement to bridge between the Applicant's management systems and those of its contractors, including the well management company if used. The primary bridging document from the perspective of well integrity and well control will be that between the Applicant and/or well management company and that of the drilling contractor who owns and operates the rig and the well control equipment.

Other bridging documents may be required for equipment and services temporarily installed on the drilling rig.

The purpose of such bridging documents is to establish clearly which management system has primacy under which circumstances, and most critically during well control incidents. Drilling contractors and rig owners who are members of the IADC will be very familiar with this requirement.

Within CER16015 (Reference 4) - CER Audit and Inspection System section the following are required:

> ***2.4 Audit and Inspection in Relation to a Production Safety Permit***
> Includes a description of what will be considered for the following:
> ***2.4.1 Audit and Inspection of the Design Process***
> ***2.4.2 Inspection of Readiness to Operate***
> ***2.4.3.1 Audit and Inspection of Procedures***
> ***2.4.3.3 Audit and Inspection of Competence***

However, for the Well Work section there is much less detail specified:

> ***2.5 Audit and Inspection in Relation to a Well Work Safety Permit***
> *The following will be audited and/or inspected by the CER in relation to a Well Work Safety Permit:*
> • *The design process;*
> • *The petroleum infrastructure; and*
> • *Compliance to the Well Work Safety Permit.*

There is no mention of readiness to operate or competence which in the context of management of contractors seems a little light. It also has some bearing on capping stack arrangements discussed in this report in Item 4. Capping Device / Relief Well Planning / Cost Estimation.

3. Well Design Review / Well Examination

There are several elements to consider in the well design review requirement:

- What level of Partner Scrutiny has taken place and are the partners competent?
- Has an independent Well Examination of the planning, design and programming documentation been commissioned by the Applicant?
- Have the Applicant's insurers commissioned an Insurance Risk Review assessment?

"Independent *verification" is legally defined in Article 2(29) of the Directive as "an assessment and confirmation of the validity of particular written statements by an entity or an organisational part of the applicant or the owner that is not under the control of or influenced by, the entity or the organisational part using those statements*". In respect of offshore installations, the schemes for independent verification shall be established, in accordance with Article 17(4)(a) of the Directive, to assure:

- That the elements identified as "critical" for safety and the protection of the environment in the applicant's/owner's risk assessment are "suitable" as described in the report on major hazards (see Article 11(2) of the Directive), and
- That the schedule of examination and testing of the safety and environmental critical elements is "suitable", up-to-date and operating as intended.

The European directive clearly indicates that independent well examination is required. It is not entirely clear where this requirement is located within the permits and approvals process for DCCAE, CER and other authorities. It is also not clear in the flow diagrams within the document *CER14766 Permissioning Process Map - Petroleum Exploration and Extraction in Ireland.* (Reference 7)

It is normal for the Well Design Review / Well Examination to confine itself to the containment envelope of the well, and the expectation is that other elements outside the well containment envelope will be dealt with in the Safety Case review and in the verification process.

If adopted, the Insurance Risk Review does have a slightly wider remit than well examination.

However, all reviews and audits of the well works need to be underpinned by the detailed audit of the management systems, policies and standards.

4. Capping Device / Relief Well Planning / Cost Estimation

Relief Well Planning is now quite commonly performed as part of the primary planning so that a well design is ready to use. The appropriate casing and other equipment may also be sourced either on consignment or readily available from stock in appropriate time frames.

There is extensive literature available in the industry relating to relief well planning including:

- OGUK - OP064 Guidelines on relief well planning for offshore wells (Reference 42).
- IADC Deepwater Well Control Guidelines (Section 4 – Emergency Response plans) (Reference 43).

A relief well plan will also give a good indication of the duration required to move on to location, drill, intersect and kill a blow-out.

CER16024 - Safety Case Requirements (Reference 6) states:

> *"The drilling of a relief well will be identified as a response option, the following must be detailed:*
> - *Any specific MODU configuration required to drill the relief well (e.g. HP/HT, deep water etc.); and*
> - *Provide details if the limited availability of a suitably configured MODU may cause delays to the relief well operations.*

An estimate of the time required to complete the relief well operation must be included from the day the relief well operation is decided upon to the day the well is killed."

Capping Devices are available from a number of sources e.g.:

- OSPRAG - is a OGUK supported capability that has a capping stack available for the Applicant to deploy. (http://oilandgasuk.co.uk/product/osprag-capping-device-brochure/)
- OSRL – is a global organisation with a number of capping stacks and related equipment deployed in several locations. OSRL has expert staff to assist with planning and deployment activity. (www.oilspillresponse.com)
- Wild Well Control – are a specialist well control company which also has a number of capping stacks available together with expert staff to assist in planning and deployment. (www.wildwell.com)

As all of the capping devices and associated equipment have similar capabilities it is the nature of the organisation that is supplying them that differentiates them.

It is therefore necessary to look at the capability of the Applicant and/or Well Management Company to decide if simply renting a device and deploying it unaided is feasible, or if a more comprehensive planning and deployment service would be more appropriate.

The business models for each of the options will be different but that is a commercial consideration for the applicant and not a concern for the regulator.

CER16024 - Safety Case Requirements (Reference 6) states:

> *"14.5.3.2 Well Capping*
>
> *A well capping device will be identified as a source control option, the following must be detailed:*
>
> - *Details of the capping device(s) deemed suitable for use;*
> - *Confirmation that the suitability of the capping device(s) has been fully assessed and is compatible with the well infrastructure and is certified for the anticipated well pressures; and*
> - *Identification and contact details of the specialist contractor(s) providing the device(s).*
>
> *An estimate of the time required to complete the well capping operation must be included from the day the capping operation is decided upon to the day the well successfully capped."*

Cost Estimation

In the context of relief well drilling the relief well plans should include a time/depth/kill estimate and a quite well defined AFE.

To a degree the distance that a rig may have to move to arrive at the relief well location will also have a bearing on time and cost. Mobilisation and demobilisation costs can be significant and part of the planning should be identification of probable sources of rigs to drill relief wells.

3.2.2 Oil Spill Response

In relation to this element we have presented detailed conclusions in relation to the following four topics: Oil Spill Modelling, Natural & Economic Resource Loss Assessment, Emergency Planning and Spill Cost Estimation.

3.2.2.1 Modelling of the Fate & Effects of Credible Spill Events

Background / Range of Possible Approaches

Fate of Oil Spills

As part of the regulatory approval process, an applicant is required to submit an Oil Spill Contingency Plan (OSCP) for approval by the Irish Coast Guard (IRCG). This will require oil spill modelling to describe how a potential spillage would be distributed as a result of local tidal, wind and weathering effects so that suitable emergency response plans can be developed. The results of this spill modelling may also be used to determine the likely costs of spill clean-up operations (see Section 3.2.2.4 Spill Clean-up Cost Estimation Methodologies) and also to identify any sites particularly sensitive to environmental damage, or economic loss (see Section 3.2.2.2 Assessing Potential Natural and Economic Resource Losses). In general, oil spill plans require a "worst case scenario" to be

defined and this can be used for determining maximum spill costs for Financial Responsibility (FR) and hence ensure a streamlined approach for the applicant.

For the purposes of this FR methodology, the spill event to be modelled should be credible yet sufficiently conservative to cover the foreseeable worst case scenarios. It should also be consistent with the Safety Case. Typically, a credible worst case scenario could be defined as:

- Release location: well location, and whether surface or subsea
- Nature of release (crude type) which causes maximum beached oil (or alternative criteria to be agreed).
- Flow rate (m^3/hr): Maximum full bore blowout.
- Duration of release (days): Number of days to install capping device on deep-water exploration wells, or time to drill relief well.
- Maximum release quantity (m^3): as above for maximum flow & duration.
- Worst case trajectory – wind and current conditions to nearest shoreline (or maximum volume oil beached etc, whichever produces highest FR).
- Tracking oil spill until it has all reached the shore or been dissipated by weathering etc.

In general, spill modelling should consider:

- Metocean data – currents, winds, temperature.
- Weathering – evaporation, emulsification, dissolution, oxidation.
- Transport – advection, spreading, dispersion, entrainment, sinking, sedimentation, overwashing, partitioning and bioavailability, and stranding.
- Likely vs worst case, low/high

Models should be capable of simulating a surface release for conventional drilling, or a subsea release at the sea floor for deep-water drilling, as applicable. Of the three commonly used models (OSCAR, OSIS and OILMAP) OSCAR is the only one capable of modelling a sea floor release, although by applying an adjustment factor OSIS has been used for this purpose (Reference 10).

Effects of Oil Spills

The effects of oil spills vary considerably depending on the characteristics of the oil, the movement and weathering of the spill, the time of year and the sensitivity of the area impacted in terms of key species or ecosystems. Physical smothering from viscous crude can be damaging to shoreline animals and plants, whereas lighter oils can contain higher proportions of soluble toxic compounds which can cause mortality or sub-lethal effects on animals on the seabed. Prevailing wind and tide can move spills towards sensitive environments such as salt marshes, where oil may become trapped in the sediments and release slowly over many years, however storms may reduce oiling on rocky shorelines and increase evaporation or mixing in the water column where natural biological processes will eventually break down the oil. Ecological changes can arise due to the loss of key species and takeover of habitats by opportunistic species, or loss of habitat or shelter. Other pressures on ecosystems also exist, however, either through natural variability or anthropogenic over-exploitation, pollution or habitat loss.

Whilst it is recognised that significant economic loss can arise, ITOPF advice based on post spill studies concludes that the natural environment is resilient and long-term damage is rare; following

initial clean-up natural recovery can take place within a few months for plankton, and a few years for most shoreline types, although salt marshes may take considerably longer, particularly if inappropriate intrusive clean-up has occurred. (References 11, 12, and 13)

Economic impacts to be considered may include:

- Fisheries – fish and shellfish.
- Mariculture – fish farms, shellfish cultivation, seaweed cultivation & harvesting.
- Tourism – hotels, tours, sailing, diving, surfing, windsurfing, kayaking.
- Other - agriculture (e.g. contaminated sea spray as occurred after Braer spill), ferries, ports & harbours, shipbuilding, power station or refinery cooling water intakes, renewable energy, sand and gravel extraction, military uses, undersea cables.

Fisheries and mariculture can be impacted by oiling of nets, boats and equipment, loss of juveniles, and tainting of seafood (or public concern over safety), and the extent of impact will depend on the time of year – migration and spawning lifecycle and harvesting cycles, recovery times, and fishing bans imposed. Intertidal shellfish and seaweed mariculture, and coastal fish farms relying on clean seawater are particularly vulnerable. The Irish Seafood Industry Key Statistics for 2015 estimates the total value of Irish seafood trade is €891 million, of which 62% derives from exports (Reference 14). After shipping and maritime transport, marine tourism and leisure is the largest category of marine-related turnover in the Irish ocean economy (Reference 15).

The Irish Offshore Strategic Environment Assessment 5 assessed the possible impacts arising from implementation of the current Irish plan for oil and gas activities (Reference 16, 17). This covered the current baseline conditions and predicted effects on the environment from drilling activities, including ways to prevent, reduce and offset them. Impacts from accidental events such as a blowout, on the ecology, physical and chemical aspects and social and economic aspects are assessed. The report states that mariculture is concentrated on the west coast, whilst tourism in the east and south coast is likely to be most sensitive.

The state of the Celtic Seas Ecoregion, and pressures on it, has been assessed by ICES (Reference 18) and provides further useful baseline data.

Proposed Methodology in relation to Oil Spill Modelling

The spill modelling requirements for the FR methodology should:

- Specify the requirements of spill models (preferably in line with IRCG OSCP requirements).
    - Capability of model (i.e. recognised model such as OSIS, OSCAR, Oilmap).
    - If surface release or sea floor release to be considered.
    - Model parameters, “worst case scenario” consistent with Safety Case.
- Specify the outputs from spill modelling, required for use in FR methodology.

See Section 4.1.2 Oil Spill Response Planning . It is proposed that similar spill modelling criteria could be used for Ireland, as is used for the UK FR method, and recent discussions with IRCG have concluded that these could be consistent with updated spill modelling requirements under IRCG for OSCP.

The spill modelling requirements and assessment of the applicant's modelling should continue to be the responsibility of ICRG but will form a fundamental input to FR requirements.

3.2.2.2 Assessing Potential Natural and Economic Resource Losses

Background / Range of Possible Approaches

This section deals with the assessment of potential environmental damage caused by a major incident arising from offshore petroleum activities. For the purposes of determining Financial Responsibility (FR) levels for compensation, the "damage" can be thought of as falling into two categories: natural resource damage (NRD) that is not readily quantifiable in economic terms and economic resource damage for which business statistics are likely to be available. For example, natural resource damage may include deep-water reefs, bird populations or salt marshes, whereas economic resources would include fishing activities, aquaculture, tourism and coastal industry.

Assessing Natural Resource Damage

Quantifying the natural resource damage in financial terms is extremely difficult but a number of approaches exist. The "value" could be based on the cost of reinstatement (either onsite or in a nearby location), the value arising from the functioning ecosystem (e.g. fish nursery grounds, waste treatment, erosion control), or the premium/price that the public would be prepared to pay to preserve and enjoy it.

Examples of costing methods include:

- Ecosystem services.
- EU Environmental Liability Directive 2004/35/EC.
- Natural Resource Damage Assessment (NRDA).
- Marine Strategy Framework Directive 2008/56/EC

An "ecosystem service" approach aims to place a monetary value on the services that a functioning ecosystem provides to society, and can be used to ensure the natural environment is considered within cost benefit analysis, for example that developed in the UK (Reference 19). Similarly, increases in fishing catches in the area surrounding a marine reserve have been used to show the economic benefit of marine reserves.

EU Environmental Liability Directive (ELD) (Reference 20) aims to ensure that the "polluter pays" to prevent and remedy environmental damage to return damaged resources and services to baseline conditions, and where the liabilities are:

- Costs of assessing environmental damage (or imminent threat of such damage), and the development and selection of remediation options.
- Costs of data collection and analysis, other general costs, monitoring and supervision costs.
- Administrative, legal, and enforcement costs.
- All costs of implementing remediation.

"Remediation" includes primary remediation carried out at the site of impact, complementary remediation required where primary remediation is not sufficient to return the resource or service to baseline conditions, and compensatory remediation for losses incurred from the onset of damage

and the time when resources or services return to baseline. However, payment instead of actual remediation is not allowed. “Environmental resources” are defined as damage to protected species and natural habitats, damage to water and damage to soil (see also note 1). The Offshore Safety Directive, containing an amendment to the ELD (extension of the scope of damage to marine waters), was adopted in June 2013. The Environmental Liability Directive has been translated into Irish law in 2008, and amended 2011, and guidance is provided for assessing and costing environmental liabilities, for incidents occurring onshore (Reference 21, 22).

In the USA, Natural Resource Damage Assessment (NRDA) (Reference 23) is used to ensure the responsible party pays for any damage to American natural resources - and that the public's resources are fully restored. The process is similar to that under the ELD, and also includes compensatory restoration to address losses from the date of injury until recovery is complete. However, in the USA fines and punitive damages are significant (see Section 2.2.2.4).

The Marine Strategy Framework Directive 2008/56/EC (MSFD) and the enacting Irish regulation (References 24, 25), and also the Irish Petroleum (Exploration and Extraction) Safety Act 2015 (see Section3.1 Regulatory Background) refer to “an economic and social analysis of the use of those waters and of the cost of degradation of the marine environment” as part of the initial assessment of marine waters carried out by 2012, and reviewed every 6 years. The initial assessment is used at a strategic level for selecting targets and environmental improvement measures. ”Cost of degradation” can be related to loss of “good environmental status” but whilst definitions for cost appear to be lacking, OSPAR is the Regional Sea Convention for coordinating implementation of the MSFD in the NE Atlantic, and is developing a consistent approach for the assessment of “cost of degradation” and “good environmental status” (Reference 26, 44, 45). There are opportunities for DCCAE to tie-in with the progress Ireland and OSPAR has made in this area (Reference 27).

Thus, the "cost of degradation of the marine environment" referred to in the PEES Act, is not directly relevant to the FR covered by this report since it refers to an initial assessment of the marine environment undertaken on behalf of the Irish Government, so that an overall strategy for improvement can be developed by the Government under the Marine Strategy Framework Directive. However, in this FR report, reference has been made to the economic assessment carried out in Ireland (Reference 15). A full discussion of this point is included in the Introduction Section 3.1. Regulatory Background.

Assessing Economic Damage

Existing compensation schemes for oil spills generally deal only with the direct economic loss for which evidence can be provided.

The International Oil Pollution Compensation Funds (IOPCF) are two intergovernmental organisations (the 1992 Fund and the Supplementary Fund) which provide compensation for oil pollution damage resulting from spills of persistent oil from tankers. Claims are only allowed in the following categories, restricted by defined criteria (Reference 28):

- Property damage.
- Economic loss in the fisheries, mariculture and fish processing sectors.
- Economic loss in the tourism sector.

- Measures to prevent pure economic loss.
- Environmental damage and post-spill studies.

Thus, for example, a claim for the cleaning of fishing nets (and the economic loss resulting from this interruption to normal business) is allowable, although for a related business such as a fish wholesaler, claims will only be allowed if a direct link to the contamination can be shown. Similarly, a coastal hotel owner may claim for loss of bookings (but offset by any spill related business and reduced overheads) but a supplier of services to the hotel such as laundry, is unlikely to be compensated. In terms of environmental damage, under the 1992 Conventions compensation for impairment of the environment is limited to loss of profit from such impairment and costs of reasonable measures of reinstatement actually undertaken or to be undertaken. In practice this means studies would be required to establish the nature and extent of environmental damage caused by an oil spill and to determine whether or not reinstatement measures are necessary and feasible, are likely to significantly accelerate natural healing processes and that costs are commensurate with the likely benefits. Damage to marine parks or nature reserves would be assessed in terms of economic loss from reduced visitor charges or fishing activity i.e.: only where direct economic impact can be proven.

The Offshore Pollution Liability Association Ltd (OPOL) provides oil pollution compensation for offshore exploration and production activities in a number of North West European countries, including Ireland. The OPOL claims criteria are very similar to the IOPCF criteria, in that only environmental damage remediation costs actually incurred, and direct economic losses are covered (Reference 29).

The OPOL/OGUK Oil Spill Cost Study, OPOL – Financial Limits (2012) (Reference 31) examined the potential financial impact resulting from well blowout scenarios in UK waters with a view to establishing whether the financial liability limit of US$250 million per incident in the OPOL Agreement is adequate. Pollution damage costs were classified as spill clean-up and economic loss for the major industries only: in shellfish farms, fish farms (primarily salmon), commercial (wild) fisheries, tourism (e.g. loss of business revenue, clean-up expenses and loss of fish stock etc.). Other economic impacts were deemed insignificant compared to fishing and tourism. Economic impacts on fishing were based on lost fishing days due to closure of fishing grounds (3 months), one year's economic impact on shellfish and for tourism on one month tourist spend (when impacts considered to occur).

The Oil and Gas UK guidelines for demonstrating financial responsibility (OGUK 2012), which includes the cost of remedial measures and payments of compensation to third parties for pollution damages, used the OPOL/OGUK Oil Spill Cost Study (Reference 30) to inform this aspect (Reference 31. Section 4.1.4.). The methodology to assess FR is as follows:

- Deterministic or trajectory oil spill modelling should be carried out using a recognised model such as OSIS, OSCAR or Oilmap.
- Results of the modelling should be analysed to determine impacts in the following four categories:
  - Marine fishing - number of ICES rectangles that the oil passes through.
  - Aquaculture – number of aquaculture sites located in areas of shoreline oiling.
  - Length of coastline oiled.

    - Volume of oil on coastline.
- Modelling assumes a 30 day full bore release, worst case trajectory to nearest shoreline – as per DECC OPEP Guidance "worst case".
- Scoring from spill modelling, gives cost banding for financial responsibility requirements. Bands 0 – 4 equate to US$0 -750m (inclusive of OPOL $250m).

Thus the OGUK FR methodology offers a relatively simple method for assessing FR, however, it should be noted that the OGUK method is being revised following extensive additional spill modelling and is due for reissue in 2017, apparently in a simplified version based on location and spill volume. This method could be adopted for use in Ireland, provided appropriate checks and adjustments have been carried out, as discussed in the next section. The key will be to determine what "costs" are to be included in the FR (e.g. those applicable under OPOL, with/ without additional third party liabilities) and determine the cost band levels with respect to scores. However, it should be noted that DCCAE would not accept a cost model which suggests an upper limit of liability. So bands may need to be extended upwards to cover costs beyond UK Band 4 (each band may have a smaller increment). Also the logistics of deploying a well cap offshore Ireland may mean that it is necessary to model a release for longer than 30 days. The applicant will need to provide justifications for numbers selected.

Proposed Methodology in relation to this Element

The general approach to FR estimation would be to undertake oil spill modelling for a credible worst-case scenario, track the oil spill until it dissipated or beached, and then assess the locations affected and the resulting pollution damage, such as the open sea including fishing grounds, shoreline oiling affecting economic activity and the spill response required.

The key to this element is to define what is meant by "environmental damage" and "economic damage" and the extent to which compensation to claimants should be available, and therefore the level of FR required. As outlined above, current internationally established spill compensation funds only cover claims for direct measurable economic losses, scientific studies of environmental damage for the purposes of selecting suitable remediation options, and actual remediation carried out. The stance taken by the ITOPF is that whilst serious economic impacts can occur, natural systems are resilient to short-term adverse changes and that, as a consequence, a major oil spill will rarely cause serious long-term damage to the marine environment. If this approach is deemed fit for purpose in Ireland, then methodology as per the UK Oil & Gas Guidelines (Reference 31) could be developed with adjustments for differing costs, if any, in Ireland. Thus, economic impact could be based on the economics data for fishing and aquaculture, and spill cleanup costs on the shoreline length impacted and volume of oil. However, the shoreline length impacted could also reflect the economic costs to tourism.

However, if natural resource damage compensation is required, then an additional costing method should be developed (for example similar to ELD as applied onshore in Ireland or US NRDA).It might be possible for an Applicant to develop a cost model for Ireland by adapting the OGUK 2012 Guidelines and set appropriate scores and band levels for Ireland, as follows:

- Review each category type:
    - Assessment of economics data for fishing, with respect to ICES rectangle – for Ireland.

    - Assessment of economics data and location of aquaculture sites and any other marine resources, with respect to coastline – for Ireland.
    - Assessment of likely spill clean-up costs with respect to shoreline length – for Ireland.
    - Assessment of likely clean-up costs with respect to volume of oil beached – for Ireland.
- Determine an equivalent cut-off for each category i.e. points score of 1 on each category equates to the same amount of FR required ("FR per point scored") (Equivalent to Table 1 Reference 31).
- Assign FR banding according to total score - taking into account minimum FR required, OPOL compensation, and "FR per point scored". (Equivalent to Table 2 Reference 31).

Given the broad estimations involved, for some categories such as spill clean-up, it might be possible to apply this method to Ireland by simply assessing whether the Irish situation differs significantly from that in the UK, and applying a simple adjustment factor. Case studies could be used to check band levels. Applicants would need to justify the use of any such model, and adjustments made.

It should be noted that in the case of aquaculture, in particular, revenue from some salmon farms is very much more than that from other aquaculture sites and cannot be treated as per the UK method above – see Section 4.1.3 Framework for Calculating Financial Responsibility Limits Differences to consider include:

- Coastal activities requiring additional protection or compensation – tourism and other industries, including seafood industry (refer to industry data).
- Likely fisheries closure time (refer to fisheries authorities).
- Coastline type – rocky or sensitive saltmarsh.
- Spill response mobilisation.
- Waste disposal.
- Transboundary impacts.

Note

1. "Environmental resources" are defined in ELD as damage to protected species and natural habitats, damage to water and damage to soil (with reference also to the EU Marine Strategy Framework Directive 2008/56/EC, Habitats Directive 92/43/EEC, Birds Directive 2009/147/EC, and Water Framework Directive 2000/60/EC.) The Offshore Safety Directive, containing an amendment to the ELD (extension of the scope of damage to marine waters), was adopted in June 2013.

3.2.2.3 Emergency Planning Arrangements

Background / Range of Possible Approaches

The International Convention on Oil Pollution Preparedness, Response & Co-operation, 1990 (OPRC Convention) provides a framework for international cooperation for combating major oil pollution incidents and sets requirements for national systems of preparedness and response. It requires countries to develop their own laws and procedures for preparing for, and responding to spills ranging from local to international scale incidents. These should be encompassed within a national oil spill contingency plan under the auspices of a designated national authority. The OPRC

Convention calls for national authorities to work with oil and shipping industries, port authorities and other relevant entities to unify their response efforts.

Two references are provided in relation to the Irish National Plan:

- The International Tanker Owners Pollution Federation Limited (ITOPF) produces a series of Country Profiles which summarise the key arrangements in place in different countries. The Ireland Country Profile is Reference 8.
- The Irish Department of Transport, Tourism & Sport, the managing agency for the Irish Coast Guard (IRCG - the competent national authority), provides a full copy of the Irish National Contingency Plan on their website. (Reference 9).

In addition, as has been noted earlier in this report, the Commission for Energy Regulation (CER) has published a guidance document in relation to Safety Case requirements (CER16/024) – Reference 6. Section 14 of this document defines emergency response requirements including those required to respond to an offshore major environmental incident.

Several guidance documents are available which describe international good-practice in relation to spill response planning. Three such documents, each with slightly different perspectives, are referred to here:

- A quasi-regulatory guideline - the International Maritime Organisation Contingency Planning Guideline.
- An international oil industry guideline - the International Oil & Gas Producers Association Contingency Planning Guideline.
- A spill industry guideline. Oil Spill Response Limited (OSRL) is arguably the most experienced and best resourced Northern hemisphere response provider outside of North America. Co-incidentally IRCG is an associate member of OSRL which enables it to contract specialised equipment and expertise at reduced rates in the event of a major incident.

The Irish National Plan (Reference 9) combined with CER document (Reference 6) are broadly consistent with the requirements of the guidelines described above. However, there is some scope for providing additional guidance in relation to spill modelling (see below –Detailed Review of Irish Spill Response Arrangements).

The current spill plan acceptance/approval processes also seem to be robust. It is proposed that these be accepted as-is.

Detailed Review of Irish Spill Response Arrangements

The Irish Coast Guard (IRCG), a part of the Department of Transport, Tourism & Sport (DTTAS), has the responsibility for organising and directing spill response at sea or in coastal areas. The service also directs and co-ordinates the function of both harbour and local authorities, who undertake clean-up of oil from beaches and nearshore waters. An electronic copy of the Irish draft National Contingency Plan (dated January 2013) is available via the DTTAS website. This document provides detailed information on how a significant pollution incident would be managed offshore Ireland.

The Sea Pollution (Amendment) Act 1999 also requires that each applicant of an offshore unit shall have in place an oil pollution emergency plan, and that these plans shall be approved by the IRCG.

The Commission for Energy Regulation (CER) is the safety regulator for offshore petroleum exploration and extraction activities in Ireland. The CER regulates the industry in accordance with the Petroleum Safety Framework; a collection of regulations, written regulatory documents and procedures, developed based on the requirements of the Act. In order for a designated petroleum activity to be undertaken offshore Ireland, the applicant must have a safety permit for that activity. To issue a safety permit, the CER must assess and accept a Safety Case. CER has published a guidance document in relation to Safety Case requirements (CER16/024). Section 14 of this document defines emergency response requirements including those required to respond to an offshore major environmental incident.

We have used the contents of the environmental elements of the CER Safety Case guideline along with the draft National Plan to compare these requirements with those in industry-wide spill response guidelines.

We have also compared these guidelines with those in place in the UK. This is in no way an attempt to compare the two frameworks; rather to recognise that any applicant or well management contractor used to preparing OPEPs for UKCS operations is likely to have planned for similar output information to be available in relation to operations offshore Ireland.

The detailed review findings are as follows:

A. SPILL MODELLING

Spill modelling provides 2 benefits:

- It provides an objective basis for at-sea and shoreline response strategies and the associated resources that will be required. A review of compliance with these requirements is included in this section.
- It also provides an objective basis for estimates of the financial responsibility (FR) in relation to oil spill response and clean-up. The modelling outputs for this may be different to that required in relation to response strategies. These FR requirements are discussed in the next section of this report.

The draft National Plan does not appear to specify oil spill modelling requirements. However, section 14.3 & 14.4 of the Safety Case Guideline does provide spill modelling guidance. Direction, location and distance to the following should be included as follows:

- Irish waters landfall
- Irish waters protected areas
- Median lines
- Sensitive areas

Modelling input requirements are also included in section 14.4.2 (worst case scenarios). These requirements define minimum oil characteristic input parameters:

- ITOPF grouping
- Specific Gravity
- Viscosity
- Wax & Asphaltene Content
- Pour Point

Section 14.4.1 of the Safety Case Guideline (Effectiveness) notes that modelling work should be used to define the effectiveness of the oil spill response plan – that is to say, the frequency, duration and timing of conditions that would preclude an effective response.

These guidelines are consistent with more general modelling requirements use to generate spill response plans. However, UK modelling guidance is more detailed than that provided in Ireland. These differences are discussed under the 'conclusions' at the end of this section (4.1.1.2).

B. SPILL REPORTING

Section 2 of the draft Irish National Contingency Plan (along with the associated Appendix C) provides detailed requirements for pollution reporting (POLREP) including:

- Nature & quantity of spillage
- Location & source
- Weather, sea state & tidal conditions
- Events and actions so far
- Potential and actual environmental threats

CER also has spill reporting requirements as part of the safety & environmental reporting requirements contained in their Compliance Assurance System (CER/16/016), a part of the Safety Case Guidelines under the Petroleum Safety Framework.

Section 14.4.3 of the Safety Case Guidelines notes that the movement of any visible pollution must be tracked and the methods used to undertake this must be detailed within the safety case. Estimations of oil at sea should be based on the Bonn Agreement Oil Appearance Code (BAOAC)

These guidelines are consistent with good practice requirements.

C. COMMAND & CONTROL

Sections 3 & 4 of the draft National Contingency Plan (along with the associated Appendix J) describe detailed arrangements regarding command and control of spill response incidents as follows:

- Although the applicant would be expected to set up command centres for minor spills, major spills would be managed via IRCG's command & control arrangements. Applicant spill plans should reflect these arrangements which can be summarised as follows:
  - Applicant Command Centres should be set up close to the spill / beaching sites. Sites should be identified and arrangements put in place to provide appropriate facilities, information and equipment.
  - For larger spills, IRCG has 3 Marine Rescue Centres (MRC – Dublin, Malin & Valencia)
  - For spills of national significance the Marine Rescue Coordination Centre (MRCC) in Dublin would be the primary command & control location.

- Although the applicant would be expected to provide an Incident Commander to manage minor spills. Larger spills are likely to be managed under IRCG command structure. Applicant spill plans should reflect these arrangements which can be summarised as follows:
  - The Incident Commander would be the Director of Coast Guard (or the Deputy Director).
  - Working under the Incident Commander the following discipline sections / officers would be in place:
    - Planning Section
    - Operations Section
    - Logistics Section
    - Finance Section
    - Lead Press Officer
    - Legal Officer
    - Safety Officer
- The draft Plan provides an extensive list of other governmental agencies who would have an involvement in spill response. It would be expected that applicant spill plans would reflect this.

These reflect a comprehensive set of command and control arrangements.

D. TRAINING & EXERCISE

Article six of the Oil Pollution Preparedness, Response and Co-operation (OPRC) Convention 1990 sets out the requirement for applicants to have in place an oil response system that includes training and exercises.

The draft National Plan notes that the European Union Framework for C-operation in the Field of Marine Pollution includes:

- The need to set up and implement training programmes in relation to pollution response
- It also recommends workshops, seminars & pilot projects on all aspects of pollution intervention.

Section 14.2.1 of the Safety case Guidelines clearly sets out emergency response organisation competency, training & exercise requirements.

No further requirements are proposed.

E. CASUALTY MANAGEMENT (SOURCE CONTROL)

Section 5 of the draft Irish National Contingency Plan contains detailed arrangements for dealing with a maritime casualty. In relation to offshore installations the Plan notes that 'when there is a release from an installation, the tasks of containing and responding to the oil on the water are identical to when a ship spills oil'. We agree that the response requirements are the same, but in relation to containing a blow-out the requirements are very different.

However, section 14.5.3 of the Safety Case Guidelines contain specific requirements in relation to both relief well and well capping requirements. Both sets of requirements include the requirement for estimates of time to complete relief well operations and to deploy a capping device.

No further requirements are proposed.

F. AT SEA RESPONSE

Section 14.3 of the Safety Case Guideline (Environmental Setting) requires the well applicant to define the offshore environmental setting including:

- Seabird vulnerability over the year
- Fisheries sensitivities within the appropriate ICES square
- Cetacean sensitivities
- Protected areas which may be impacted in the event of a worst-case release
- Meteorological & oceanographic data

Section 14.5 of the Safety Case Guideline (Emergency Response Plan) describes a number of requirements in relation to at-sea response. These include:

- Appropriate strategies (monitoring & surveillance, dispersion and containment & recovery).
- An implementation plan is required in relation to the chosen strategies.
- Details of third party support arrangements with specialist oil spill response contractors are required along with inventories of equipment and response timings.
- It is noted that use of dispersants is not permitted except in the case of saving life. It is also noted that any use of dispersants must be authorised by the IRCG.
- It is also noted that, if in-situ burning is identified as a potential response option then justification supporting this option must be provided.

Section 6 of the draft Irish National Contingency Plan (along with the associated Appendices H & I) describes potential at-sea response strategies as follows:

- Mechanical recovery of spilled oil by the use of booms and skimmers. The viability of such techniques is dependent on a number of factors such as wind wave & current conditions at the time. It is also noted that such equipment is ship-borne and will take time to arrive at the scene of the spill. Where such techniques are to be considered it would be normal to identify where resources would be coming from and whether they could be mobilised to site in sufficient time.
- To 'assess and monitor' with a view to allowing the oil to evaporate and degrade naturally. This strategy involves a combination of real time spill modelling and surveillance (both via aircraft and satellite tracking). Appendix H notes that IRCG has access to spill modelling systems as well as satellite tracking resources. The ITOPF Ireland Country Profile also notes that IRCG contracts aerial surveillance via Reconnaissance Ventures Limited which operates out of East Midlands Airport in the UK.
- Use of dispersants is one option for at-sea response. The National Contingency Plan notes that 'the use of dispersants in Irish waters is forbidden, unless authorised, except in life-threatening situations. The IRCG, on behalf of the Minister, is the authorising body for dispersant usage'.
- In-situ burning is an option for removing oil from the sea surface by burning. Appendix H notes that 'in-situ burning is not a viable option for the turbulent waters around Ireland. It is not government policy. Any change in policy would require in-depth consultation.

These guidelines are consistent with good practice requirements.

G. HARBOUR & SHORELINE RESPONSE

Section 14.3 of the Safety Case Guideline (Environmental Setting) requires the well applicant to define the onshore environmental setting including:

- Coastal environment (eg wetlands & estuarine)
- Seabed & subsoil conditions
- Protected areas which may be impacted in the event of a worst-case release.

Section 14.5 of the Safety Case Guideline (Emergency Response Plan) describes a number of requirements in relation to shoreline response. These include:

- Appropriate strategies (monitoring & surveillance, dispersion and containment & recovery).
- An implementation plan is required in relation to the chosen strategies.
- Details of third party support arrangements with specialist oil spill response contractors are required along with inventories of equipment and response timings.
- Where necessary a Shoreline Protection Plan must be in place and relevant Local Authorities should have been consulted on this plan

Section 7 of the draft Irish National Contingency Plan (along with the associated Appendix K) describes potential harbour and shoreline response strategies. The key features of these strategies are:

- Harbour authorities are responsible for clean-up of on-water, jetties/wharves and beach/shorelines under the jurisdiction of the harbour authority.
- Local authorities are responsible for clean-up of relevant shorelines including land exposed by a falling tide.
- Local / harbour authorities are required to have contingency plans in place (submitted to and approved by IRCG). These plans should include arrangements for handling liaison with other groups involved in the incident. This would seem to suggest that where spill modelling suggests that specific harbour/local authorities may be impacted by a pollution incident some consultation should have taken place between the well applicant and the authority in terms of access to resources and response planning.
- Appendix K provides detail regarding the setting up of a Shoreline Response Centre. Some of this information in this Appendix provides a useful resource that should be considered in relation to applicant spill response plans:
    - Provision of environmental support.
    - Allocating spill response contractors
    - Interacting with the media, local councils and the public.
    - Monitoring expenditure & managing claims.
    - Plans for dealing with waste.

Appendix Q of the draft Plan provides guidelines in relation to dealing with oiled wildlife.

This guidance is consistent with good practice requirements.

ENVIRONMENTAL ADVICE & MONITORING

Section 14.5 of the Safety Case Guideline (Emergency Response Plan) describes a number of requirements in relation to environmental support including:

- Details of third party support arrangements with specialist oil spill response contractors are required along with inventories of equipment and response timings.
- Where necessary a Shoreline Protection Plan must be in place relating to the relevant environmental sensitivities.

Section 8 of the draft Irish National Contingency Plan (along with the associated Appendix I) describes the environmental advice and monitoring arrangements within the draft National Plan. Although these arrangements have been put in place by IRCG, but there is clearly scope for these arrangements to be supplemented by contributions from the well applicant. The main element of this relates to arrangements to provide additional trained environmental monitoring and assessment resources (e.g. SCAT (Shoreline Clean-up Assessment Team) resources). It would be expected that the applicant's spill plan includes such commitments.

These guidelines are consistent with good practice requirements.

MEDIA

Section 9 of the draft Irish National Contingency Plan (along with the associated Appendix L) describes media response arrangements in the event of a major pollution incident. It is noted that liaison between the various interested parties is important with regard to contact with the media.

There would seem to be scope for the applicant to establish arrangements for involvement in these plans.

FINANCE

Section 10 of the draft Irish National Contingency Plan (along with the associated Appendices M and N) describes financial response arrangements including:

- The importance of the appointment of a Financial Controller.
- Detailed guidance on cost recover and record-keeping (Appendix M)
- Guidance on presentation of claims.
- Claims arising from oil pollution from offshore installations
- Guidance on liability & compensation
- Types of clean-up and emergency response claims covered

These guidelines are consistent with good practice requirements.

CONCLUSIONS

Overall, the combination of requirements within both the draft National Contingency Plan and section 14 of the Safety Case Guidance document are detailed and comprehensive. Only in one area (guidance on oil spill modelling) is it possible that additional guidance might be useful.

This guidance would ensure a consistent approach with regard to estimating financial responsibility limits. It would make sense to provide a single set guidance relating to all uses for the modelling output.

UK modelling requirements are included in two guidance documents:

1. UK Department for Business, Energy & Industrial Strategy Guidance Notes for Preparing Oil Pollution Emergency Plans (BEIS OPEP Guidance - most recent issue - December 2016)

2. Oil & Gas UK Guidelines to assist licensees in demonstrating Financial Responsibility to DECC for the consent of Exploration & Appraisal Wells in the UKCS (Issue 1; November 2012).

As noted above, any applicant or well management contractor familiar with submitting proposals for Exploration and Appraisal drilling activities in the UKCS would be familiar with these requirements.

Additional modelling guidance in these UK documents (over and above that described in the CER/IRCG review above) includes the following:

- Modelling should be done using recognised models such as OSIS, OSCAR or Oilmap.
- The model should accurately represent the worst-case scenario (e.g. if the worst-case release location is subsurface, appropriate subsurface modelling must be carried out).
- Model input requirements include:
  - Stochastic modelling must be undertaken as follows:
    - Using a minimum 2-year time series data-set
    - A minimum of 100 runs should be performed (a lower number of runs may be acceptable when accompanied by sound scientific or statistical justification)
    - The duration of the model period should be appropriate to the scenario. In the case of an E&A well this would typically be the time to mobilise and deploy a capping stack or drill a relief well.
    - For temporary operations, such as E&A drilling, the seasons during which operations are to be undertaken should be used for modelling purposes.
    - The model results must be displayed to an oil thickness of 0.3 micrometers.
- Model output analysis should include the following:
  - Impacts on marine fisheries
  - Impacts on aquaculture
  - Length of coastline oiled
  - Volume of oil stranded onshore

(it is noted that these categories, in the UK method above, have been chosen because they have been seen to have the most influence on costs).

Thus – we propose additional spill modelling criteria within the FR Methodology (see 4.1.3 Framework for Calculating Financial Responsibility Limits) as follows:

- Justification for the choice of spill model utilised for predictive modelling. For example, some models are better suited to assess subsea as opposed to surface releases.

- Justification for the blowout flowrate and fluid properties that are to be modelled.
- Justification for the duration of flow used. This would typically be consistent with the amount of time to deploy a capping stack or drill a relief well.
- Confirmation of the location of release that is being modelled. This would normally be the proposed well location and would take into account whether the blowout is surface or subsea.
- Information on the type of stochastic modelling work that has been completed to identify a reasonable worst-case scenario (eg number of runs, duration of runs, oil thickness modelled, output data presentation).
- Information on the metocean data that has been used in the modelling (inc. relevant seasons that have been modelled).
- Information on the worst-case scenario deterministic run(s) that have been selected to identify all potentially impacted shorelines, environmentally sensitive marine and coastal environments, marine protected areas and transboundary impacts. Typically, this information would include duration of runs, oil thickness modelled and output data presentation.
- The modelling outputs should also include estimates of the volumes of oil or emulsion stranded.

Basis of Proposed Guidelines to Applicants for Emergency Planning

It is proposed that existing arrangements be accepted as-is, but that additional guidance in relation spill modelling be considered, as listed above.

Following the workshop and subsequent discussions with IRCG, the IRCG have clarified their latest requirements for oil spill modelling relevant to OSCP (IRCG to DCCAE, 19.June 2017). The additional guidance proposed for FR above is consistent with this and is broadly based on UK Requirements .

The latest IRCG Guidance (19 June 2017) is as follows:

> "In the absence of a specific guidance document for modelling, applicants should use until furthered notified: United Kingdom Department of Business, Energy and Industrial Strategy - GUIDANCE NOTES FOR PREPARING OIL POLLUTION EMERGENCY PLANS For Offshore Oil and Gas Installations and Relevant Oil Handling Facilities (December 2016), Appendix B 4
>
> Further information required should include -
>
> The Modelling Information must outline detailed information -
>
> 1. Model will offer data over a period of 1 year
> 2. Time periods should be at one month intervals (unless agreed otherwise).
> 3. The oil amounts should be presented in tabular form and quantified.
> 4. Information presented should include Special Areas and Environmentally Sensitive Areas etc.
> 5. Information required will include
>   a. Amount of oil reaching Landfall – Predicted locations within the Irish EEZ should specify the geographical location of the beaching.
>   b. Amount of oil dispersed in water column – Comment on expected fate of oil – will, when, where will this oil move to?

This should be done on a monthly basis to include time periods for oil to further beach.

c. Amount of oil expected to be on seabed – details of oil pattern on seabed."

3.2.2.4 Spill Clean-up Cost Estimation Methodologies

Background / Range of Possible Approaches

There are 3 potentially significant elements associated with a well blowout and the various costs and consequences arising:

- Costs associated with the potential loss of the drilling rig. Under the terms of typical contracts between the rig owner and the well applicant, the rig owner is responsible for the liabilities for his rig and his personnel under all circumstances; indeed if the rig is sunk the rig owner is responsible for the removal and when appropriate marking or lighting of any wreck or debris.
- The applicant responsibility is for cleaning up the pollution arising from the release. The rig owner's responsibility for pollution is limited to any pollution from the actual rig itself e.g. fuel spillages, spillage from tanks on the rig etc. These are not material in comparison with blowout consequences.
- The well applicant is also responsible for 'source control' – that is to say deployment of capping devices and/or the drilling of relief wells.

In relation to pollution clean-up it is impossible to provide a simple clean-up 'cost per gallon' of oil spilled. The time of year of the spillage, the nature of the receiving environment and the accessibility of the coastline are all factors (amongst others) that impact on the final cost. These various factors are described in detail in References 32, 33, and 34.

One of the most significant differences in estimates of cost of oil spillage viewed internationally arises from the system of compensation, fines and punitive damages which applies in the United States. Taken with the contingency fee system for remuneration for plaintiff's legal costs, the propensity for class actions and the assumption of no limitation of an applicant's liability, the damages awarded by US courts to civil action claimants (or associated out of court settlements) can be multiples of the equivalent amounts recoverable at law in European jurisdictions. Furthermore, punitive damage awards for bodily injury and property damage claims are a uniquely US concept and at the court's discretion a multiplier to the amount of proven loss may be applied. In addition, fines may also be applied in relation to relevant legislation such as the Oil Pollution and Clean Water Acts.

But even when looking solely at European oil spill clean-up costs there is some variability. Reference 32 provides a 2008 comparison of clean-up costs across Europe as follows:

Country	**Cost for Spill Clean-up (US$/US gallon)**
Denmark	38
Estonia	23
Finland	7
France	8
Germany	36
Greece	29
Ireland	16
Italy	22
Country	**Cost for Spill Clean-up (US$/US gallon)**
Latvia	31
Lithuania	0.3

Netherlands	23
Norway	79
Spain	2

Sweden	53
UK	11
Yugoslavia	5

N.B. 1 US$ = €0.92 on 1/5/17

It would be tempting to use these or similar statistics to come up with an estimate of national clean-up costs based on the volume of likely spillage. However, the data-sets are small (relatively few significant spillages happen) and most spillages are due to vessel spillage rather than well-related events.

On the other hand, both the tanker industry and the oil industry have very similar categorisations for the various types of spill response costs. Both OPOL (oil industry – Reference 35) and the tanker industry (IOPC – Reference 36) broadly use the following headings:

- Command Centre Costs
- Offshore Dispersant Spraying
- Offshore Mechanical Recovery
- Nearshore Mechanical Recovery
- Protective Nearshore Booming
- Shoreline Clean-up
- Wildlife Clean-up
- Shoreline assessment, surveillance & media
- Waste Disposal Costs
- Economic Impacts

OPOL and the UK offshore industry have used these headings to model detailed consequences of potential blowout events. They have developed a range of representative scenarios and have used the model results along with expert-group input to estimate the cost of clean-up for each scenario. The results of this work is included in reference 30.

This work has been used by the UK offshore industry to develop a simple scoring system for calculating blowout spill-related financial liabilities (see reference 38). On the one hand this approach is more specific than the use of a simple 'cost per gallon' figure. On the other hand it does not require extensive modelling and estimation work by the applicant which in any case is unlikely to address all potential spill scenarios.

Based on an examination of the issues as described above, we believe that the following potential options are available to the Irish Regulator & Offshore Industry in relation to well control spill cost estimation:

1. Apply simple 'cost per gallon' figures to identify spill costs.
2. Use the existing UK regulator scoring system.
3. Carry out Ireland-based studies using the same methodology as the UK with a view to creating an Ireland-specific scoring system.
4. Carryout basic comparison to determine any major differences between Ireland and the UK and hence if there is a need to use Ireland-specific score criteria or cost banding. If only minor differences exist, adopt the UK system to enable consistency for applicants in this part of the North East Atlantic.

As noted in Section 3.2.2.2 Assessing Potential Natural and Economic Resource Losses, it may be possible to adapt the UK points method – for example to use the categories "length of shoreline oiled", and "volume of oil beached" to estimate the cost of spill clean-up. However, the applicant would need to justify the use of this model and any adjustment made.

Proposed Methodology in relation to this Element

- We propose that spill clean-up costs could be estimated using the UK method as a basis, but incorporating any adjustments for Ireland. For example, the data provided for the UK (Reference 30), may be approximated as follows: minimum costs for Tier 3 Response of £70m (€83.3m) plus variable costs £1,000 - £2,500 (€1,190 -€2,975) per unit volume beached (m^3 emulsion).

3.3 Approaches to Financial Assurance

In this section, we have reviewed legislation and regulation in areas with established offshore production acreage and how financial assurance is covered within different regulatory regimes.

We have focussed particularly on the regulatory framework of key European (EU) nations which will have specific relevance to the DCCAE since these are related to the Offshore Directive.

3.3.1 Australia

Offshore Petroleum and Greenhouse Gas Storage Act 2006 (OPGGS Act)[1]

The OPGGS Act provides the regulatory framework for all offshore petroleum exploration, production and greenhouse gas activities in Commonwealth waters (those areas more than three nautical miles from the Territorial sea baseline and within the Commonwealth Petroleum Jurisdiction Boundary). The OPGGS Act is supported by regulations and directions covering matters such as safety, diving, petroleum resource management and environmental management.

In the event of an incident involving the release of hydrocarbons, the OPGGS Act imposes a statutory duty on "titleholders" to control the release, clean-up the spill and monitor the potential environmental impacts. If a titleholder fails to fulfil this duty and the government is required to act, the costs incurred by the government are recoverable from the titleholder.

The titleholder is required to maintain financial assurance sufficient to meet the costs of the operational response measures (e.g. well control and containment) and costs arising from addressing the environmental consequences (e.g. monitoring and remediating the environment).

The Australian Petroleum Production & Exploration Association Ltd (APPEA), which represents Australia's upstream oil and gas exploration and production industry, produced a document in November 2014 entitled, "*Method to assist titleholders in estimating appropriate levels of financial assurance for pollution incidents arising from petroleum activities*". www.appea.com.au

The National Offshore Petroleum Safety and Environment Management Authority (NOPSEMA) (www.nopsema.gov.au) have generally endorsed this APPEA document as being, "generally suitable for determining the level of financial assurance", while reserving its right to require further

[1] http://www.austlii.edu.au/au/legis/cth/consol_act/opaggsa2006446/index.html

information when they consider the APPEA method is not appropriate for a particular petroleum activity.

As outlined in the document, "*the APPEA method considers reasonably estimable costs, expenses and liabilities associated with responding to an incident, cleaning up and monitoring. The method does not consider unidentifiable or inestimable costs which may be associated with compensation for loss or ongoing damage*".

The APPEA method adopts the approach endorsed by the UK regulator, the Department of Energy & Climate Change (DECC)[2], as outlined elsewhere in this report. In January 2013, DECC recognised an approach developed by Oil & Gas UK and presented in their Guidelines to assist licensees in demonstrating Financial Responsibility to DECC for the consent of Exploration & Appraisal Wells in the United Kingdom Continental Shelf (the Oil & Gas UK Guidelines).

APPEA considered that the Oil & Gas UK Guidelines offer a practical method of demonstrating financial assurance and provide a consistent approach across industry. They address potential costs related to:

- the cost of well control and
- the cost of environmental remediation and compensation from pollution.

For activities that do not include the risk of a loss of well control, the cost considered is the cost of the operational response to a pollution incident.

In developing a method for the Australian oil and gas industry, APPEA's Financial Assurance Reference Group took a similar approach to that presented in the Oil & Gas UK Guidelines. A limitation of the approach presented in the Oil & Gas UK Guidelines is that they only addressed incidents associated with a loss of well control. To meet the broader requirements of the OPGGS Act, the method developed by APPEA extended the range of activities considered to include not only drilling and wells but also Floating Production Storage and Offtake units (FPSOs), Floating Liquefied Natural Gas (FLNG) facilities, pipelines, seismic activities and other vessel-based activities.

The level of financial assurance calculated by the APPEA method does not limit the liability of the titleholder. In the event of a pollution incident, the titleholder will be liable for all the costs associated with the duties under the OPGGS Act, regardless of the level of financial assurance held.

From a practical standpoint the APPEA method uses information that will be readily available in the Environmental Plan (EP) and Oil Pollution Emergency Plan (OPEP) or Oil Spill Contingency Plan (OSCP).

The information required from the EP and OPEP/OSCP is:

- the hydrocarbon type – gas, gas/condensate, medium crude oil, heavy crude oil, marine diesel or fuel oil
- the total volume of hydrocarbon released
- oil spill modelling output, or some other means of determining the volume of oil ashore.

[2] The responsibilities Department of Energy and Climate Change (DECC) were incorporated into the newly created Department for Business, Energy and Industrial Strategy (BEIS) on 14th July 2016. References to DECC in this document are accurate in the context of timing and BEIS may be substituted as necessary

Financial Requirements

The method of estimating the financial assurance requirements involves two steps:

1. Where the incident is caused by a loss of well control, estimate the cost of a relief well if required and the deployment of a capping stack, if appropriate.

2. Estimate the cost of the operational response using:

- the hydrocarbon type,
- the total spill volume, and
- the potential shoreline impact.

The APPEA method provides for two alternatives to calculate the cost of well control: Method A looks at the initial well estimate (and the deployment of a capping device); Method B is based on estimated rig costs and time required to achieve "*well kill*".

In order to estimate the cost of operational response (for example, containment and recovery, dispersant application, shoreline clean-up, waste management, monitoring and evaluation, pre- and post- contact wildlife response and other associated field activities) a pollution incident is assigned to one of eight cost bands, according to the potential impact of the incident, ranging from USD[3] 10 million to USD500 million (€9.2 million to €460 million).

The estimated operational response is derived from the sum of three categories:

a) Hydrocarbon Type
b) Total Spill Volume
c) Potential Shoreline Impact

To demonstrate compliance the OPGGS Act, titleholders are required to submit to NOPSEMA a declaration of compliance, signed by an authorised officer of the company. Although only the registered titleholder is required to demonstrate financial assurance, all joint venturers in a petroleum activity are jointly and severally liable for the costs arising from an incident.

The titleholder is responsible for maintaining records of the calculations used to determine the level of financial assurance required. NOPSEMA may also request evidence of the level and form of financial assurance maintained by the titleholder and of the methods used to calculate the level of financial assurance required.

APPEA does not make recommendations related to the forms of financial assurance that might be appropriate, although the OPGGS Act recognises the following forms of financial assurance:

- insurance
- self-insurance
- a bond
- the deposit of an amount as a security with a financial institution
- an indemnity or other surety
- a letter of credit from a financial institution
- a mortgage.

[3] United States Dollars

Titleholders can use a combination of these forms to meet the financial assurance requirement. In the vent that the insurance option is utilised to provide financial assurance, there is no specific requirement to provide a certificate from an insurance company or broker, evidencing that insurance is in place.

3.3.2 Canada

The Canada-Newfoundland and Labrador Atlantic Accord Implementation Act (1987)[4] sets out in section 162(1) the liability imposed on the licence holder for discharge, emission or escape of petroleum. The licence holder is strictly liable (without proof of fault or negligence) up to an applicable limit. This limit is dependent on whether the area of land or submarine area is adjacent to or subjacent to arctic waters, but as a minimum CAD[5] 1 billion (approximately €670 million).

In February 2016, new financial requirements came into force through legislative amendments and new subordinate legislation.

The legislation that will be amended is as follows (collectively referred to hereafter as the "Acts"):

- Canada Oil and Gas Operations Act (COGOA)
- Canada Petroleum Resources Act (CPRA)
- Canada-Newfoundland and Labrador Atlantic Accord Implementation Act (C-NLAAIA)
- Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act (C-NLAAINLA)
- Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act (CNOSPRAIA)
- Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation (Nova Scotia) Act (CNSOPRAI(NS)A)

The new subordinate legislation is as follows (collectively referred to hereafter as the "Regulations"):

- Canada Oil and Gas Operations Financial Requirements Regulations
- Canada-Newfoundland and Labrador Offshore Petroleum Financial Requirements Regulations (Federal)
- Canada-Newfoundland and Labrador Offshore Petroleum Financial Requirements Regulations (Provincial)
- Canada-Nova Scotia Offshore Petroleum Financial Requirements Regulations (Federal)
- Canada-Nova Scotia Offshore Petroleum Financial Requirements Regulations (Provincial)

The Acts and Regulations can be found on the websites of each respective Board:

Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) - www.cnlopb.ca

Canada-Nova Scotia Offshore Petroleum Board (CNSOPB) - www.cnsopb.ns.ca

National Energy Board (NEB) - www.neb-one.gc.ca

[4] http://laws-lois.justice.gc.ca/eng/acts/C-7.5/

[5] Canadian Dollars

The amendments, in part, updated and strengthened the liability regime in relation to the drilling for or development or production of petroleum or other petroleum-related work or activities in offshore and certain onshore areas.

Jointly, the NEB as well as the C-NLOPB and the CNSOPB (both collectively referred to as the Offshore Boards) prepared Financial Requirements Guidelines to provide clarity on the financial requirements set out in COGOA, the Accord Acts and the Regulations.

Prior to obtaining an Authorization to drill, an Applicant must demonstrate to the respective Board that it is capable of acting in a responsible manner for the life of the proposed work or activity.

The basic objectives of the financial requirements include:

(a) the Applicant has the ability to respond to an Incident to pay for all actual losses or damages incurred by any person as a result of the Incident, which includes loss of income, future loss of income and, with respect to any Aboriginal peoples of Canada, loss of hunting, fishing and gathering opportunities; and

(b) the payment of any costs and expenses reasonably incurred by any person, including a respective Board.

In the event of an Incident, the Applicant must clean up the spill and debris as well as pay out all claims as appropriate. In the event an Applicant fails in these duties, the Acts provide that the respective Board may manage and control that work or activity and take all reasonable measures in relation to the spill and pay out claims for damages as prescribed.

Financial Requirements

The legislative regime sets out three (3) components of financial requirements:

- absolute liability,
- financial responsibility, and
- financial resources.

These components of financial requirements reflect the polluter pays principle, which is consistent with the notion that liability is unlimited for an Applicant who is at fault for an Incident.

(a) Absolute Liability

The Acts establish that Applicants undertaking work or activities in relation to the drilling for, or development or production of petroleum, as well as other authorized activities in the Regulated Areas are liable for the loss or damage that they may cause as a result of an Incident in accordance with COGOA and the Accord Acts. The Acts, and where applicable the Inuvialuit Final Agreement, further state that Applicants are liable, regardless of negligence or fault, for losses or damages up to certain limits. This is known as absolute liability. An Appendix (1) sets out the absolute liability limits for each Regulated Area, ranging from CAD10 million for onshore activities to CAD 1 billon for offshore activities.

(b) Financial Responsibility

The Acts require that Applicants provide proof of financial responsibility to a respective Board when applying to conduct a work or activity. The Acts also require that each Applicant shall ensure that proof of financial responsibility remains in force for the duration of the work or activity for which the Authorization was issued, or in certain circumstances for a longer period as the respective Board may direct.

The following instruments may be acceptable to a respective Board as proof of financial responsibility:

- Letter of Credit;
- Bank Letter of Guarantee;
- Indemnity Bond;
- Proof of participation in a pooled fund[6] (for offshore drilling, development or production activities); and/or,
- Any other form that is satisfactory to the respective Board.

The amount of the financial responsibility required by an Applicant for each Regulated Area is also set out in Appendix 1 and ranges from CAD 10 million to CAD 250 million (€6.7 million to €167.5 million) but often determined on a case-by-case basis.

(c) Financial Resources (note "*Resources*" compared with "*Responsibility*" above)

The Acts require that an Applicant provide proof that it has the financial resources necessary to pay the absolute liability limit applicable to the work or activity. The Acts also require that each Applicant shall ensure that proof of financial resources remains in force for the duration of the work or activity for which the Authorization was issued, or in certain circumstances for a longer period as the respective Board may direct.

The Regulations set out the acceptable forms of financial resources. The Regulations state that an Applicant will provide, to the satisfaction of the respective Board, a Statement of Net Assets or Funding Arrangements more particularly described elsewhere in the Regulations which shall be accompanied by one or more of the following Financial Resource documents:

- Most recent audited financial statements and credit rating;
- Promissory note;
- An insurance policy or a certificate of insurance;
- An escrow agreement;
- A letter of credit;
- A line of credit;
- A guarantee agreement; or,
- A security bond or pledge agreement or an indemnity bond or suretyship agreement.

In a similar manner to the Absolute Responsibility and Financial Responsibility, the amount of financial resources is set out in Appendix 1, ranging from CAD250,000 to CAD 1 billion (€167,500 to €670 million).

The Regulations go on to explain each of these Financial Resource documents in detail.

[6] INDECS are not aware of the existence of such pooled funds elsewhere

Focusing on the insurance solution that is acceptable, a prescribed certificate is included in the Regulations for completion by an insurance broker or insurer (including Captive Insurance companies[7]). The Board can, notwithstanding the provision of the certificates, request sight of the full policies for review. The following insurance requirements must be met in order for the Board to consider it a satisfactory means of evidencing its Financial Resources:

i. A detailed insurance plan may be requested.
ii. Insurance policies should be considered that are customary among international petroleum exploration or production companies.
iii. Insurance companies must be ranked "A-" or higher by Standard and Poor's, or equivalent rating from a similar international ratings company.
iv. Insurance arranged with a Captive must be rated “A-“ or its reinsurers are rated "A-" or higher by Standard and Poor's, or equivalent.
v. The insurance policies shall include coverage of, at least, the following risks:
    a. Control of the well, and any other contamination or environmental damage.
    b. The cost of redrilling and/or recompleting the well to the condition it was in prior to the Incident.
    c. The cost of removal of and clean-up operations.
    d. Loss or damage to property or bodily injury caused to any third party.
    e. Protection and Indemnity.
    f. Hull and Machinery.
    g. Comprehensive General Liability.
    h. Provisions for offshore terrorism.
vi. The Applicant or Applicant should ensure that all contractors performing operations carry insurance to cover the risks of property damage to and liabilities arising from their own assets and equipment used to perform their services
vii. The respective Board is included as an additional insured party and the policy may not be cancelled unless notice has been given to the respective at least thirty (30) days (or less for war) prior to the date of cancellation, and that the insurance company has waived the right of subrogation towards the respective Board and any of its authorities.
viii. A new certificate should be provided at each renewal.
ix. The Board may request a technical justification justifying the sums insured for well control, pollution and third party liability insurances.

A template certificate is provided which must be completed in the prescribed form and signed by either the insurance broker or insurer (including Captive insurers). See APPENDIX 2 EXAMPLE INSURANCE CERTIFICATE this can be applied to a well at any stage in a field’s life.

3.3.3 Denmark

The Danish Energy Agency is part of the Ministry of Energy, Utilities and Climate.

The relevant legislation is the Act on the Use of the Danish Subsoil and specifically, Danish Act No. 535 of 29 April 2015 which implements the Offshore Safety Directive.

[7] A wholly owned insurance subsidiary of the Applicant

Companies working in the upstream oil, gas and geothermal business are obliged to be insured appropriately. The size of the insurances shall be balanced with respect to the risk of the activities and the cost of insurances.

The need for appropriate insurances is amplified by the fact, that co-licensees according to section 31 of the model license are jointly and severally liable for damages, cf. section 35 in the Danish Subsoil Act.

Neither the Danish Subsoil Act nor the model license describes which insurance products companies must take out. These requirements are, however formulated in an "*Insurance Declaration*". The applicant of a license must annually submit this declaration to the Danish Energy Agency.

In the insurance declaration the applicant of the license declares that the companies have taken out insurances for Control of Well (COW) and Third Party Liability (TPL) and that the total insurances of the co-licensees have a certain minimum coverage depending on the activities taking place Onshore or Offshore. Also the declaration implies that the total coverage has to be higher in case of expensive Drillings measured by the planned expenditure on the well known as the Authorisation for Expenditure (AFE).

According to Danish legislation the economic consequences of pollution must be paid by those who have caused the pollution (i.e. "polluter pays" principle). This principle is stated in section 35 of the Subsoil Act, which in section 1 states that

> *"A licensee shall be liable to pay damages for any loss, damage or injury caused by the activities carried out under the licence, even though such loss, damage or injury was caused accidentally*."

According to the commentary to section 35, the strict liability includes both damage to property belonging to others and injury to persons, including employees, contractual partners, etc.

It is important that all co-owners of a license have sufficient financial capacity to remedy any damage which might happen as a result of the activities taking place in the license. Companies do not always have a large financial capacity. It is therefore important that companies, according to section 30 of the model license and Danish Subsoil Act section 24e, are insured appropriately. The size of the insurances shall be balanced with respect to the risk of the activities and, interestingly, the cost of insurances**.**

Financial Requirements

There are currently no specific requirements from the authorities detailing exactly what type of costs a COW or TPL insurance exactly should cover. Without explicitly formulated requirements we consider that there is a risk that the insured party does not take out the appropriate breadth and limit of insurance for the activities undertaken. This potentially increases the financial risk of co-licensees and the Danish state. Accordingly, we feel that the insurance requirements should be better defined and transparent and provide for reasonable coverage for accidents.

Possibly with this in mind, the DEA is currently undertaking a study and consultancy process to review the adequacy of their current insurance requirements which are summarised as follows:

Applicant's additional expenses
Offshore activities *Control of Well (COW) - including seepage and pollution*
Coverage: normal coverage in the Danish sector is a minimum of DKK 1,000,000,000 (100% interest) per occurrence - including underground blow out. (€134 million) If, when multiplying all costs relating to drilling and testing any well in the covered year by three, the amount exceeds DKK 1,000,000,000 (€134 million) the coverage should as a minimum be increased to this amount for that well. Cost relating to drilling and testing this well shall be as stated in the budget for the licence, approved in accordance with the JOA.
Onshore Activities *Control of Well (COW) - including seepage and pollution*
Coverage: normal coverage in Denmark is a minimum of DKK 300,000,000 (100% interest) per occurrence - including underground blow out. (€40.2 million) If, when multiplying all costs relating to drilling and testing any well in the covered year by three, the amount exceeds DKK 1,000,000,000 (€134 million) the coverage should as a minimum be increased to this amount for that well. Cost relating to drilling and testing this well shall be as stated in the budget for the licence, approved in accordance with the JOA.
Third Party Liability regarding exploration, development and production both onshore and offshore
- when drilling: DKK 1,000,000,000 (100% interest) per occurrence (€134 million) - when not drilling: DKK 100,000,000 (100% interest) per occurrence (€13.4 million)
Other activities than drilling
The applicant is required to declare that companies carrying out activities other than drilling carry insurance coverage which is normal for the specific activity performed under the Knock-for-Knock[8] principle.

3.3.4 Israel

The Israeli Petroleum Law, 5712-1952[9], was enacted in 1952 and underwent revision in 1965, in an attempt to encourage foreign interest in exploration activities. The Law governs the exploration and production of petroleum in Israel, including the continental shelf.

Petroleum resources belong to the State of Israel, whether or not located on state lands. No person is allowed to explore for or produce petroleum without receiving a right under the Law. The Law provides for three types of rights, two relevant to the exploration stage (Preliminary Permit and License), and the third for production (Production Lease).

Financial Requirements

[8] A knock for knock indemnity is a reciprocal or mutual indemnity in which the parties agree to indemnify and hold harmless each other against any claims or liabilities arising in respect of damage to their own property (whether owned, hired or leased) and personal injury, illness or death to their own.

[9] http://www.refworld.org/docid/3ae6b4ec0.html

The State of Israel is currently in the process of reissuing instructions for providing securities in connection with petroleum rights. Applicants are thus far required to submit securities as follows:

(a) Autonomous bank guarantee (USD 500,000 (€460,000) for existing onshore licenses; USD 2.5 million (€2.3 million) for existing offshore licenses. The guarantee for new offshore licenses has been increased to a minimum of USD 5 million (€4.6 million). For leases the guarantee amount is USD 1.5 million (onshore) (€1.38 million) and USD 7.5 million (offshore) (€6.9 million).

(b) Insurance policies

The existing requirements set out for insurance are very detailed and stipulate the following standards:

- Whatever is "customary" among oil or gas exploration and production companies
- Have minimum financial credit rating (such as Standard & Poor's or AM Best) for insurance companies used.
- Approval by the Commissioner required if a Captive insurance company is used
- Policies to be in place for:
    - Physical Damage
    - Control of Well/Environmental Damage
    - Third Party Liability
    - Removal of Wreck
- Prior to the submission of an insurance certificate, the provision by the oil company of an "insurance plan" which demonstrates the basis for the limits it has insured.
- All policies name the State of Israel is added as additional insured with a waiver of subrogation in its favour.
- Notice of cancellation provisions.
- Summaries of insurance to be provided.
- Confirmation by insurer or insurance broker required.

As part of the current review by the State, these insurance "*guidelines*" are being rewritten, including a requirement for insurance brokers to complete and sign a prescribed certificate of insurance. Although the new guidelines are yet to be published (expected June 2017), we understand that they have been "*rolled out*" to oil companies renewing their insurance in 2017.

Contrary to the position outlined above for Australia, there is no specific guidance provided to oil companies to assist them in estimating appropriate levels of financial assurance for pollution incidents, and each insurance plan submitted is considered on its own merits. The State employs an independent third party consultant to assist them with this work.

Out of interest, we are aware that the APPEA (Australian) method has been accepted as a reasonable basis for justifying insurance limits purchased in Israel.

3.3.5 Netherlands

The Dutch Ministry of Economic Affairs (the Minister) regulates the oil, gas and geothermal energy exploration and production in the Netherlands, via the Mining Act of the Netherlands, the Mining Decree and Mining Regulation. Until 1970, the focus on exploration for oil and gas was onshore. In 1973, gas was discovered in the Dutch continental shelf, with production beginning in 1977.

The Mining Act details two types of offshore oil and gas licences. They are:

- An exploration licence; and
- A production licence.

These regulations do not have a specific requirement for insurance however it is stipulated that security will have to be provided to cover the liability for the damages that can reasonably be expected to occur through soil movement resulting from the production of minerals.

The Netherlands Civil Code which imposes liability for bodily injury, property damage and economic loss, is fault-based. The Code includes provisions imposing strict liability for dangerous activities, at least one of which applies to harm from pollution from an offshore oil and gas incident that causes damage in the territory of the Netherlands.

The Dutch law of torts does not specifically state that pure economic loss is recoverable but neither does it state that it is not recoverable. Dutch courts decide whether to award pure economic loss on a case by case basis depending on the facts of each case.

In this respect Dutch regulation is less specific compared to the regulations in place in UK, Norway and Denmark. Neither the Dutch Mining Act nor any other legislation imposes mandatory financial security requirement for compensation for bodily injury, property damage and economic loss involving offshore oil and gas operations. The financial security provisions in the Mining Act relate only to financial security for the discharge of payments and obligations under a licence. Such financial security is rarely imposed.

Financial Requirements

The provisions on financial security in the Mining Act refer, in substantial part to financial security for "*soil movement resulting from the production of minerals*" (article 46(1)) and the production of terrestrial heat and the storage of substances (article 46(4). These provisions do not, however, apply to oil and gas exploration and production operations on the Dutch continental shelf.

Financial security may be required to cover administrative measures to enforce the requirement for a licensee to carry out its obligations to remove installations. The Mining Regulations do not specify when the Ministry of Economic Affairs may demand such financial security. The Ministry may, however, refuse to grant an application for an exploration or production licence if it is not satisfied that the applicant will be able to provide financial security if the Ministry was to request it in the future

The licensee(s) of an exploration or production licence may be required, as indicated in the preceding paragraph, to have evidence of financial security for discharging payments and obligations under the licence. Each entity that holds an interest in a licence is considered to be a holder of the licence regardless of the percentage of their interest in it.

Evidence of financial security, if required by the Ministry of Economic Affairs, is required when an exploration or production licence is granted.

The Mining Act does not specify a monetary amount of financial security. Article 46(3) states that "*the amount of and the period during which, the moment in time and the manner in which the provision of security will be provided, must be to the satisfaction of [the Minister of Economic Affairs*]".

The Mining Act does not specify the time at which the adequacy of financial security is reviewed. As indicated in section 1.11.5 above, article 46(3) provides that "*the amount of and the period during*

which, the moment in time and the manner in which the provision of security will be provided, must be to the satisfaction of [the Minister of Economic Affairs]".

3.3.6 Norway

Norway has an offshore hydrocarbon exploration history dating back to 1966. Oil and gas have been produced from Norway's continental shelf since 1971 and 1977, respectively.

Norway is a member of the EEA rather than the EU with regulation of the resource management of petroleum activities falling under the jurisdiction of the Ministry of Petroleum and Energy and the Norwegian Petroleum Directorate (OD), a government agency.

The main legislation contained within is Royal Decree 27 June 1997 pursuant to Act 29 November 1996 no 72 relating to petroleum activities (Petroleum Act), Section 10-18 and Act 10 February 1967 relating to procedure in cases concerning the public administration, Section 13c third paragraph and Section 19 third paragraph. This was most recently amended by Royal Decree 2 July 2012 No 729.

Norway has a well-developed and sophisticated regime for compensating persons who suffer bodily injury, property damage and economic loss from offshore oil and gas operations. The Petroleum Act, which channels liability to the licensee, specifically includes pure economic loss.

When the Ministry of Petroleum and Energy (MPE) grants a production licence, the licensees enter into a standard Joint Operating Agreement (JOA) that regulates the relationship between them and the State of Norway (section 3-3). The JOA also sets out the financial arrangements between the parties to it, the work programmes, and insurance requirements. The JOA enables the Norwegian Government to maintain control over the operations to ensure that the exploitation of oil and gas is for the benefit of Norwegian society. The applicant of the production licence is appointed by the MPE.1026

The Petroleum regulations have a Section on insurance which stipulates that the activities conducted by the licensee pursuant to shall be insured at all times. The insurance must at least cover:

- Damage to facilities;
- Pollution damage and other liability towards third parties;
- Wreck removal and clean-up as a result of accidents;
- Insurance of the licensee's own employees who are engaged in the activities.

It is stipulated that the licensee shall ensure that contractors and subcontractors engaged in the activities take out insurance for their employees to the same extent as the applicant insures his own employees.

When taking out insurance for damage to facilities, pollution, third party liability, wreck removal and clean-up the licensee shall provide reasonable insurance cover, taking into consideration risk exposure and premium costs.

Insurance for employees shall be taken out as further agreed with the organizations of the employees.

The MPE may consent to the licensee using another form of security arrangement from insurance, but this has to be agreed before the commencement of any operations.

The licensee is required to inform the Ministry of existing insurance arrangements on an annual basis, with an outline of the main terms. The Ministry reserves the right to require further insurance

to be taken out. There is no set amount of insurance. Instead, the Ministry determines the limit of insurance required in individual cases.

Chapter 7 of the Petroleum Act imposes strict and unlimited liability for pollution damage (including bodily injury and property damage) from petroleum activities. Liability under chapter 7 mainly protects Norwegian interests. In addition, damage that originates in Norway or on the Norwegian continental shelf which causes damage in Denmark, Finland and Sweden is also compensable under chapter 7 (section 7-2).

Compensation for Norwegian fishermen

Norwegian Petroleum Directorate imposes specific regulations to protect its fishermen because of the industry's importance to Norway's economy. Norway is the leading producer of Atlantic salmon and the world's second largest exporter of seafood.

The special rules which apply in respect of compensation for financial losses incurred by Norwegian fishermen as a result of the petroleum activities occupying fishing fields or resulting in pollution and waste, or as a result of damage caused by a facility or actions in connection with the placing of a facility.

In the event of petroleum activities within an area entirely or partly occupying a fishing field, the State is obliged, to the extent that fishing becomes impossible or is substantially impeded, to award compensation in respect of any resulting financial loss. The State may claim recovery from the licensee if the licensee ought to have averted the loss.

The licensee is liable, regardless of fault, in respect of financial losses incurred as a result of pollution and waste from the petroleum activities, and the cost of reasonable measures to avert or limit such damage or such loss, including damage or loss as a result of such measures.

The liability of the licensee also includes damage and inconvenience due to pollution and waste as a result of supply vessel and support vessel traffic, as well as during relocation of the facility to or from the field concerned.

The licensee has the right of recourse against the perpetrator actually causing the loss or the ship-owner, providing the other prevailing conditions of liability have been fulfilled.

In order to claim compensation for lost fishing time in connection with locating, marking, retrieval or bringing ashore objects, the objects must be properly marked or brought ashore and presented to the police or port authority or other equivalent public authority, unless absolute obstacles exist. Their location must in any case be reported to the police or port authority. Liability for damages also comprises other vessels assisting a fishing vessel in bringing objects ashore.

If damage has been caused and it is not possible to identify who caused the damage, the licensees shall be jointly and severally liable insofar as the damage may be believed to have been caused by petroleum activities in connection with the licence in question.

If there is more than one licensee, the applicant is primarily liable for claims for compensation. Any other licensees are secondarily liable if the applicant fails to pay the claims by the specified deadline for payment.

Claims for pollution damage from offshore oil and gas operations must be brought under the Petroleum Act. If the Petroleum Act does not apply to a claim, the claim may be brought under the Pollution and Waste Act or the Act Relating to Compensation in Certain Circumstances, as applicable.

The Petroleum Act does not apply in Svalbard. Instead, the Svalbard Act applies. That Act imposes strict liability "*to pay compensation … for economic loss resulting from the environmental damage*" caused by that person due to breaching provisions of the Act.

In summary, Norway has a highly developed liability system established by the Petroleum Act for claims for compensation from offshore oil and gas incidents. Liability under the Act includes liability for pure economic loss. Further, liability is strict, it is channelled to licensees, and claims from offshore oil and gas incidents must be brought under the Act if it applies. Legislation that applies to Svalbard also imposes liability for economic loss arising from an offshore oil and gas incident.

3.3.7 United Kingdom

Offshore oil and gas operations in the UK began in 1964, when the UK Government issued the first licences to produce oil and gas from the UK continental shelf.

There is a substantial amount of UK legislation governing offshore oil and gas operations. The main law is the Petroleum Act 1998.

The UK's transition following the EU Offshore Safety Directive was sponsored by the then Department of Energy and Climate Change (DECC) alongside the Health and Safety Executive (HSE).

Prior to obtaining consent for Exploration & Appraisal Wells in the United Kingdom Continental Shelf (UKCS) Licensees are required to provide evidence of financial responsibility. Guidelines were issued by United Kingdom Offshore Oil and Gas Industry Association Limited (Oil & Gas UK) to assist licensees in demonstrating Financial Responsibility with respect to well control, clean up and legal liability to third parties as a consequence of a release of hydrocarbons.

Financial security is required in the UK "*to discharge any liability for damage attributable to the release or escape of Petroleum in the course of activities connected with the exercise of rights granted by the licence*".

Financial Requirements

BEIS require evidence that the licence holders have sufficient financial resource to pay for any potential well control and oil spill response/clean-up. Evidence must be submitted before the relevant operations can commence i.e. before spudding the first well. This process now applies to all UK drilling and production activities

The level of Financial Responsibility required is in two categories: Control of Well Cost and Remediation Cost. The Guidelines (referred to below) establish a means to calculate each category. The required limit for Control of Well Cost is calculated according to four primary criteria: location; well depth; and geo-environment. The required limit for calculating the Remediation Cost is dependent on well(s) categories with amounts varying from USD nil to USD 500 million (€460 million). This amount is in addition to the amounts required under The Offshore Pollution Liability Association Ltd (OPOL), except where the wells are gas, gas condensate or require artificial lift to flow.

- BEIS allows evidence of Financial Responsibility to be on the basis of company financial capacity, parent company guarantee or insurance;
- BEIS will accept evidence either that the licence applicant alone has sufficient financial capacity, or that the co-venturers have that capacity between them in proportion to their licence interest;

- insurers have to have credit or financial strength ratings of "BBB-" or higher from Standard & Poor's; "B+/bbb" or higher from A.M. Best; "Baa3" or higher from Moody's; "BBB-" or higher from Fitch; and/or the equivalent from another internationally recognised credit rating
- Oil and Gas UK have issued a document: "*Guidelines to assist licensees in demonstrating Financial Responsibility to DECC for the consent of Exploration & Appraisal Wells in the UKCS Issue 1, November 2012*" available to members and also for purchase.
- It is common practice for Applicants to require co-venturers to purchase insurance for their own percentage share. This would be incorporated into the applicable Joint Operating Agreement.

It is the responsibility of the Applicant to submit all required evidences which will include those for financial responsibly or appropriate insurance on behalf of their licence partners.

The DECC Guidance provides, among other things, that "*The level of financial responsibility that companies need to demonstrate for any particular well should be calculated by establishing the combined cost of well control and cost of financial remediation and compensation from pollution*".

The DECC Guidance further states that evidence of financial responsibility may be provided by: "*reliance on credit/financial strength rating of the applicant or co-venturer; insurance; parent company guarantee/affiliate undertaking; and any combination of the above*". The Guidance does not specify the type of financial security that is specifically required for compensation for traditional damage.

3.3.8 The Offshore Pollution Liability Association Ltd (OPOL)

There is no UK legislation that establishes a fund to compensate persons who suffer bodily injury, property damage or economic loss from pollution from offshore oil and gas operations. Under the Offshore Pollution Liability Agreement (referred to as OPOL), operating companies voluntarily agree to accept liability for pollution damage and the cost of remedial measures with only certain exceptions, up to a maximum of USD 250 million (€230 million) per incident. Within this limit there may also be included the cost of remedial measures undertaken by the party to OPOL involved in the incident.

The parties have to establish financial responsibility to meet claims arising under OPOL by producing evidence of insurance from insurers with the financial credit strength rating required by the OPOL Rules, a guarantee from a company with financial or credit strength rating required by the OPOL Rules or by producing evidence that they qualify as a self-insurer by meeting the financial or credit strength rating required by the OPOL Rules. They also jointly agree that in the event of a default by one of the parties, each will contribute proportionally to meet claims.

The responsibility for meeting claims under OPOL rests solely with the applicant. As in all joint ventures, the applicant may wish to make its own arrangements as to financial responsibility with other participants (known as non-applicants) in a venture, but these will not involve the submission to or scrutiny by OPOL of any financial documentation concerning non-applicants.

OPOL does not supersede the common law in the UK; it provides an alternative means of obtaining compensation following an oil spill from offshore oil and gas operations. As the Liability Agreement under OPOL specifically states, it "*does not restrict a claimant's right to seek redress in the courts for reimbursement of a particular claim or claims*".

OPOL initially applied to offshore facilities within the jurisdiction of the United Kingdom but was later extended to apply to such facilities within the jurisdiction of other countries as well, as described below.

OPOL is thus intended to achieve the following:

1. To provide an orderly means for the expeditious settlement of claims arising out of an escape or discharge of oil from offshore exploration and production operations.

2. To encourage immediate remedial action by the parties.

3. To ensure the financial responsibility of the parties to meet their obligations.

4. To provide a mechanism for ensuring that claims are met up to the maximum liability under OPOL.

5. To avoid complicated jurisdictional problems.

Application of OPOL

OPOL applies to those offshore facilities from which there may be a risk of an escape or discharge of oil causing pollution damage. These facilities are wells, drilling units, platforms, offshore storage/loading systems and pipelines, where these are to seaward of the coastal low water line, including gas wells when being drilled, re-completed or worked upon. They do not include permanently abandoned wells, installations or pipelines, or facilities for the production, treatment or transport of natural gas or natural gas liquids.

Membership of OPOL is mandatory for licensees of offshore oil and gas operations in the UK

Scope of OPOL

All offshore facilities in the OPOL designated States operated by a member are generally subject to OPOL. In certain circumstances an application for membership may be accepted on the basis that not all of the applicant's operated facilities in the designated States will be subject to OPOL.

OPOL covers escapes or discharges of oil from offshore facilities within the jurisdiction of any State that is specified in OPOL. It applied initially to offshore facilities within the jurisdiction of the United Kingdom of Great Britain and Northern Ireland, but has subsequently been extended to offshore facilities within the jurisdictions of Denmark, the Federal Republic of Germany, France, the Republic of Ireland, the Netherlands, Norway, the Isle of Man , the Faroe Islands and Greenland, but excluding those offshore facilities located in the Baltic and Mediterranean Seas, and can be extended so as to apply to offshore facilities within the jurisdiction of any other State.

The location of the pollution damage or the place where remedial measures are taken need not necessarily be within waters within the jurisdiction of a State designated in OPOL; the location of the offshore facility is the governing factor.

Claims under OPOL

There are two classes of claimants under OPOL:

a) Public Authorities, defined so as to include Governments and other public bodies and municipal and local authorities, may claim in respect of remedial measures taken to prevent, mitigate or eliminate pollution damage, or to remove or neutralise the oil following an escape or discharge. The cost of remedial measures undertaken by the party to OPOL, who is the applicant of the facility, may be set off against the total amount of compensation that would otherwise be available under OPOL to meet the claims of Public Authorities.

   In addition OPOL applicants are required to be responsible for the costs of those remedial measures which they do undertake.

These measures do not however include the cost of well control or any measures taken to protect, repair or replace the facility. The reason for giving the party involved right of set off is to encourage it to take prompt action upon the occurrence of an escape or discharge of oil.

b) Anyone, including a Public Authority, may claim compensation for pollution damage. This is defined as direct loss or damage caused by contamination, but excludes loss of or damage to the facility which is the source of the escape or discharge of oil.

Key Facts

- As is commonly misunderstood, OPOL is not a fund, but a voluntary oil pollution compensation scheme providing a Mutual Guarantee borne by members for each other's obligations;
- OPOL Limits of Liability currently USD 250 million (€230 million) per incident; USD 500 million (€460 million) in the aggregate annually;
- The annual aggregate for the establishment of financial responsibility does not reduce the maximum liability of the Applicant;
- A maximum deductible of USD 10 million (100%) per incident is permitted. (€9.2 million)
- OPOL provides an effective means of ensuring compliance by licensees. It is further reinforced by the inclusion of a standard OPOL Clause in all Joint Operating Agreements (JOA);
- Applicants often use the financial responsibility demonstrated to OPOL to satisfy their financial responsibility verification obligations to the BEIS (formerly DECC) relating to exploration and appraisal wells on the UKCS in respect of remediation and compensation up to USD 250 million;
- Only the licence Applicant may be a party under OPOL. Where there are joint ventures, the Applicant assumes the obligations under OPOL relying upon the undertakings of the JOA for and the joint venture's own OPOL evidences of cover for their protection;
- Certification is a continuous procedure with insurers or insurance brokers providing evidences of coverage when necessary, in a pre-prescribed format.

3.3.9 Summary of Financial Requirements

The table below summarises the requirements discussed above.

Summary of Financial Responsibility Requirements/Guidelines

Country	Item	Employers Liability	Plant & Equipment	Removal of Wreck/Debris	Capping Costs	Relief Well	Redrilling of Well	Spill clean up	Foreshore clean-up	Environmental degradation costs	Compensation to Fishermen/ Aquaculture	Compensation to other businesses
Australia	Applicable Act	The OPGGS Act requires titleholders to demonstrate financial assurance for all petroleum activities and some activities may result in pollution incidents other than the release of hydrocarbons										
	Responsibility Guidelines	None specified over and above existing legislation for employees	None Specified	Deployment of capping stack cost to be included in the calculation for well control (min AUD50 million)	Clearance of debris is to be included in the calculation for the cost deployment of capping stack etc.	Drilling a relief well assumed to cost twice original AFE, and is required for calculation of Well Control measures	None Specified	Assessment for pollution according to hydrocarbon type and volume		No specific reference		
	Certification	"To demonstrate compliance with section 571(2) of the OPGGS Act, titleholders are required to submit to NOPSEMA a declaration of compliance, signed by an authorised officer. OPGGS Act recognises the following forms of financial assurance (Titleholders can use a combination of these forms to meet the financial assurance requirement): • Insurance • Self-insurance • A bond • The deposit of an amount as a security with a financial institution • An indemnity or other surety • A letter of credit from a financial institution • A mortgage."										

Country	Item	Employers Liability	Plant & Equipment	Removal of Wreck/ Debris	Capping Costs	Relief Well	Redrilling of Well	Spill clean up	Foreshore clean-up	Environmental degradation costs	Compensation to	
											Fishermen/ Aquaculture	other businesses
Canada	Applicable Act	The Canada-Newfoundland and Labrador Atlantic Accord Implementation Act (1987) sets out in section 162(1) the liability imposed on the licence holder for discharge, emission or escape of petroleum.										
	Responsibility Guidelines	None specified over and above existing legislation for employees	Where insurance is used to evidence "Financial Resources", the Applicant or Applicant should ensure that all contractors performing operations carry insurance to cover the risks of property damage to and liabilities arising from their own assets and equipment used to perform their services	Where insurance is used to evidence "Financial Resources", the appropriate Board may request a technical justification justifying the sums insured for well control, pollution and third party liability insurances.								
	Certification	"The Acts require that Applicants provide proof of financial responsibility and financial resources to a respective Board when applying to conduct a work or activity. The Acts also require that each Applicant shall ensure that proof of financial responsibility and resources remain in force for the duration of the work or activity for which the Authorization was issued, or in certain circumstances for a longer period as the respective Board may direct. The following instruments may be acceptable to a respective Board as proof of financial responsibility: • Letter of Credit; • Bank Letter of Guarantee; • Indemnity Bond; • Proof of participation in a pooled fund (for offshore drilling, development or production activities); and/or, • Any other form that is satisfactory to the respective Board. The following are accepted forms of financial resources: • Most recent audited financial statements and credit rating; • Promissory note; • An insurance policy or a certificate of insurance; • An escrow agreement; • A letter of credit; • A line of credit; • A guarantee agreement; and/or, • A security bond or pledge agreement or an indemnity bond or suretyship agreement."										

Country	Item	Employers Liability	Plant & Equipment	Removal of Wreck/ Debris	Capping Costs	Relief Well	Redrilling of Well	Spill clean up	Foreshore clean-up	Environmental degradation costs	Compensation to	
											Fishermen/ Aquaculture	other businesses
Israel	Applicable Act	The Israeli Petroleum Law, 5712-1952 , which was enacted in 1952 and underwent revision in 1965, governs the exploration and production of petroleum in Israel, including the continental shelf.										
	Responsibility Guidelines	None specified over and above existing legislation for employees	Current insurance requirements require cover for Physical Damage & Removal of Wreck which should be included in the submitted insurance plan.		No specific reference, however guidelines have been undergoing re-assessment and we are aware that the APPEA (Australian) method has been accepted as a reasonable basis for justifying insurance limits purchased in Israel.			Currently, there is no specific guidance provided to oil companies to assist them in estimating appropriate levels of financial assurance for pollution incidents, and each insurance plan submitted is considered on its own merits. These guidelines have been undergoing re-assessment and we are aware that the APPEA (Australian) method has been accepted as a reasonable basis for justifying insurance limits purchased in Israel.				
	Certification	Currently autonomous bank guarantee(s) and insurance policies/evidences of insurance are required as well as the provision by the oil company of an "insurance plan" which demonstrates the basis for the limits it has insured. All policies name the State of Israel is added as additional insured with a waiver of subrogation in its favour. As part of the current review by the State, insurance "guidelines" are being rewritten, including a requirement for insurance brokers to complete and sign a prescribed certificate of insurance. Although the new guidelines are yet to be published (expected June 2017), we understand that they have been "rolled out" to oil companies renewing their insurance in 2017. We are aware that the APPEA (Australian) method has been accepted as a reasonable basis for justifying insurance limits purchased in Israel.										
Netherlands	Applicable Act	Mining Act of the Netherlands, the Mining Decree and Mining Regulation										
	Responsibility Guidelines	None specified over and above existing legislation for employees	No specific reference	Financial security may be required to cover administrative measures to enforce the requirement for a licensee to carry out its obligations to remove installations.	No specific reference			The Netherlands Civil Code which imposes liability for bodily injury, property damage and economic loss, is fault-based. The Code includes provisions imposing strict liability for dangerous activities, at least one of which applies to harm from pollution from an offshore oil and gas incident that causes damage in the territory of the Netherlands. Dutch courts decide whether to award pure economic loss on a case by case basis depending on the facts of each case.				
	Certification	Evidence of financial security, if required by the Ministry of Economic Affairs, is required when an exploration or production licence is granted. The Mining Act does not specify a monetary amount of financial security, but it "must be to the satisfaction of [the Minister of Economic Affairs]".										

Country	Item	Employers Liability	Plant & Equipment	Removal of Wreck/Debris	Capping Costs	Relief Well	Redrilling of Well	Spill clean up	Foreshore clean-up	Environmental degradation costs	Compensation to Fishermen/ Aquaculture	Compensation to other businesses
Norway	Applicable Act	Royal Decree 27 June 1997 pursuant to Act 29 November 1996 no 72 relating to petroleum activities (Petroleum Act), Section 10-18 and Act 10 February 1967 relating to procedure in cases concerning the public administration, Section 13c third paragraph and Section 19 third paragraph. This was most recently amended by Royal Decree 2 July 2012 No 729.										
	Responsibility Guidelines	Insurance of licensee's own employees who are engaged in the activities is specified as a requirement.	"The Petroleum regulations stipulate that activities conducted by the licensee pursuant to shall be insured at all times. This should include damage to facilities.	The Petroleum regulations stipulate that activities conducted by the licensee pursuant to shall be insured at all times. This should include wreck removal as a result of accidents.	No specific reference			The Petroleum regulations stipulate that activities conducted by the licensee pursuant to shall be insured at all times. This should include and clean up as a result of accidents, pollution and other liability towards third parties.			Norwegian Petroleum Directorate specifically authorises compensation to fisheries affected by offshore oil and gas operations, including a release of pollutants. Norway has also instituted a claims system if a loss should occur.	The Petroleum regulations stipulate that activities conducted by the licensee pursuant to shall be insured at all times. This should include and clean up as a result of accidents, pollution and other liability towards third parties.
	Certification	Oil companies are required to provide the Ministry with a signed Confirmation of Insurance (this may be signed by Insurer, Insurance Broker or Authorised Representative of the Company) confirming coverage for: (a) Physical Loss to Installations, (b) Removal of Wreck, Cost of Well Control, Third Party Liability and Insurance of Personnel.										

Country	Item	Employers Liability	Plant & Equipment	Removal of Wreck/Debris	Capping Costs	Relief Well	Redrilling of Well	Spill clean up	Foreshore clean-up	Environmental degradation costs	Compensation to Fishermen/ Aquaculture	Compensation to other businesses
United Kingdom	Applicable Act	The UK's transition following the EU Offshore Safety Directive was sponsored by the then Department of Energy and Climate Change (DECC) alongside the Health and Safety Executive (HSE). As a result, Licensees have had to evidence financial responsibilities prior to obtaining consent for Exploration & Appraisal Wells in the United Kingdom Continental Shelf (UKCS). The United Kingdom Offshore Oil and Gas Industry Association Limited (trading as Oil & Gas UK) issued a series of Guidelines and Technical Notes to assist licensees in demonstrating their Financial Responsibility.										
	Responsibility Guidelines	None specified over and above existing legislation for employees	None Specified		Cost of capping device deployment is expected to be included in Control of Well Cost calculation.	Well Control Obligation defined as the actual costs and expenses incurred by the Company in regaining or attempting to regain control of any Well(s) which get Out of Control, including the costs of drilling any relief well, but only such costs and/or expenses incurred until such Well is brought Under Control.	None Specified	No specific reference, however Pollution Remediation/Compensation Obligation defined as all legal liabilities owing or incurred by the Company in respect of the cost of remediating any pollution arising directly as a result of any well being Out of Control and/or the cost of any compensation for pollution damage awarded by any court of competent jurisdiction against the Company to any Third Party arising directly as a result of any well being Out of Control.				
	Certification	Applicant has to sign a Certificate of Financial Responsibility for Well Operations including costs for Well Control and Pollution, Remediation & Compensation. This is supported by Evidence(s) of Financial Responsibility which may include: • Insurance certification • Credit or financial strength ratings from internationally recognised credit rating agencies • Parental Company/Affiliate Undertaking in prescribed form										

3.3.10 Prompt settlement of claims

Conventional insurance policies such as Well Control are written on what are known as “an indemnification” basis. In other words, the insurers will indemnify the insured for costs it has incurred, and can demonstrate it has occurred through the provision of invoices etc. For less financially resourced insureds it may be preferable to arrange its insurance with the insurers paying claims directly to a contractor or third party on the insured’s behalf. While INDECS have seen such arrangements agreed to (in return for additional premium) these should be very much considered the exception to the norm.

Policies will normally contain a provision that allows for period payments “on account” to be scheduled, once the insurer has accepted liability under its policy.

3.3.11 Pure economic loss

Pure economic loss is a term which refers to financial loss and damage suffered by a person such as can be seen only on a balance sheet rather than as physical injury to the person or destruction of property.

As there is no traditional damage suffered, it is uncertain whether third party liability claims would be covered by law as there is a general bar on the payment of compensation for economic loss in the absence of bodily injury or property damage.

The word “pure” is considered to be crucial since if there is an economic loss that is connected to the slightest damage to person or property then the term “consequential economic loss” applies and claims would be payable.

The law of many EU states only recognises “direct claims” rather than remote or indirect claims. Further many of EU states, including Ireland, require proof of negligence for all claims for traditional damage as well as for pure economic loss. The need to prove fault makes compensation claims more difficult and slower to complete.

Only Norway has legislation that specifically authorises compensation to fisheries affected by offshore oil and gas activities, complete with a claims system should loss occur.

From an insurance perspective, it is hard to envisage insurance companies paying compensation unless required by law and without detailed evidence of loss. However, should a convention (such as OPOL) require such payments and the insurance policy is worded to respond accordingly then coverage could be granted.

Reference 40 gives further information which can be summarised as:

The legislation for offshore oil and gas exploration and production in Ireland does not specifically impose liability for compensation to third parties who suffer bodily injury or property damage from offshore oil and gas operations. Instead the Civil Liability Act, 1961, and common law apply, both of which are mainly fault-based for claims for compensation of the type that would be claimed for harm from pollution from an offshore oil and gas incident.

As a general rule, liability for pure economic loss does not exist under Irish law. A court may award pure economic loss but only if the loss was foreseeable and significant.

Ireland does not have a procedure for handling claims for compensation although we understand that membership of OPOL has been accepted as financial security in the past.

In summary, liability for pure financial loss for compensation for harm from pollution from an offshore oil and gas incident does not, as a general rule, exist under Irish law. Even if it does exist, pure economic loss is not generally recoverable. Fault would apply to claims for harm from pollution from an offshore oil and gas incident.

In the case for claims by fishermen for various financial losses, the route could be via the Department, but the argument that the Department was responsible, on the grounds that they had permitted the activity is one for the legal argument. In usual circumstances, the Department would refer such claims to the Applicant, and if the courts found in favour of the fishermen then the third party liability insurance would respond accordingly. The Department should be named as an Assured under the insurance policy so they are afforded protection under the Policy for instances when, say, fishermen name the Department in legal proceedings as well as the Applicant.

4 Recommended Approach

4.1 Responsibilities of the Applicant

The applicant should have presented the following to the ICB, CER, IRCG as part of the Safety Case submission and assessment process:

- Description of potential reservoir, well design, programme and any 'combined operations'
- Applicant's and applicant's plus contractors' experience, and organisation for managing the programme
- Assessment of the technical risks of an event occurring, describing the physical and procedural barriers in place (these also have to be demonstrated to the CER in the Safety Case), including:
    - maximum flow-potential in the event of loss of well control
    - Contingency plans for 'Source Control' (Well capping and relief well planning arrangements, etc.)
- Modelling of the potential outcomes and the effect on the environment and third parties, describe emergency planning arrangements (including spill response, dispersant use & clean-up arrangements, etc.) Note the Coast Guard guidance and required approvals of plans.

In earlier sections of this report it has been noted that in relation to both well design & construction and oil spill response planning, existing arrangements are largely satisfactory. Technical measures in relation to well control are described in section 4.1.1. Technical measures in relation to oil spill response planning are described in section 4.1.2.

In relation to identifying the potential costs associated with a major loss of well control, as has been described in earlier part of this report, we are proposing that applicants may use a scoring framework similar to that used in the UK and in Australia, but the framework would need to be modified (by applicants) to account for differences between the countries concerned, including differences in the environment, economic activity and costs. The preferred approach is to use modelling to identify impacts directly and use Irish (or transboundary data, if appropriate) to calculate potential costs. The proposed framework for calculating financial responsibility limits is described in section 4.1.3.

So, in addition to the information provided to CER and IRCG the applicant will be required to provide additional analysis and information to the DCCAE comprising:

- Calculation of well control costs including the mobilisation of resources, management and installation of a well capping device (where appropriate) and the drilling and completion of a relief well;
- Calculation of the Financial Responsibility required to cover pollution remediation and compensation according to the approved Methodology.
- Demonstration that appropriate financial resources (including liability & insurance arrangements, including indemnities) are available to meet the obligations.
- Description of the mechanism to ensure prompt payment of compensation

4.1.1 Calculation of Well Control Costs

The DCCAE will require neither additional information on well design and construction nor any additional information regarding the design, and time estimates for relief well operations to that already supplied to the ICB and CER as part of the overall safety case submissions. The applicant will need to provide AFE information for the planned well work and also for contingency relief well operations, as well as acquisition, transport and deployment of a capping stack where appropriate.

The information provided to the ICB for the assessment of the well design and construction together with the design and time estimates for relief well operations within the safety case submission should be used as the basis for estimating the cost of well control in the event of a blow out. If the Applicant is unable to provide the relief well operation AFE then a default would be to determine the daily spread cost for the original well and multiply this by the days estimated for relief well operations.

The starting point for the assessment of Financial Liability is the time required to mobilise a rig, drill a relief well and complete the well kill operation and/or put in place a capping stack; these should be available from the CER safety case assessment process.

Other key information such as the prediction of reservoir fluid types and the possible maximum uncontrolled flow rate should be supplied to the CER but is fundamental to the assessment of potential costs of damage.

Mitigation measures and applicant competence belong to the CER process which DCCAE should draw upon. The contingency plans described in the information presented to the CER in the Safety Case and to the IRCG in the Oil Spill Response Plan should form the basis of costings presented to DCCAE. All the measures required following a release together with the costs of direct damage and remediation should be included as part of the financial liability estimation process. Ideally a fully costed relief well design should be presented allowing for cost of mobilising a rig (with special capabilities if required), bearing in mind availability, current well suspension and re-entry, transfer to location as well as daily drilling costs. Alternative approaches may be considered, such as a multiple of the AFE of the original well (provided this takes account of the complexity of the operation) or the estimated time for mobilisation plus time to drill relief well and kill the original multiplied by a daily rate for the entire spread involved (including support vessels, etc.)

The provision of well capping devices, if deemed appropriate, will also be included in the cost of well control and should be consistent with the information accepted by the Irish Coast Guard, in terms of time for mobilisation, deployment and final spill control. Any potential delays resulting from Regulatory Approvals for equipment or chemicals, including customs clearance should be included.

4.1.1.1 Guidance on the estimating the Cost of Well Control.

The applicant should consider the following:

1. In the unlikely event of a loss of well control the primary focus must be on the safety of personnel involved and then protection of the environment by bringing the well under control using the most appropriate methods while dealing with the consequences of the resultant spill. These methods will have been considered and planned and will form part of the Safety Case submissions reviewed by CER and the Irish Coast Guard.

2. The Safety Case Requirements include the consideration of relief well drilling and where appropriate the deployment of capping stack devices.
3. Additional costs arise mainly from the drilling of a relief well (or wells) and deployment of a capping stack device if this is deemed appropriate. Cost estimates should include site clearance, dispersal of spill to provide safe surface conditions and to aid subsea visibility, re-entry and securing of the well.
4. The intent of guidance is to provide an agreed methodology that can be used consistently across the industry.
5. The largest component of the cost of well control in most instances will be the cost of drilling a relief well and the subsequent well kill operations. Relief well design and planning will have been scrutinised by CER as part of the well work safety case. For a "basic" relief well where a simplistic AFE may have been derived the cost may be estimated by applying a multiplication factor to the AFE of the relief well. This factor will help to cover time and cost escalations and unforeseen costs associated with the well kill operations. For "Complex" relief wells a more detailed deterministic cost estimate may be required.
6. The cost of deploying a capping stack device can be determined by the Applicant from the contractual arrangements that must be in place if a capping stack contingency is determined to be appropriate. These arrangements will have been reviewed by the Irish Coast Guard.
7. In the case of those wells which are incapable of flowing naturally, i.e. those which would require artificial lift, there should be no requirement to assess the cost of relief wells or capping stack devices.

4.1.1.2 Factors determining the cost of drilling a Well in Irish Waters

The estimates of performing the well work will have been developed in determining the AFE for that work and are likely to have been subject to detailed partner scrutiny. The components of the well work AFE should be the basis for calculating much of the cost of the relief well drilling, which must also take into account mobilisation of a MODU, site preparation, and logistics support for drilling and well kill operations.

4.1.1.3 The cost of drilling a Relief Well

The costs of drilling a relief well are likely to exceed that of the planned well. Factors that need to be considered in determining an appropriate multiplication factor for a "Basic" relief well are:

- Potential for variation in the MODU day rate
- Additional mobilisation and demobilisation costs.
- Cost of suspending the well the MODU was working on at the time of being mobilised for relief well operations, and the subsequent re-entry of that well.
- Potential increased cost associated with the directional drilling and surveying of a deviated relief well.
- Relief well and well kill specific products and services

Note: OGUK have suggested in their guidance that taking into account all of the factors above the multiplication factor for a "Basic" relief well should be 2x.

4.1.1.4 The cost of deploying Capping Stack Devices

The decision as to whether a capping stack device is appropriate or not will have been made during the assessment for the safety case submission and will have been reviewed by the Irish Cost Guard.

A large applicant might be considered competent to deploy such a device using their internal expertise and may have made arrangements for access to a device without additional support.

Smaller applicants are unlikely to have the expertise to deploy such devices unaided and are more likely to have contractual arrangements in place with a specialist provider.

The costs of deploying a device will vary depending upon the contractual arrangements but may be estimated using the contract pricing and terms and conditions.

Note : OGUK guidance suggest that the cost of capping stack deployment may be considered to be relatively constant and suggests a sum of US$ 40 million. This is based on UK conditions, logistics, support and costs which may vary in Ireland and so need individual calculation by an applicant.

4.1.2 Oil Spill Response Planning

The Irish Coast Guard (IRCG), a part of the Department of Transport, Tourism & Sport (DTTAS), has the responsibility for organising and directing spill response at sea or in coastal areas. The service also directs and co-ordinates the function of both harbour and local authorities, who undertake clean-up of oil from beaches and nearshore waters. An electronic copy of the Irish draft National Contingency Plan (dated January 2013) is available via the DTTAS website. This document provides detailed information on how a significant pollution incident would be managed offshore Ireland.

The Sea Pollution (Amendment) Act 1999 also requires that each applicant of an offshore unit shall have in place an oil pollution emergency plan, and that these plans shall be approved by the IRCG.

The Commission for Energy Regulation (CER) is the safety regulator for offshore petroleum exploration and extraction activities in Ireland. The CER regulates the industry in accordance with the Petroleum Safety Framework; a collection of regulations, written regulatory documents and procedures, developed based on the requirements of the Act. In order for a designated petroleum activity to be undertaken offshore Ireland, the applicant must have a safety permit for that activity. To issue a safety permit, the CER must assess and accept a Safety Case. CER has published a guidance document in relation to Safety Case requirements (CER16/024). Section 14 of this document defines emergency response requirements including those required to respond to an offshore major environmental incident.

We have used the contents of the environmental elements of the CER Safety Case guideline along with the draft National Plan to compare these requirements with those in industry-wide spill response guidelines.

We have also compared these guidelines with those in place in the UK. This is in no way an attempt to compare the two frameworks; rather to recognise that any applicant or well management contractor used to preparing OPEPs for UKCS operations is likely to have planned for similar output information to be available in relation to operations offshore Ireland.

The detailed review findings are given in Section 3.2.2.3 Emergency Planning Arrangements.:

Thus – we propose additional spill modelling criteria within the FR Methodology (see 4.1.3 Framework for Calculating Financial Responsibility Limits) which is in line with the latest approach expected by the IRCG (Ref – discussions between DCCAE & IRCG 19.6.2017) see also Section 3.2.2.3 Emergency Planning Arrangements.

- Justification for the choice of spill model utilised for predictive modelling. For example, some models are better suited to assess subsea as opposed to surface releases.
- Justification for the blowout flowrate and fluid properties that are to be modelled.
- Justification for the duration of flow used. This would typically be consistent with the amount of time to deploy a capping stack or drill a relief well.
- Confirmation of the location of release that is being modelled. This would normally be the proposed well location and would take into account whether the blowout is surface or subsea.
- Information on the type of stochastic modelling work that has been completed to identify a reasonable worst-case scenario (e.g. number of runs, duration of runs, oil thickness modelled, output data presentation).
- Information on the metocean data that has been used in the modelling (including relevant seasons that have been modelled).
- Information on the worst-case scenario deterministic run(s) that have been selected to identify all potentially impacted shorelines, environmentally sensitive marine and coastal environments, marine protected areas and transboundary impacts. Typically, this information would include duration of runs, oil thickness modelled and output data presentation.
- The modelling outputs should also include estimates of the volumes of oil or emulsion stranded.

Following the workshop and subsequent discussions with IRCG, the IRCG have clarified their latest requirements for oil spill modelling relevant to OSCP (IRCG to DCCAE, 19.June 2017). The additional guidance proposed for FR above is consistent with this and is broadly based on UK requirements .

The latest IRCG Guidance (19 June 2017) is as follows:

> "In the absence of a specific guidance document for modelling, applicants should use until furthered notified:
>
> > United Kingdom Department of Business, Energy and Industrial Strategy - GUIDANCE NOTES FOR PREPARING OIL POLLUTION EMERGENCY PLANS For Offshore Oil and Gas Installations and Relevant Oil Handling Facilities (December 2016)" see http://www.hse.gov.uk/osdr/assets/docs/opep-guidance-rev3-dec-2016.pdf and Appendix B in particular
>
> Further information required should include -
>
> > The Modelling Information must outline detailed information -
> >
> > 1. Model will offer data over a period of 1 year
> > 2. Time periods should be at one month intervals (unless agreed otherwise).
> > 3. The oil amounts should be presented in tabular form and quantified.

4. Information presented should include Special Areas and Environmentally Sensitive Areas etc.
5. Information required will include
   a. Amount of oil reaching Landfall – Predicted locations within the Irish EEZ should specify the geographical location of the beaching.
   b. Amount of oil dispersed in water column – Comment on expected fate of oil – will, when, where will this oil move to?
   This should be done on a monthly basis to include time periods for oil to further beach.
   c. Amount of oil expected to be on seabed – details of oil pattern on seabed."

4.1.3 Framework for Calculating Financial Responsibility Limits

This proposed framework will be used by applicants to calculate appropriate financial responsibility levels which should be demonstrated by them to the Regulator. Note that the Protocol for Assessment of the applicant's submission is given in Appendix 5 and may be used as a guide to applicants in preparing their submission.

For Financial Responsibility, overall costs can be considered as:

- Control of the well
  - Installation of capping device
  - Drilling relief well

- Pollution remediation and compensation
  - Clean-up operations (including scientific studies & monitoring)
  - Economic loss

Regarding the pollution elements, we are proposing that applicants should use spill modelling to identify impacts directly and use Irish (or transboundary data, if appropriate) to calculate potential costs. Applicants may use a scoring framework similar to that used in the UK and in Australia, but the framework would need to be modified (by applicants) to account for differences between the countries concerned, including differences in the environment, economic activity and costs. In addition, by making use of data from oil spill modelling being carried out for the OSCP, and remaining consistent with the Safety Case submission, the Applicant's requirements are streamlined. Applicants would undertake oil spill modelling for a credible worst case scenario, track the oil spill until it dissipated or beached, and then assess the locations affected and the resulting pollution damage, such as the open sea including fishing grounds, shoreline oiling affecting economic activity and the spill response required.

Further development of a cost model for Ireland, as the FR process develops, may be beneficial. Calibration of the cost model could be based on the clean-up costs per length of oiled coastline and the volume of beached, while economic data could be based on the counties oiled and the fishing, aquaculture and tourism earnings for each county. Cost estimation could be further streamlined, for example, if fisheries sensitivity maps were created - from data already collected for submission to the EU, showing fishing activity or catch values per ICES statistical rectangle.

1. Control of Well

Using the Guidelines in Section 4.1.1.1, and using data consistent with the Safety Case and agreements with IRCG, the applicant should complete Table 1 and also submit details of all background calculations and justifications.

Table 1. FINANCIAL RESPONSIBILITY LIMITS CALCULATIONS – Well Control			
Protocol Element	**Consideration**	**Applicable Y/N**	**Estimated Cost (€)**
Well	The well will not flow without artificial lift (and therefore it is not considered necessary to assess the cost of controlling the well)		n/a
Capping Device	In the event of loss of well control – it is anticipated that a capping device would be installed as agreed with IRCG.		
Relief Well	The applicant confirms that relief well plans and associated costs have been submitted.		
		Total for Well Control	

2. Pollution Remediation and Compensation

Using data consistent with the Safety Case and agreements with IRCG, the applicant should complete Table 2 and also submit details of all background calculations and justifications.

Table 2. FINANCIAL RESPONSIBILITY LIMITS CALCULATIONS – Pollution Remediation & Compensation		
Protocol Element	**Consideration**	**Estimated Cost (€)**
Impact Assessment	Costs of scientific studies to determine nature & extent of environmental impact	
Oil-spill Response & Clean-up	Cost of oil-spill response and clean-up	
Fisheries	Potential economic impact on fisheries	
Aquaculture	Potential Economic impact on aquaculture	
Other economic impacts	Other potential economic impacts, such as tourism, marine industries, and transboundary impacts.	
	Total for Pollution Remediation & Compensation	

Whilst the Assessment Protocol in Appendix 5 may be used as guidance for applicants, the following sections give additional points for applicants to consider.

Worst Case Scenario & Spill Modelling:

- Justification for the choice of spill model utilised for predictive modelling. For example, some models are better suited to assess subsea as opposed to surface releases.
- Justification for the blowout flowrate and fluid properties that are to be modelled.
- Justification for the duration of flow used. This would typically be consistent with the amount of time to deploy a capping stack or drill a relief well.
- Confirmation of the location of release that is being modelled. This would normally be the proposed well location and would take into account whether the blowout is surface or subsea.
- Information on the type of stochastic modelling work that has been completed to identify a reasonable worst-case scenario (eg number of runs, duration of runs, oil thickness modelled, output data presentation).
- Information on the metocean data that has been used in the modelling (inc. relevant seasons that have been modelled).
- Information on the worst-case scenario deterministic run(s) that have been selected to identify all potentially impacted shorelines, environmentally sensitive marine and coastal environments, marine protected areas and transboundary impacts. Typically, this information would include duration of runs, oil thickness modelled and output data presentation.
- The modelling outputs should also include estimates of the volumes of oil or emulsion stranded.

Impact Assessment:

- Scientific studies to determine the nature and extent of the environmental impact (in addition to those required to determine the appropriate spill response)
- Studies to determine whether or not reinstatement measures are necessary and feasible, if spill modelling identifies potential damage to protected species and habitats (under EU Habitats and Birds Directives)..

Cost of Oil-spill Response & Clean-up:

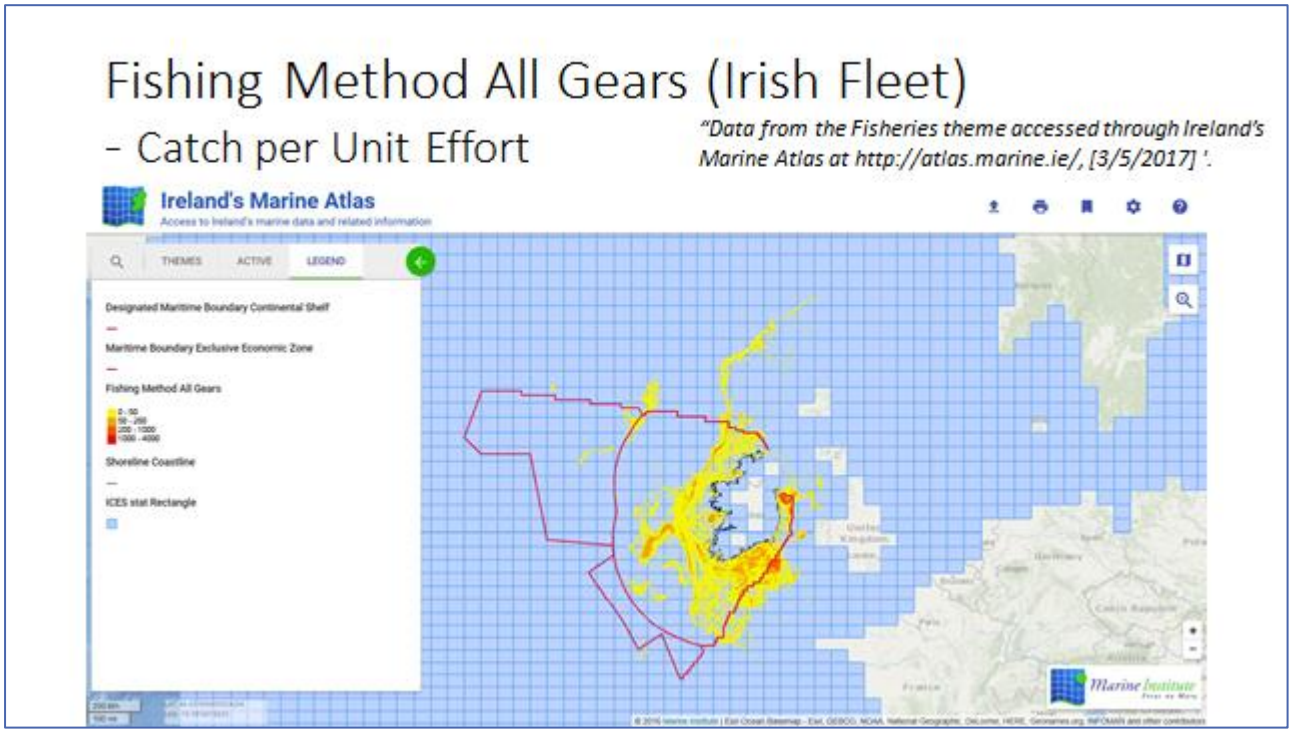
- Justification of use of other cost models, modified as necessary. (e.g. OGUK 2012, Ref.30 may be approximated to minimum costs for Tier 3 Response of £70m plus variable costs £1,000 - £2,500 per volume beached (m3 emulsion).
- Reference to data sources where applicants are using direct estimates of response and clean-up costs.

Fisheries:

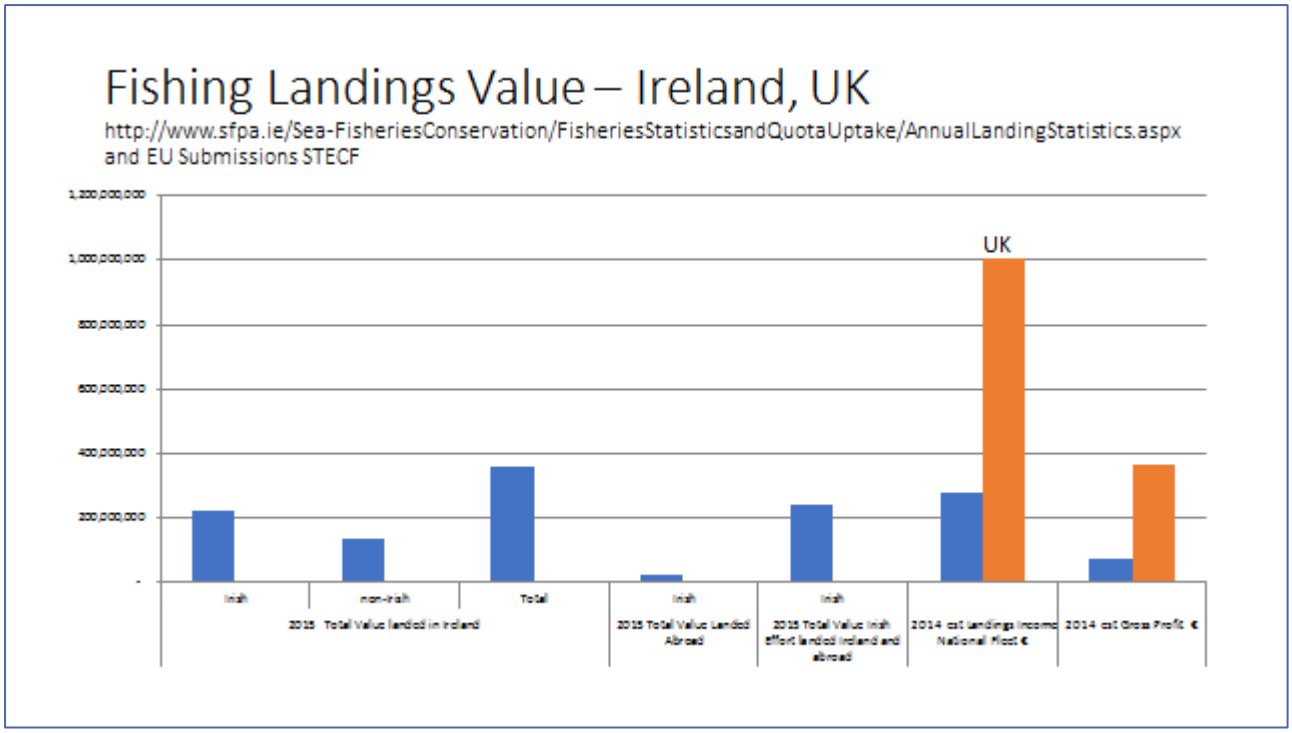
- Justification of use of other cost models (e.g. OGUK 2012, Ref.30), modified as necessary.
- Alternative models such as simplified economic impacts - e.g. key ports impacted by county - Cork (€ 140million annual landings) Donegal (€ 100million annual landings), others (up to €30million annual landings each), see SFPA data below.
- Reference to data sources for direct estimation of costs.

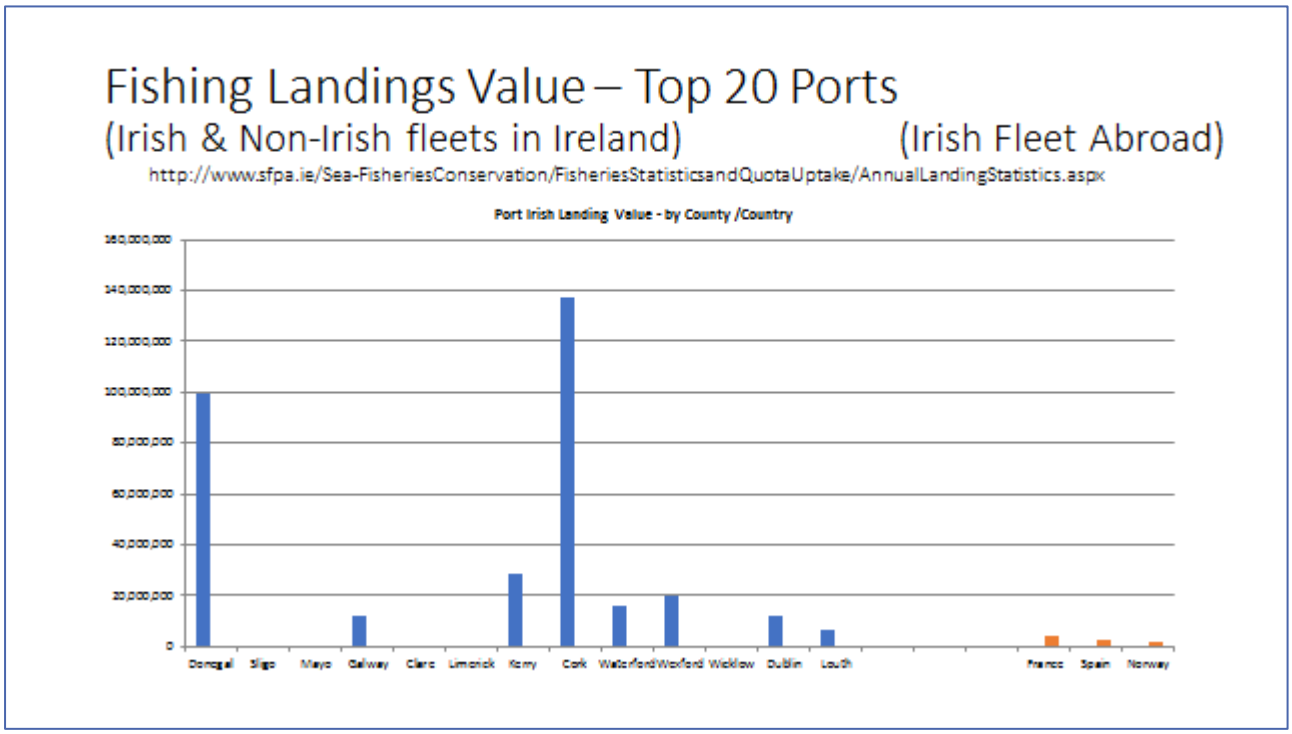
- Justification of compensation levels e.g.: season, spawning / nursery / migration, fishing stocks, number of months fisheries closure, values of landings, sea areas affected, ports affected, gear cleaning, monitoring.
- Consistency with submission in Safety Case – Offshore Environmental Setting.

Potential Data Sources for Fisheries Impacts
Maps - Marine Institute Marine Atlas Theme Fisheries-Offshore http://atlas.marine.ie
Protected or sensitive sites (EU etc), Fishing activity.
Example only (Applicant to check all data at source):



Fisheries landings by port, tonnes and value. Sea Fisheries Protection Authority (SFPA)
http://www.sfpa.ie/Sea-FisheriesConservation/FisheriesStatisticsandQuotaUptake/AnnualLandingStatistics.aspx
Example only, (Applicant to check all data at source):

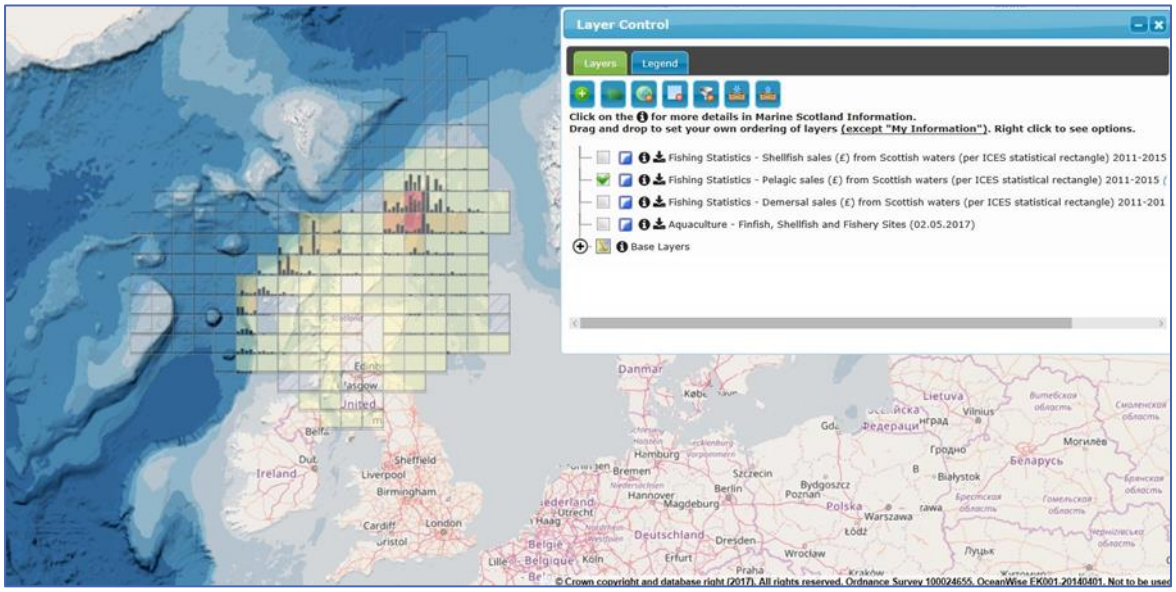




Fisheries Landings per ICES Statistical Rectangle. EU Joint Research Centre host an international database of landings by ICES rectangle that can be downloaded and an online facility to generate maps https://stecf.jrc.ec.europa.eu/dd/effort/graphs-quarter.

Economics of fishing fleet, profitability etc https://stecf.jrc.ec.europa.eu/reports/economic. The 2015 Annual Economic Report on the EU Fishing Fleet (STEF 15-07) See (p 252 Ireland) https://stecf.jrc.ec.europa.eu/documents/43805/1034590/2015-07_STECF+15-07+-+AER+2015_JRC97371.pdf

Transboundary effects - UK Fishing Activities - Marine Scotland
http://marine.gov.scot/information/fishing-tonnage-effort-and-change-maps
Example only (Applicant to check all data at source): Pelagic Sales by ICES Statistical Rectangle 2011-2015

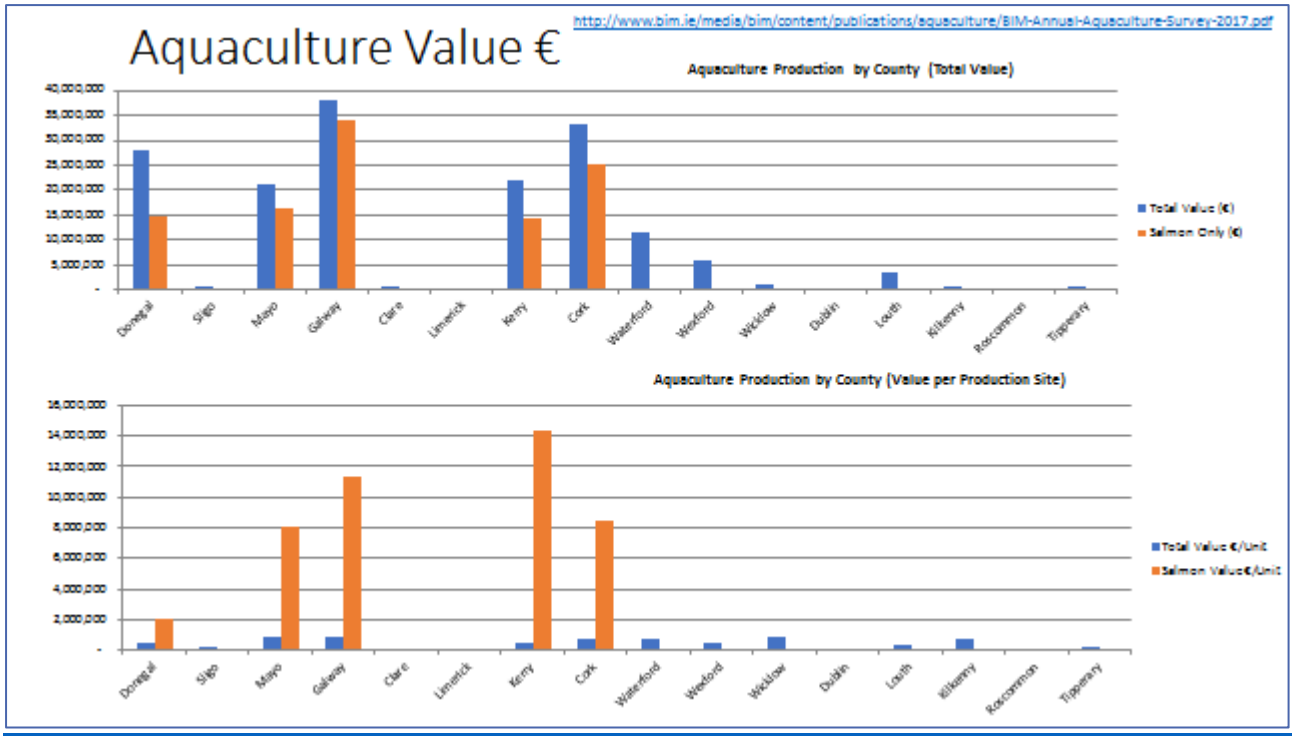


Aquaculture:

- Justification of use of other cost models (e.g. OGUK 2012, Ref.30), modified as necessary.
- Alternative models such as simplified economic impacts - e.g. key counties for salmon are Donegal, Mayo, Galway, Kerry, Cork (up to € 40million annual production each), other aquaculture (up to €15million annual production each), see BIM data below.
- Reference to data sources for direct estimation of costs.
- Justification of compensation levels e.g.: stocks (number of years stock impacted by oiling), number of months closure, loss of revenue, sea areas affected, ports affected, gear cleaning, monitoring.
- Consistency with submission in Safety Case – Offshore Environmental Setting.

Potential Data Sources for Aquaculture Impacts
Aquaculture Maps - Marine Institute Marine Atlas, Theme Fishing – Aquaculture, & Theme Fisheries-Inshore http://atlas.marine.ie

BIM Aquaculture http://www.bim.ie/media/bim/content/publications/aquaculture/BIM-Annual-Aquaculture-Survey-2017.pdf
Example only, (Applicant to check all data at source):



Transboundary Effects – UK Marine Scotland fishing statistics – Aquaculture
http://marine.gov.scot/information/fishing-tonnage-effort-and-change-maps

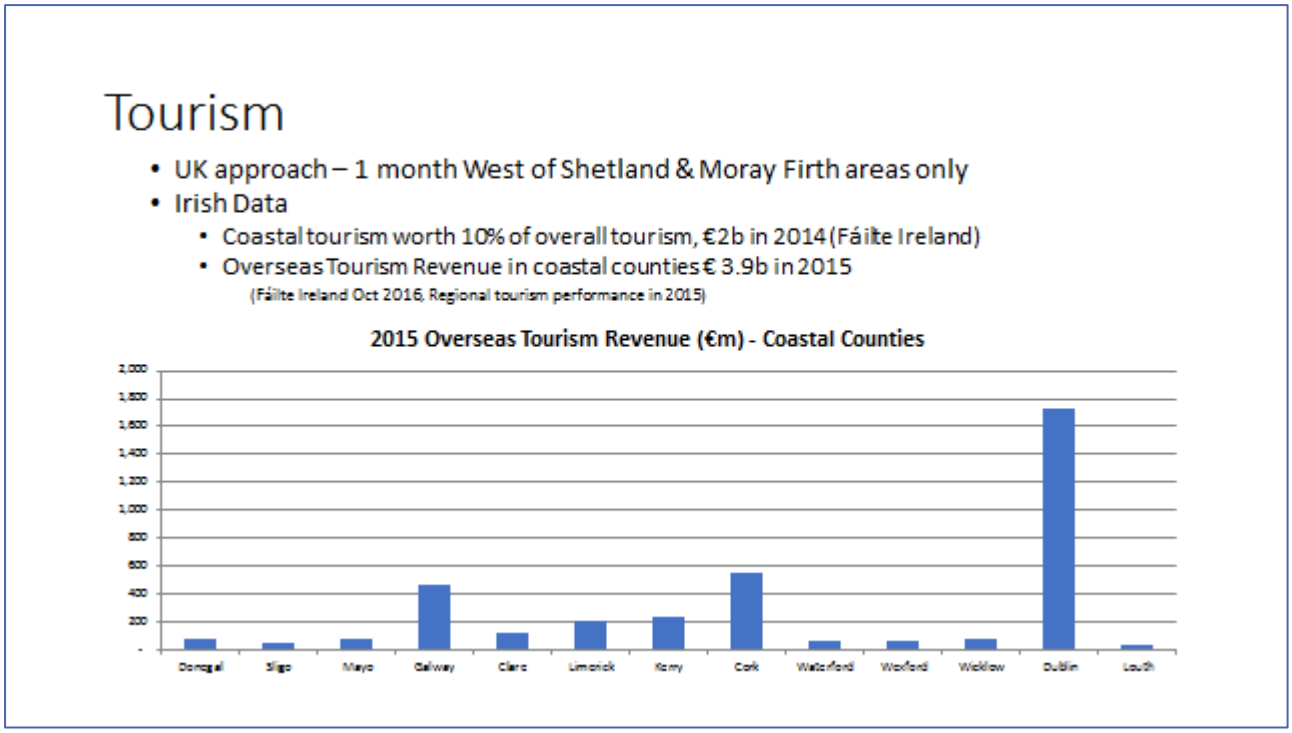
Other Economic Impacts:

- Justification for inclusion / exclusion other economic impacts such as tourism, farming, industrial cooling water intakes, renewables, ferries, ports.

Marine Industry, Marine Tourism Data
SEMRU Report "Ireland's Ocean Economy" Reference Year 2012.
https://www.marine.ie/Home/site-area/irelands-marine-resource/importance-irelands-marine-resource

Fáilte Ireland http://www.failteireland.ie/

Example only, (Applicant to check all data at source):



3. Overall Financial Responsibility

Table 5. FINANCIAL RESPONSIBILITY LIMITS CALCULATIONS – Combined	
	FR Level €
Total for Well Control	
Total For Pollution	
Overall Total FR	

4.1.4 Financial Arrangements

A Petroleum Undertaking (PU) requesting consent to drill a well (an "Applicant") must demonstrate to the DCCAE that sufficient funds are available order to finance its own loss mitigation actions and compensate third parties for loss or damage suffered by them following a major oil and gas incident. [The material issues to be considered in calculating the possible funds required are discussed above in 4.1.1]. Funds may be available from several possible sources, as described in the Australian and Canadian regimes (described above in 3.3.1 Australia and 3.3.2 Canada) including:

- Insurance
- Self-insurance
- The deposit of an amount as a security with a financial institution
- Letter of Credit from a financial institution;
- Bank Letter of Guarantee;
- Mortgage
- Indemnity Bond or other surety;
- Proof of participation in a pooled fund (for offshore drilling, development or production activities); and/or,
- Any other form that is satisfactory to the Regulator.

The Role of Insurance in the Provision of Financial Resources

Since insurance is a contract of financial indemnity between and applicant and its insurers, the insurance market is not able to provide liquid on-demand instruments favouring the DCCAE. For this reason, it is important to understand that insurance cannot be considered a guarantee, but, nevertheless a very valuable financial "resource".

Insurance as a financial indemnity contract is an extremely useful means by which an applicant can demonstrate measurable financial resources, available to the applicant to finance loss mitigation and compensation obligations, and most regulators have introduced requirements for applicants to lodge proof of insurance as proof that they have the financial wherewithal to go some way to meet their control of well, pollution and liability exposures.

We have provided below some general commentary on the particular features of insurance as a financial assurance contract, and some guidance on the key requirements of insurances from a regulator's perspective. In order to try to accommodate the features of these requirements, we have developed suggested guidelines below as well as a suggested bespoke insurance certificate (proposed Appendix A) which we would recommend is completed by each applicant's insurance broker or insurance company, in essence providing assurance of the key requirements.

Insurance Coverage

Insurances generally available to applicants in the marketplace will cover:

1. The costs of controlling wells, putting out fires and making the well(s) safe
2. The cost of re-drilling and/or recompleting the well to the condition it was in prior to the incident
3. The costs of cleaning up pollution caused by the blowout
4. The costs to compensate third parties who have suffered injury/damage/pollution as a result of the blowout or pollution incident (but not "pure economic loss" see 3.3.11 Pure economic loss).

There are often other insurances such as property damage, removal of debris, and protection and indemnity insurances arranged by owners of vessels contracted in to perform work. We would not suggest that these are material to the DCCAE's concerns and would not recommend including requirements for these in the guidelines except for a general statement that the applicant of a license is expected to ensure that they and their contractors should procure insurance in line with industry norms.

Limits of Insurance Coverage

The amount of insurance coverage for single exploration wells which is readily available to applicants may be hotly disputed by market participants. Our guidance on limits typically purchased and realistically available, for such a well would be as follows:

Coverage	Amounts Typically Purchased (100%)	Amount Commercially Available (100%)
Applicants Extra Expense (Control of Well, Re-drilling and Clean-Up)	USD 250,000,000 to USD 500,000,000 (€230 million to €460 million)	Theoretically, the combined limit may be in excess of USD 5 billion, (€4.6 billion) however (a) this may not be economically viable and (b) insurers would be reluctant to be exposed to such large limits without strong justification. Therefore the highest realistic combined limit available for a single well could be expected to be in the region of USD 1 billion (€920 million).
Third Party Liability (including Pollution Liability)	USD 100,000,000 to USD 300,000,000 (€92 million to €276 million)	

Insurer security

Applicants should be expected to procure insurance with financially secure insurers and would advise the DCCAE that they should specify a minimum financial security minimum threshold of S&P "A-" or equivalent from Moodys, A.M Best or Fitch.

Deductibles and Self Insurance

Insurance policies always carry deductibles or excesses. These are generally low level financial (typically USD1 million) thresholds which applicants accept as uninsured, before the insurance policy kicks in to provide coverage. We would not recommend that the DCCAE involve themselves in managing these. However many large oil and gas companies self-insure for large amounts and in many cases insure through 100% owned insurance subsidiaries (captive insurance companies). Such captives may not carry independently assess financial ratings and so the guidelines should be flexible to accommodate them, but always providing the DCCAE with the ultimate right to approve them or otherwise.

Regulator's Interests

Although insurers are often reluctant to provide assurances (such as co-insured status and advanced notice of cancellation) to parties other than their contracted assureds, we strongly recommend that the guidelines clearly include these assurances to the DCCAE, which are generally acceptable to insurers. Examples are co-insured status, advance notice of cancellation and waiver of subrogation that have been referred to already.

Policy Period

Most insurances have a duration of no longer than 12 months and so it is recommended that robust obligations are placed on applicants to provide annual updates of their insurance details. This requirement is already included in the general guidelines.

Guidelines for petroleum authorisation holders, hereafter referred to as "applicant"

The DCCAE should have in place basic Bank Guarantee requirements in support of license applications, the proposed requirements for arrangements to provide indemnities and / or insurance cover for damage arising from loss of well control or other major environmental incidents are in

addition. Recommendations are made regarding Financial Responsibility in support of exploration drilling activities.

Insurance policies

Applicants shall place insurance policies according to the requirements detailed in these guidelines and will annually provide the DCCAE an insurance certificate according to the attached Appendix A.

Requirements with regard to insurance:

1. The applicant, at its expense, shall place and maintain all of the insurance policies which are customary among international oil or gas exploration or production companies, throughout the entire period of the oil right, in accordance with the requirements detailed in these guidelines.

2. The insurance policies should be arranged with insurance companies, ranked "A-" or higher by Standard and Poor's, or equivalent rating from a similar international credit ratings company.

3. If the insurance is placed with an insurance company that is rated according to this clause and the said rating drops during the insurance period that insurance company will be able to continue participating in the insurance program for a period of 60 days from the day the rating was dropped, unless the DCCAE approves the participation of that insurance company.

4. Insurance arranged with a "captive" insurance company may be taken out as long as the "captive" or its reinsurers are rated "A-" or higher by Standard and Poor's, or equivalent rating from a similar international ratings company.

5. The insurance policies shall have conditions suitable to cover the scope of operations of the applicant and the exposures involved in its activities, and shall include coverage of, at least, the following risks (but shall not be limited to them):

    a. Loss or damage to facilities, equipment and other assets used for [onshore or] offshore gas and oil production, as applicable; in addition, in respect of facilities, equipment and essential properties where the applicant leases property from others, the applicant will undertake to oblige the lessor to place property damage and removal of debris coverage in respect of those facilities, equipment and properties.

    b. Control of the well, and any other contamination or environmental damage caused as a result of oil and gas exploration [or production] activities, [onshore or] offshore, as applicable;

    c. If the applicant is a member of OPOL, (see 3.3.8) then the insurance coverage should reflect this;

    d. Loss of property or damage or bodily injury caused to any third party in the course of the oil and gas exploration [or production] activities, [onshore or] offshore, as applicable;

    e. Third Party Liability insurance should have any exclusions for costs arising from well operations deleted;

f. The cost of removal of wreckage and clean-up operations required as a result of an accident occurring in the course of oil and gas exploration [or production] operations, [onshore or] offshore.

g The applicant shall waive all rights against DCCAE, and shall ensure that its insurers provide a waiver of subrogation in all insurances referred to above.

h. The applicant shall undertake to use its best endeavours to ensure that all contractors performing operations on behalf of the applicant carry insurance to cover the risks covered that would otherwise be covered by the applicant's insurance, as detailed above. The insurance required shall cover, in respect of the activities performed by the contractor, the following risks if applicable: Protection and Indemnity and Third-Party Liability and Aviation Liability. The applicant shall require the contractor to provide insurance for removal of wreck and clean-up of pollution emanating from the wreck. Upon demand from the DCCAE, the applicant is required to provide the DCCAE with a proof of these insurance policies placed by the contractor. The applicant shall also use its best endeavours to ensure that the contractors have their insurers include a waiver of subrogation toward DCCAE. In any event, contractor will waive all rights of recourse against the DCCAE. This is giving ultimate protection to the DCCAE. An insurer can only "subrogate" against a third party if it has the legal right to do so. If the contractor has waived such rights, the contractors insurers cannot either.

i. Simultaneously with the submission of the application for well work activities, the applicant shall submit a detailed insurance plan in respect of the limits to be purchased for the approval of the DCCAE., This approval is a condition for: authorization of drilling; [or commencement of the construction; and commencement of the production] for such period, and the insurance policies thereunder must be taken out accordingly. The plan shall include a clear methodology prepared by the applicant for evaluating robust assessments of the cost of controlling a worst case wild well blowout, cleaning up associated pollution, and redrilling the affected well.

j. The applicant shall ensure that the liability policies under the approved insurance plan shall include the DCCAE as an additional insured party, covering its liability for any act and/or omission by the applicant, and that it is stated in each of the policies that the policy may not be cancelled unless notice was given to the DCCAE by the applicant or by the insurance broker, at least 30 days prior to the date of cancellation.

k. 30 days prior to any exploration, construction and production phase, and thereafter, once a year, the applicant shall submit to the DCCAE a summary of the insurance policies taken out under this section; the content of the summary and the manner of its submission shall be in accordance with APPENDIX 2 EXAMPLE INSURANCE CERTIFICATE which requires confirmation from the insurance company, or from an insurance broker to the satisfaction of the DCCAE, stating that the policies have been placed fully in accordance with the provisions of this [directive] with regard to insurance.

a) Upon the DCCAE's demand, the applicant shall provide the DCCAE with:

i) Explanations with regard to the content of the insurance, type of insurance, scope, and liabilities thereunder;

ii) Assessments with regard to the type and extent of risks involved in the actions of the applicant;

iii) Any other information relating to insurance under this section which is necessary in the DCCAE's opinion at any time at his discretion.

b) For the avoidance of doubt, providing Appendix 2 to the DCCAE shall in no way lessen the applicant's responsibility with regard to its duty to maintain the accepted level of insurance as stated in this section.

c) The DCCAE may require the applicant to act, at its own expense, to implement assessments that are reasonably required, in the DCCAE's opinion, to determine policies' extent of suitability.

d) The applicant shall comply with all conditions and warranties contained in the insurance policies, including the payment of premium as required under the policy.

e) Should notice of cancellation of insurance be sent, the applicant shall act to remove the reason for cancellation, or shall act immediately to obtain alternative insurance, and shall inform the DCCAE of the actions taken to this end.

f) In the event that the applicant did not comply with the requirements of the insurance in accordance with these guidelines, or that the insurance was cancelled or expired for any reason whatsoever, including failure to pay the insurance premium, and the applicant did not arrange a new alternate insurance, the DCCAE may, should he see fit, pay the premium instead of the applicant, and forfeit the guarantee in connection with the license, or part of it, in order to cover payment of the premium or the costs involved therein, and any other costs involved in achieving the insurance required in accordance with these guidelines.

Policy Payment Wording

Where applicants cannot demonstrate they have the financial capability to fund a well control/pollution event, they may be required to arrange their Applicants Extra Expense insurance, on a “pay on behalf” basis, as opposed to the traditional “indemnity” basis. If this mechanism is pre-agreed by insurers at the outset of the insurance policy, Insurers will then pay contractors and third parties directly, following confirmation from a pre-appointed loss adjuster that the claim is valid.

If an applicant is unable to provide such “pay on behalf” phraseology, they may be required to provide other evidence of financial assurance such as those detailed in the following section *Other Methods of Financial Assurance.*

Other Methods of Financial Assurance

Applicants may propose other forms of indemnity to cover the costs of liabilities, including measures such as those envisaged in the Canadian guidelines which include the following options (with templates): “Funding Arrangements must be accompanied by one or more of the following documents that substantiate it to the satisfaction of the [Board]:

- Most recent audited financial statements and credit rating*;
- Promissory note;
- An insurance policy or a certificate of insurance;
- An escrow agreement;
- A letter of credit;
- A line of credit;
- A guarantee agreement; and/or,
- A security bond or pledge agreement or an indemnity bond or suretyship agreement "

Note on joint and several liability: Notwithstanding any advice in the guidance, or financial assurance provided it should be clear that the provision within the Department's licensing terms will prevail.

Irish Guidelines on decommissioning already require provision of security for the costs of decommissioning and similar instruments may be acceptable to the Minister for the purposes of Financial Responsibility (including the provision for prompt payment). These are:

"

- *A guarantee such as:*
    - *An irrevocable stand-by letter of credit, which;*
        - *has been provided by the applicant for the purpose of securing all its obligations under Financial Responsibility, and*
        - *Is in the possession of the Minister, and*
        - *Is issues by a Bank or Banks or other financial institution based in London or having a lending office in London (which is not an affiliate of the applicant) rated AA- or better on its or their senior unsubordinated , unsecured long-term debt by Standard & Poors or Aa3 by Moody's (or in the event such Agencies cease to publish an equivalent level by another rating agency approved by the Operating Committee and the Minister) or such other comparable Bank as may have been approved by the Applicant, and*
        - *Is payable on demand in Dublin at the written demand of the Minister, and*
        - *Is issued for a minimum period of one year such period commencing on the date drilling commences, or anniversary thereof as the case may be; or*
    - *A guarantee or bond, which*
        - *has been provided by the applicant for the purpose of securing all its obligations under Financial Responsibility, and*
        - *Is in the possession of the Minister, and*
        - *Is issues by an Affiliate quoted on a recognised stock exchange, rated AA / Aa3- or better on its or their senior unsubordinated , unsecured long-term debt by Standard & Poors or Moody's respectively (or in the event such Agencies cease to publish an equivalent level by another rating agency approved by the Operating Committee and the Minister), and*
        - *Is payable on demand in Dublin at the written demand of the Minister, and*
        - *Is issued for a minimum period of one year such period commencing on the date drilling commences, or anniversary thereof as the case may be; or*

- *Any other form of security which may be approved by the Operating Committee and the Minister from time to time*

Or,

- *A payment into a Trust Fund*"

4.2 Method for assessment of an Application – DCCAE Protocol

The DCCAE should first verify that the applicant has provided the following details and analyses for input to the costs estimation and that it is consistent with the information submitted to the CER/IRCG for their assessments:

- Identification of Hazards and Assessments of Risks from proposed wells
- Description of the Natural and Human Environment which could be affected by a release
- Well design and control systems
- Description of elements of the Safety Management System and Procedures used to ensure integrity of containment of well fluids
- Subsurface Zones prognosis
- Expected or potential properties of well fluids that can be anticipated (temperature, pressure, gas and / or crude oil types, sour fluids, etc).
- Mitigation measures
- Oil spill response plan and costs
- Availability, time to deploy and Cost of Well Capping
- Availability of second drilling unit, time to mobilise and time to drill a relief well
- Duration of release
- Extent of potential contamination from a worst case, full bore release
- Impact of contamination – geographical, activities affected and financial impacts

The DCCAE assessment process should be consistent with and coordinated with the rest of the approvals processes and needs to be included in the Permissioning Process Flow Chart. The following are required for the assessment of financial assurances:

- Insurance policies and financial capacity of the market or the licensee
- Alternative means of ensuring adequate financial resources are available.
- Mechanism for prompt payment of claims by third parties.

The proposed protocol establishes a format for recording the essential information provided in the process, ensuring that vital information such as method of certification of Financial Responsibility, compliance and contact details of relevant parties are captured and accessible in addition to copies of the certification and the checklist. Protocols for the DCCAE assessment are included in Appendix 5.
The assessment can then proceed to consider the details of the information provided:

4.2.1 Assessment of Technical Measures and Costs

A pre-requisite of the DCCAE's assessment will be the approval of applicant's demonstration of satisfactory prevention measures by the CER as evidenced by the issue of a Safety Permit and the approval of the Oil Spill Contingency Plan by the IRCG which define the mitigation measures, to be included in the costing. To demonstrate that all the required costs have been calculated on the basis of a sound analysis the following sub-sections describe the information required by the DCCAE:

4.2.1.1 Assessing well design and construction plans and emergency well control plans

DCCAE will require no information additional to that submitted to the ICB and CER in the overall safety case submission provided that the following information is included in the Applicant's calculation of the cost of well control:

- The AFE for the planned well work activity
- The AFE and time to deploy a MODU, complete relief well operations and well kill operations
- The time required to deploy a capping stack device, if appropriate, and the cost of such activity
- The estimated maximum full bore uncontrolled flow rate in the event of a loss of well control and the physical and chemical nature of the reservoir fluids expected to be released. These estimates to be used in the spill modelling

4.2.1.2 Assessing Oil Spill Contingency Plans

Under current arrangements there appear to be two levels of assessment of oil spill contingency plans.

A. Assessment by Independent Review Body (IRB)

- CER has established a Compliance Assurance System (CER/16/016), part of the Safety Case Guidelines under the Petroleum Safety Framework. This system contains 3 elements:
  - Verification of compliance with performance standards in relation to Safety & Environmentally Critical Elements (SECE's).
  - Safety & Environmental performance reporting requirements.
  - Independent Safety Case Review
- The independent safety case review is carried out by an Independent Review Body (IRB) appointed by the well applicant but approved by CER.
- CER's Safety Case Guidance document (CER16/024) notes that the content of a Well Work Safety Case should include Emergency Response requirements.
- The results of an independent safety case review are submitted by the applicant to CER in a standardised format. The review report should demonstrate that all actions and findings have been closed out.

B. Acceptance and Approval by Regulatory Agencies

- The Sea Pollution (Amendment) Act 1999 requires that each applicant of an offshore unit shall have in place an oil pollution emergency plan, and that these plans shall be approved by the IRCG.
- The Commission for Energy Regulation (CER) is the safety regulator for offshore petroleum exploration and extraction activities in Ireland. In order for a designated petroleum activity to be undertaken offshore Ireland, the applicant must have a safety permit for that activity. To issue a safety permit, the CER must assess and accept a Safety Case which includes a description of elements of the oil pollution emergency plan.

- On 5th May 2017 NRG spoke to Roisin Cullinan (Regulatory Manager at CER) with a view to understanding how these approvals and assessments are carried out. It became apparent that IRCG representatives attend a number of CER's meeting with prospective well applicants in the course of safety case acceptance discussions in order to address oil spill response planning issues.

Given that CER and IRCG are working to detailed and comprehensive guidelines in relation to oil spill response planning (see section 4.1.1.2); and that compliance with these requirements are assessed by IRB, CER and IRCG before the plans are accepted / approved, we believe that effective assessment arrangements are already in place regarding Oil Spill Contingency Planning for Exploration & Appraisal drilling activities.

The additional requirement to assure Financial Responsibility requirements are met will be the requirement to evaluate the potential costs of implementing the plans and arrangements for payment of those incurring the costs.

4.2.1.3 Assessment of Technical and Spill Costs

Calculations of financial responsibility limits submitted by applicants of oil and gas exploration and production operations offshore Ireland should conform to the requirements of "Methodology for Calculation of Financial Responsibility Limits" described in this report.

The assessment protocol will be used by responsible parties within the Department of Communications, Climate Action & Environment (DCCAE), or their appointed agents to assess the extent to which calculations for financial responsibility limits meet the requirements of this methodology.

Note that the "worst case scenario" used for well control cost estimates and spill modelling should be consistent with each other and also the Safety Case submission to CER, and OSRP agreed with IRCG.

Where material shortcomings are identified, these will be noted as 'observations' within the following assessment protocol. Specific recommendations (and associated deadlines) will be documented within the completed protocol in order to remedy these shortcomings.

The Assessment Protocol is given in Appendix 5 and will cover the following main elements for the estimation of technical and spill costs:

Capping Stack
Relief Well
Spill Modelling
Estimated Cost of Oil Spill Response & Clean-up
Estimated Cost of Impacts on Fisheries & Aquaculture
Estimate of any other Economic Costs deemed relevant
Financial Responsibility (FR) Cost Estimate

4.2.2 Assessment of Financial Arrangements

Insurance

As referred to in the recommendations above (4.1.4 Financial Arrangements), it is considered best practice to include a pro-forma certificate in the guidance, which will be required to be signed by the applicant's insurance broker or insurer. This is provided in APPENDIX 2 EXAMPLE INSURANCE CERTIFICATE which can be applied at any stage in a field's life.

a. Applicants' Insurance (as per APPENDIX 2 EXAMPLE INSURANCE CERTIFICATE.)

   i. If a prescriptive insurance certificate is not required to be completed, then the risk for any regulator is that it will receive a great variety of documents in various forms from a number of different sources, making validation difficult and time consuming, frequently requiring much dialogue with the applicant and subsequent iterations
   ii. The employment of an expert to check the certificates is recommended.
   iii. Check the validity of the Effective Periods shown. Quite regularly the expiry date provided in these sorts of certificates may have passed!
   iv. Make sure it's signed.
   v. As noted above, there is also scope to have the Applicant of a license responsible for collation of certificates from all co-venturers. Note for exploration activities, each co-venturer is likely to arrange its own insurance for its equity share of the risk.

b. Oil Spill Response Planning

c. The Irish Coast Guard (IRCG), a part of the Department of Transport, Tourism & Sport (DTTAS), has the responsibility for organising and directing spill response at sea or in coastal areas. The service also directs and co-ordinates the function of both harbour and local authorities, who undertake clean-up of oil from beaches and nearshore waters. An electronic copy of the Irish draft National Contingency Plan (dated January 2013) is available via the DTTAS website. This document provides detailed information on how a significant pollution incident would be managed offshore Ireland.

The Sea Pollution (Amendment) Act 1999 also requires that each applicant of an offshore unit shall have in place an oil pollution emergency plan, and that these plans shall be approved by the IRCG.

The Commission for Energy Regulation (CER) is the safety regulator for offshore petroleum exploration and extraction activities in Ireland. The CER regulates the industry in accordance with the Petroleum Safety Framework; a collection of regulations, written regulatory documents and procedures, developed based on the requirements of the Act. In order for a designated petroleum activity to be undertaken offshore Ireland, the applicant must have a safety permit for that activity. To issue a safety permit, the CER must assess and accept a Safety Case. CER has published a guidance document in relation to Safety Case requirements (CER16/024). Section 14 of this document defines emergency response requirements including those required to respond to an offshore major environmental incident.

We have used the contents of the environmental elements of the CER Safety Case guideline along with the draft National Plan to compare these requirements with those in industry-wide spill response guidelines.

We have also compared these guidelines with those in place in the UK. This is in no way an attempt to compare the two frameworks; rather to recognise that any applicant or well management contractor used to preparing OPEPs for UKCS operations is likely to have planned for similar output information to be available in relation to operations offshore Ireland.

The detailed review findings are given in Section 3.2.2.3 Emergency Planning Arrangements.:

Thus – we propose additional spill modelling criteria within the FR Methodology (see 4.1.3 Framework for Calculating Financial Responsibility Limits) which is in line with the latest approach expected by the IRCG (Ref – discussions between DCCAE & IRCG 19.6.2017) see also Section 3.2.2.3 Emergency Planning Arrangements.

- Justification for the choice of spill model utilised for predictive modelling. For example, some models are better suited to assess subsea as opposed to surface releases.
- Justification for the blowout flowrate and fluid properties that are to be modelled.
- Justification for the duration of flow used. This would typically be consistent with the amount of time to deploy a capping stack or drill a relief well.
- Confirmation of the location of release that is being modelled. This would normally be the proposed well location and would take into account whether the blowout is surface or subsea.
- Information on the type of stochastic modelling work that has been completed to identify a reasonable worst-case scenario (e.g. number of runs, duration of runs, oil thickness modelled, output data presentation).
- Information on the metocean data that has been used in the modelling (including relevant seasons that have been modelled).
- Information on the worst-case scenario deterministic run(s) that have been selected to identify all potentially impacted shorelines, environmentally sensitive marine and coastal environments, marine protected areas and transboundary impacts. Typically, this information would include duration of runs, oil thickness modelled and output data presentation.
- The modelling outputs should also include estimates of the volumes of oil or emulsion stranded.

Following the workshop and subsequent discussions with IRCG, the IRCG have clarified their latest requirements for oil spill modelling relevant to OSCP (IRCG to DCCAE, 19.June 2017). The additional guidance proposed for FR above is consistent with this and is broadly based on UK requirements .

The latest IRCG Guidance (19 June 2017) is as follows:

> "In the absence of a specific guidance document for modelling, applicants should use until furthered notified:
>
> > United Kingdom Department of Business, Energy and Industrial Strategy - GUIDANCE NOTES FOR PREPARING OIL POLLUTION EMERGENCY PLANS For Offshore Oil and Gas Installations and Relevant Oil Handling Facilities (December 2016)" see http://www.hse.gov.uk/osdr/assets/docs/opep-guidance-rev3-dec-2016.pdf and Appendix B in particular
>
> Further information required should include -
>
> > The Modelling Information must outline detailed information -
> >
> > 1. Model will offer data over a period of 1 year
> > 2. Time periods should be at one month intervals (unless agreed otherwise).
> > 3. The oil amounts should be presented in tabular form and quantified.

4. Information presented should include Special Areas and Environmentally Sensitive Areas etc.
5. Information required will include
   a. Amount of oil reaching Landfall – Predicted locations within the Irish EEZ should specify the geographical location of the beaching.
   b. Amount of oil dispersed in water column – Comment on expected fate of oil – will, when, where will this oil move to?
   This should be done on a monthly basis to include time periods for oil to further beach.
   c. Amount of oil expected to be on seabed – details of oil pattern on seabed."

4.2.3 Framework for Calculating Financial Responsibility Limits

This proposed framework will be used by applicants to calculate appropriate financial responsibility levels which should be demonstrated by them to the Regulator. Note that the Protocol for Assessment of the applicant's submission is given in Appendix 5 and may be used as a guide to applicants in preparing their submission.

For Financial Responsibility, overall costs can be considered as:

- Control of the well
  - Installation of capping device
  - Drilling relief well

- Pollution remediation and compensation
  - Clean-up operations (including scientific studies & monitoring)
  - Economic loss

Regarding the pollution elements, we are proposing that applicants should use spill modelling to identify impacts directly and use Irish (or transboundary data, if appropriate) to calculate potential costs. Applicants may use a scoring framework similar to that used in the UK and in Australia, but the framework would need to be modified (by applicants) to account for differences between the countries concerned, including differences in the environment, economic activity and costs. In addition, by making use of data from oil spill modelling being carried out for the OSCP, and remaining consistent with the Safety Case submission, the Applicant's requirements are streamlined. Applicants would undertake oil spill modelling for a credible worst case scenario, track the oil spill until it dissipated or beached, and then assess the locations affected and the resulting pollution damage, such as the open sea including fishing grounds, shoreline oiling affecting economic activity and the spill response required.

Further development of a cost model for Ireland, as the FR process develops, may be beneficial. Calibration of the cost model could be based on the clean-up costs per length of oiled coastline and the volume of beached, while economic data could be based on the counties oiled and the fishing, aquaculture and tourism earnings for each county. Cost estimation could be further streamlined, for example, if fisheries sensitivity maps were created - from data already collected for submission to the EU, showing fishing activity or catch values per ICES statistical rectangle.

1. Control of Well

Using the Guidelines in Section 4.1.1.1, and using data consistent with the Safety Case and agreements with IRCG, the applicant should complete Table 1 and also submit details of all background calculations and justifications.

Table 1. FINANCIAL RESPONSIBILITY LIMITS CALCULATIONS – Well Control

Protocol Element	Consideration	Applicable Y/N	Estimated Cost (€)
Well	The well will not flow without artificial lift (and therefore it is not considered necessary to assess the cost of controlling the well)		n/a
Capping Device	In the event of loss of well control – it is anticipated that a capping device would be installed as agreed with IRCG.		
Relief Well	The applicant confirms that relief well plans and associated costs have been submitted.		
		Total for Well Control	

2. Pollution Remediation and Compensation

Using data consistent with the Safety Case and agreements with IRCG, the applicant should complete Table 2 and also submit details of all background calculations and justifications.

Table 2. FINANCIAL RESPONSIBILITY LIMITS CALCULATIONS – Pollution Remediation & Compensation

Protocol Element	Consideration	Estimated Cost (€)
Impact Assessment	Costs of scientific studies to determine nature & extent of environmental impact	
Oil-spill Response & Clean-up	Cost of oil-spill response and clean-up	
Fisheries	Potential economic impact on fisheries	
Aquaculture	Potential Economic impact on aquaculture	
Other economic impacts	Other potential economic impacts, such as tourism, marine industries, and transboundary impacts.	
	Total for Pollution Remediation & Compensation	

Whilst the Assessment Protocol in Appendix 5 may be used as guidance for applicants, the following sections give additional points for applicants to consider.

Worst Case Scenario & Spill Modelling:

- Justification for the choice of spill model utilised for predictive modelling. For example, some models are better suited to assess subsea as opposed to surface releases.
- Justification for the blowout flowrate and fluid properties that are to be modelled.
- Justification for the duration of flow used. This would typically be consistent with the amount of time to deploy a capping stack or drill a relief well.
- Confirmation of the location of release that is being modelled. This would normally be the proposed well location and would take into account whether the blowout is surface or subsea.
- Information on the type of stochastic modelling work that has been completed to identify a reasonable worst-case scenario (eg number of runs, duration of runs, oil thickness modelled, output data presentation).
- Information on the metocean data that has been used in the modelling (inc. relevant seasons that have been modelled).
- Information on the worst-case scenario deterministic run(s) that have been selected to identify all potentially impacted shorelines, environmentally sensitive marine and coastal environments, marine protected areas and transboundary impacts. Typically, this information would include duration of runs, oil thickness modelled and output data presentation.
- The modelling outputs should also include estimates of the volumes of oil or emulsion stranded.

Impact Assessment:

- Scientific studies to determine the nature and extent of the environmental impact (in addition to those required to determine the appropriate spill response)
- Studies to determine whether or not reinstatement measures are necessary and feasible, if spill modelling identifies potential damage to protected species and habitats (under EU Habitats and Birds Directives)..

Cost of Oil-spill Response & Clean-up:

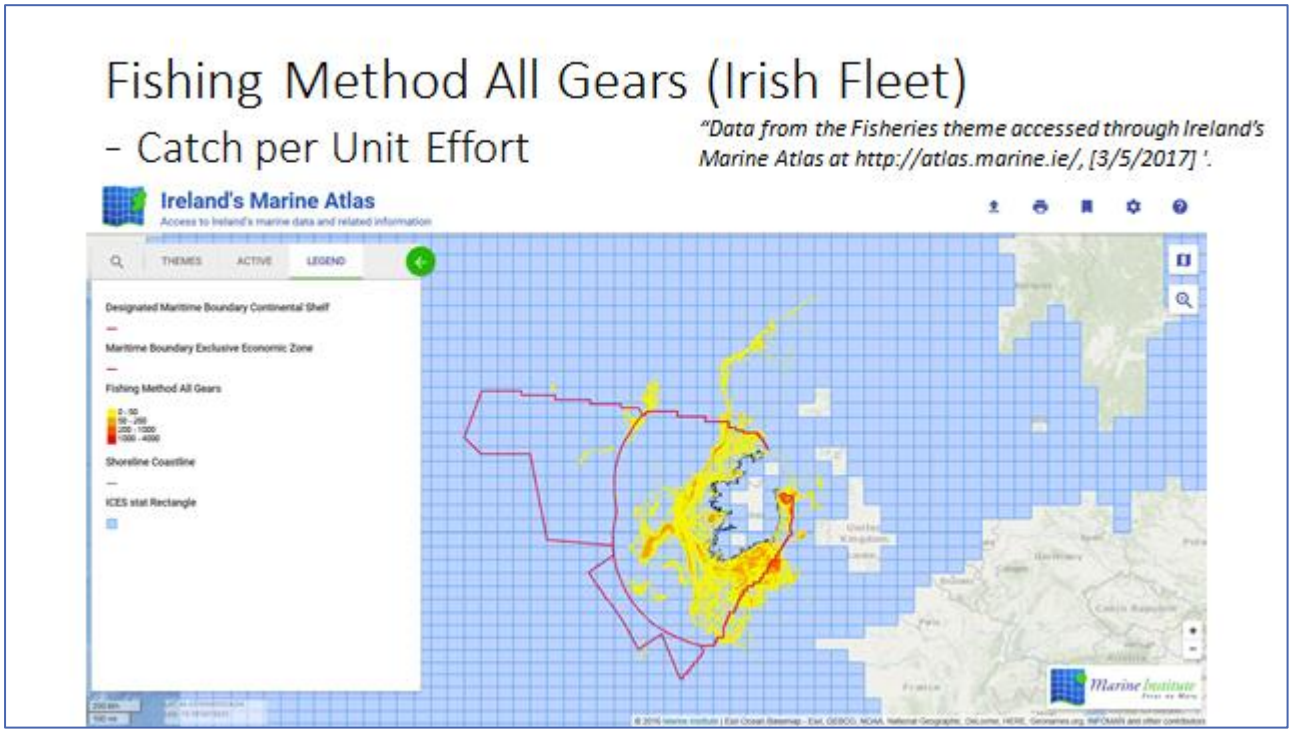
- Justification of use of other cost models, modified as necessary. (e.g. OGUK 2012, Ref.30 may be approximated to minimum costs for Tier 3 Response of £70m plus variable costs £1,000 - £2,500 per volume beached (m3 emulsion).
- Reference to data sources where applicants are using direct estimates of response and clean-up costs.

Fisheries:

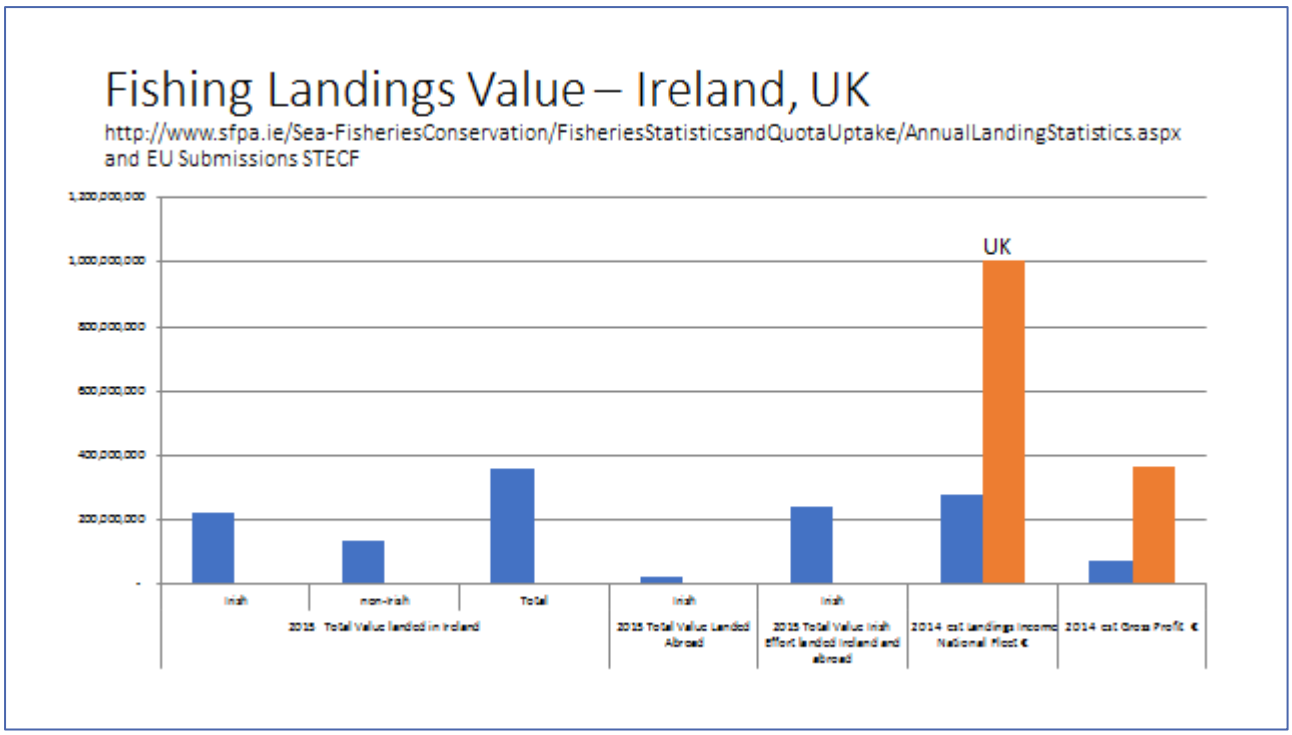
- Justification of use of other cost models (e.g. OGUK 2012, Ref.30), modified as necessary.
- Alternative models such as simplified economic impacts - e.g. key ports impacted by county - Cork (€ 140million annual landings) Donegal (€ 100million annual landings), others (up to €30million annual landings each), see SFPA data below.
- Reference to data sources for direct estimation of costs.

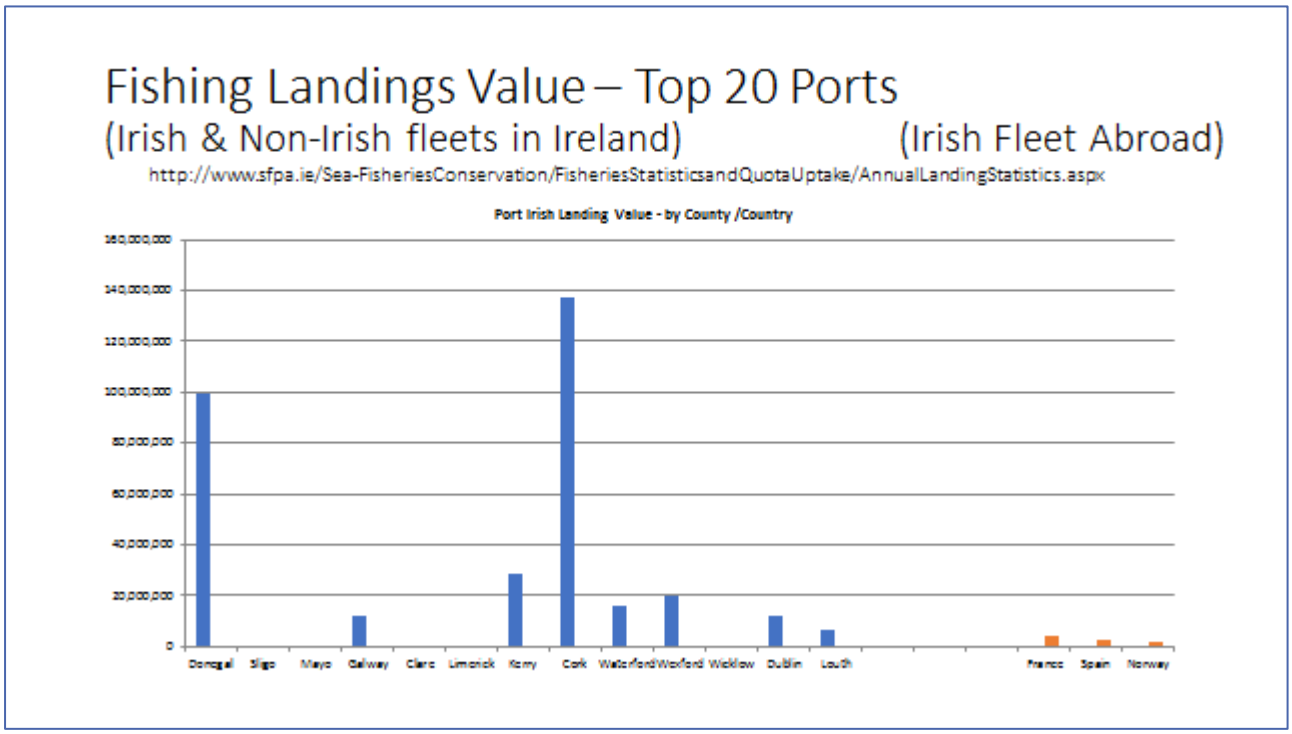
- Justification of compensation levels e.g.: season, spawning / nursery / migration, fishing stocks, number of months fisheries closure, values of landings, sea areas affected, ports affected, gear cleaning, monitoring.
- Consistency with submission in Safety Case – Offshore Environmental Setting.

Potential Data Sources for Fisheries Impacts
Maps - Marine Institute Marine Atlas Theme Fisheries-Offshore http://atlas.marine.ie
Protected or sensitive sites (EU etc), Fishing activity.
Example only (Applicant to check all data at source):



Fisheries landings by port, tonnes and value. Sea Fisheries Protection Authority (SFPA)
http://www.sfpa.ie/Sea-FisheriesConservation/FisheriesStatisticsandQuotaUptake/AnnualLandingStatistics.aspx
Example only, (Applicant to check all data at source):

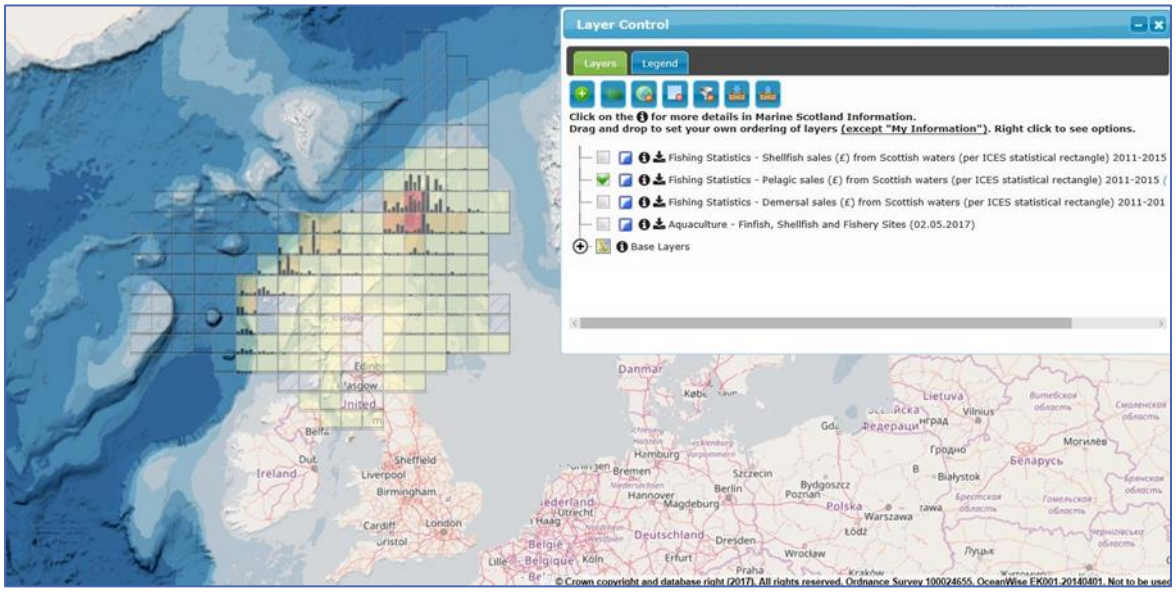




Fisheries Landings per ICES Statistical Rectangle. EU Joint Research Centre host an international database of landings by ICES rectangle that can be downloaded and an online facility to generate maps https://stecf.jrc.ec.europa.eu/dd/effort/graphs-quarter.

Economics of fishing fleet, profitability etc https://stecf.jrc.ec.europa.eu/reports/economic. The 2015 Annual Economic Report on the EU Fishing Fleet (STEF 15-07) See (p 252 Ireland) https://stecf.jrc.ec.europa.eu/documents/43805/1034590/2015-07_STECF+15-07+-+AER+2015_JRC97371.pdf

Transboundary effects - UK Fishing Activities - Marine Scotland
http://marine.gov.scot/information/fishing-tonnage-effort-and-change-maps
Example only (Applicant to check all data at source): Pelagic Sales by ICES Statistical Rectangle 2011-2015

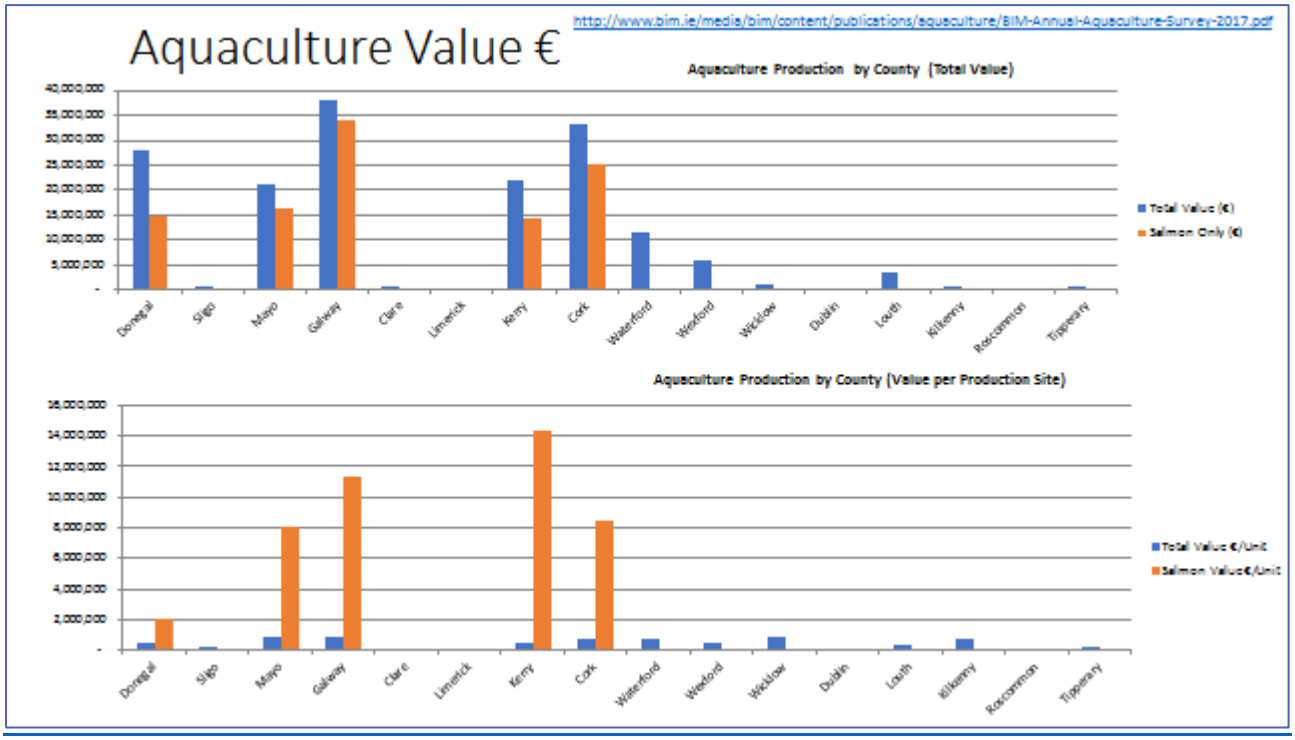


Aquaculture:

- Justification of use of other cost models (e.g. OGUK 2012, Ref.30), modified as necessary.
- Alternative models such as simplified economic impacts - e.g. key counties for salmon are Donegal, Mayo, Galway, Kerry, Cork (up to € 40million annual production each), other aquaculture (up to €15million annual production each), see BIM data below.
- Reference to data sources for direct estimation of costs.
- Justification of compensation levels e.g.: stocks (number of years stock impacted by oiling), number of months closure, loss of revenue, sea areas affected, ports affected, gear cleaning, monitoring.
- Consistency with submission in Safety Case – Offshore Environmental Setting.

Potential Data Sources for Aquaculture Impacts
Aquaculture Maps - Marine Institute Marine Atlas, Theme Fishing – Aquaculture, & Theme Fisheries-Inshore http://atlas.marine.ie

BIM Aquaculture http://www.bim.ie/media/bim/content/publications/aquaculture/BIM-Annual-Aquaculture-Survey-2017.pdf
Example only, (Applicant to check all data at source):



Transboundary Effects – UK Marine Scotland fishing statistics – Aquaculture
http://marine.gov.scot/information/fishing-tonnage-effort-and-change-maps

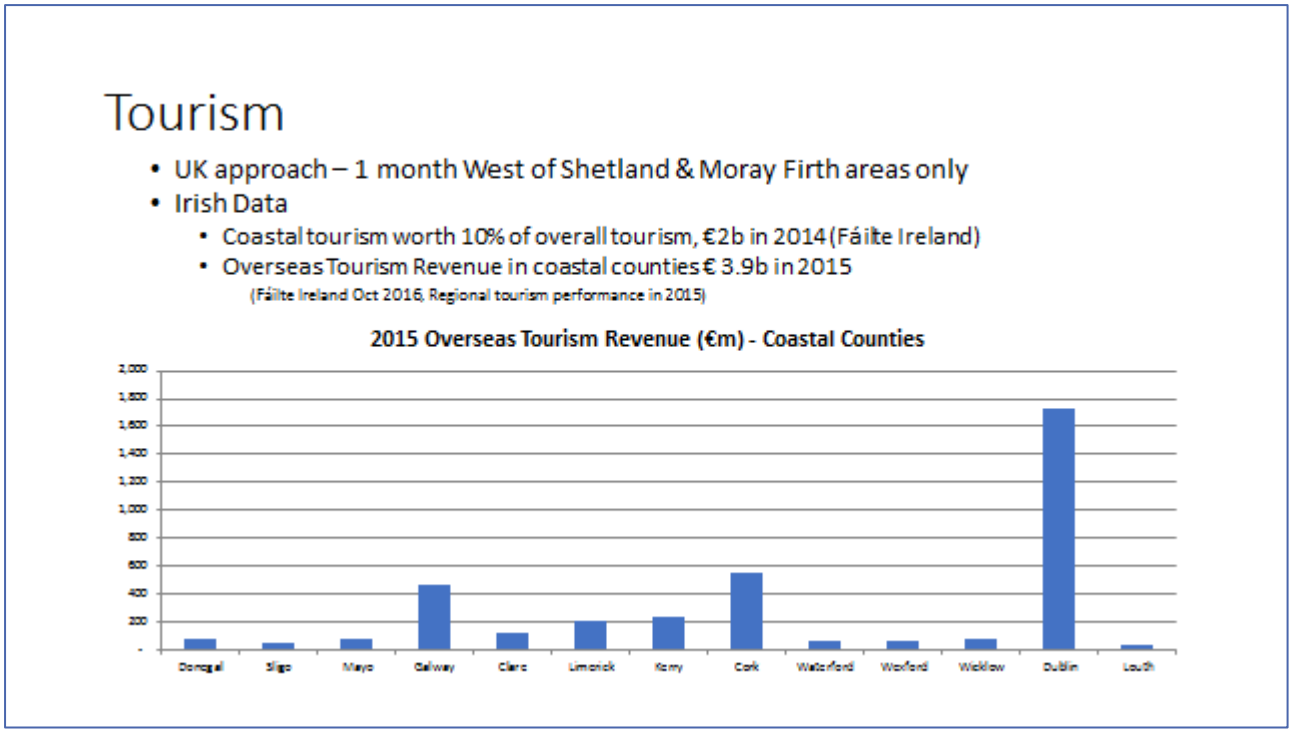
Other Economic Impacts:

- Justification for inclusion / exclusion other economic impacts such as tourism, farming, industrial cooling water intakes, renewables, ferries, ports.

Marine Industry, Marine Tourism Data
SEMRU Report "Ireland's Ocean Economy" Reference Year 2012.
https://www.marine.ie/Home/site-area/irelands-marine-resource/importance-irelands-marine-resource

Fáilte Ireland http://www.failteireland.ie/

Example only, (Applicant to check all data at source):



3. Overall Financial Responsibility

Table 5. FINANCIAL RESPONSIBILITY LIMITS CALCULATIONS – Combined	
	FR Level €
Total for Well Control	
Total For Pollution	
Overall Total FR	

d. 4.1.4 Financial Arrangements – Insurance Policies)

i. We would consider the most important contractor policies to be provided evidence of are:

1. Protection & Indemnity ("P&I")
2. Third Party Liability (to the extent not covered under the P&I)
3. Simply stated, P&I can be considered third party liability for a marine vessel. Most importantly it provides coverage for pollution from that vessel, and removal of wreck of the vessel itself should it sink.
4. P&I cover is typically provided by a P&I club (which is a mutual insurance company owned by its members), although in some circumstances in can be provided as part of a marine liability insurance policy from the commercial market.
5. We consider that P&I cover provided by any of the members of the International Group of P&I clubs to be acceptable.
6. P&I Clubs provide Protective Co-Assured status

e. Insurance Glossary

i. Applicant's Expense Insurance ("OEE") provides a combined single limit of liability per occurrence covering three principle areas:

1. Reimbursement of the Insured for actual costs and/or expenses incurred in controlling a well
2. Reimbursement of the Insured for actual costs and/or expenses incurred to re-drill a well (which was previously out of control as in i. above), but only down to the same depth as was reached at the time of a well "blowout". Indemnification of the Insured for costs and liabilities arising out of seepage and pollution, clean-up and contamination.

ii. The most common insurance policy form used for OEE is known as E.E.D. 8/86. "86" being the year this was developed. It has stood the test of time!

iii. Waiver of Subrogation. Without a waiver once an insurer has paid a claim to its insured it is entitled to makes recoveries (subrogate) from any party that the insured can legally or contractually hold liable. Effectively the insurer is acting in the name of the insured. Obtaining a waiver of subrogation in favour of a particular party prevents the insurer from claiming against that party.

iv. Additional Insured Status is recommended to enable direct access to the policy should the insured (applicant or applicant) become insolvent.

Other Financial Securities for Indemnity Assurance Provision

The DCCAE should take expert advice on whether the values stated are indeed supported by the assets available because the balance sheet valuations may differ markedly from the amounts that could be realised in a "forced sale" situation. The means by which the funds provided by the assurances could be released to provide prompt payments also needs to be considered.

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Appendices

The following Appendices are included for additional information:

APPENDIX 1 Process Map for Offshore Well Work Activities

APPENDIX 2 Example Insurance Certificate

APPENDIX 3 Guidance on Insurance Risk Reviews

APPENDIX 4 Glossary of Abbreviations and Acronyms

APPENDIX 5 Assessment Protocol etc

APPENDIX 1 Process Map for Offshore Well Work Activities

Notes: Map taken from Reference 7

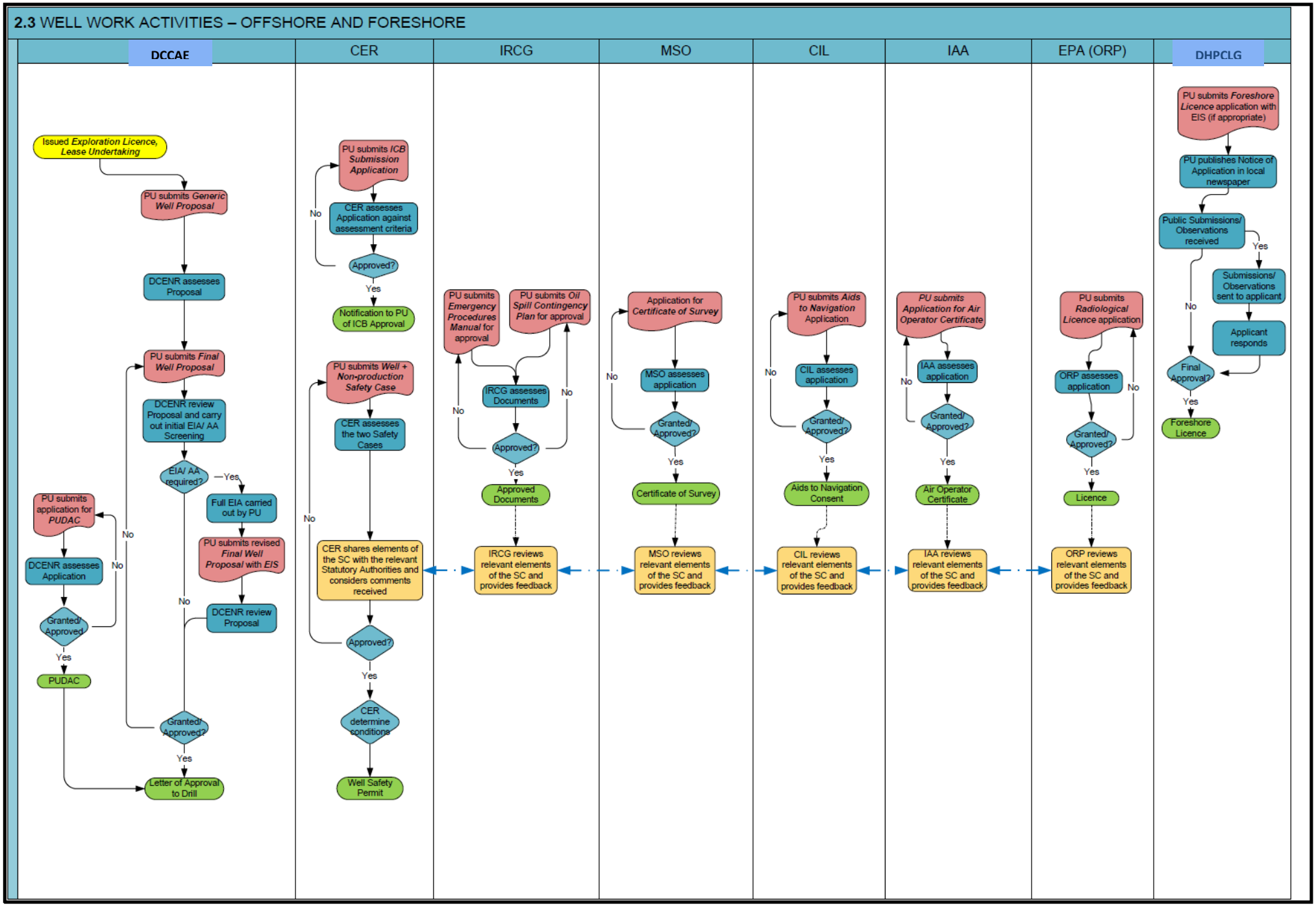
PERMITS / APPROVALS Required (Yellow highlights for Exploration Drilling):

Authority	Permit/ Consent/ Approval	Offshore
DCCAE formerly DCENR		
	Plan of Development Approval	✓
	- Approved Management Plan	✓
	AA	✓
	EIA	✓
	PUDAC	✓
	- Consent to Construct upstream pipeline	✓
	- Consent to Operate upstream pipeline	✓
	- Approval for First Gas and Oil	✓
CER		
	Well Work Safety Case	✓
	Non-production Safety Case	✓
	Design Safety Case (in some cases)	✓
	Production Safety Case	✓
	Well Work Safety Permit	✓
	Production Safety Permit	✓
IRCG		
	Emergency Response Procedures Manual	✓
	Oil Spill Contingency Plan	✓
MSO	Certificate of Survey	✓
CIL	Aids to Navigation	✓
DHPCLG formerly DEHLG	Foreshore Licence13	✓
ABP	Planning Permission/Approval	
EPA (ORP)	Licence to handle Radioactive Sources	✓
EPA	IPPC/ Industrial Emissions	✓
IAA	Air Applicant Certificate	✓
HSA		
	Emergency Response Procedures Manual	
	Pre-construction Safety Report	
	Operational Safety Report	

ABBREVIATIONS

PU	Petroleum Undertaking
DCENR now DCCAE	Department of Communications Climate Action and Environment
EIA	Environmental Impact Assessment
AA	Appropriate Assessment (under Habitats Directive)
PUDAC	Permit to Use and Discharge Added Chemicals
CER	Commission for Energy Regulation
SC	Safety Case
IRCG	Irish Coast Guard
MSO	Marine Survey Office
CIL	Commissioners of Irish Lights
IAA	Irish Aviation Authority
ORP	Office of Radiological Protection
HAS	Health and Safety Aithority

2.3 WELL WORK ACTIVITIES – OFFSHORE AND FORESHORE



APPENDIX 2 EXAMPLE INSURANCE CERTIFICATE

We the undersigned Insurance Broker/Insurer (including Captive Insurance Company certify as follows:

1. That the policies detailed below have been issued to…… (hereinafter referred to as the "Insured")
   whose address is
   at……..
   ……..……

2. That subject to the policies terms and conditions, the policies provides for

Exploration Phase (delete if not applicable)

- Control of Well including cover for Redrill, Seepage and Pollution, Clean up and Contamination insurance' with a combined single limit of US $..... Per Occurrence [100%] OR [for Insured's interest].
  Deductible: Per Occurrence US $..... [100%] OR [for Insured's interest].

  Policy number …….

  Effective from…… and expiring on…….

- Third Party Liability insurance covering legal liability for bodily injury and or property damage up to a limit of US $..... Per Occurrence and in the aggregate [100%] OR [for Insured's interest].

  Deductible: Per Occurrence US $..... [100%] OR [for Insured's interest].

  Policy number …….

  Effective from…… and expiring on…….

Development Phase (delete if not applicable)

- Control of Well including cover for Redrill Seepage and Pollution, Clean up and Contamination insurance with a combined single limit of US $..... Per Occurrence [100%] OR [for Insured's interest].
  Deductible: Per Occurrence US $..... [100%] OR [for Insured's interest].

  Policy number …….

  Effective from…… and expiring on…….

- Third Party Liability insurance covering legal liability for bodily injury and or property damage up to a limit of US $..... Per Occurrence and in the aggregate [100%] OR [for Insured's interest].
  Deductible: Per Occurrence US $..... [100%] OR [for Insured's interest].

Policy number …….

Effective from…… and expiring on…….

- Erection All Risk insurance with a sum insured of US $..... [100%] OR [for Insured's interest]
  Deductible: Per Occurrence US $..... [100%] OR [for Insured's interest].

  Policy number …….

  Effective from…… and expiring on…….

Operational Phase (delete if not applicable)

- Control of Well including cover for Redrill, Seepage and Pollution, Clean up and Contamination insurance' with a combined single limit of US $..... Per Occurrence [100%] OR [for Insured's interest].
  Deductible: Per Occurrence US $..... [100%] OR [for Insured's interest].

  Policy number …….

  Effective from…… and expiring on…….

- Third Party Liability insurance covering legal liability for bodily injury and or property damage up to a limit of US $..... Per Occurrence and in the aggregate [100%] OR [for Insured's interest].
  Deductible: Per Occurrence US $..... [100%] OR [for Insured's interest].

  Policy number …….

  Effective from…… and expiring on…….

- Property All Risk insurance with a sum insured of US $..... [100%] OR [for Insured's interest
  Deductible: Per Occurrence US $..... [100%] OR [for Insured's interest].

  Policy number …….

  Effective from…… and expiring on…….

This certificate recognizes an insurance plan has been provided to the DCCAE, but does not represent any confirmation of the validity of such a plan by the undersigned.

General conditions

The following conditions apply to all of the policies in all phases:

- The policies have been placed in compliance with any applicable laws and regulations, and the DCCAE is added as an additional Insured for its liability arising out of any act or omission of the Insured.
- The DCCAE are provided with a waiver of subrogation.
- Should the policy be cancelled before the expiration date the insurer will provide 30 days written notice to the appropriate Board as follows:

- Address:
- Email:
- Phone: +
- Fax: +

- The policies are extended where relevant to include coverage for removal of wreck/debris and Third Party Liability policies should be extended to include coverage for accidents or occurrences caused by or arising from the drilling of, production from, servicing of, operation of or participation in wells.
- The insurers (or reinsurers of Captives) underwriting each of the policies have one or of the following credit or financial strength ratings:

    - "A-" or higher from Standard & Poor's and/or the equivalent from another internationally recognized credit rating agency.
    - If any such insurer ceases to satisfy such requirement, then we shall as soon as practicable notify the DCCAE in writing of the same.

Signed for and on behalf of the [Insurer] / [Insurance Broker/Insurer (including Captive Insurance Company follows:

……

Name of Insurance Broker/Insurer (including Captive Insurance Company)

……

Address of Insurance Broker/Insurer (including Captive Insurance Company)

…… **Authorized Signature**

…… **Full Name**

……**Title**

…… **Date**

APPENDIX 3 – Guidance on Insurance Risk Reviews

Insurance Industry Briefing Document

Well Design and Operations Planning Process

Document No: G-001-IRR-D23

Revision No: 04

Date: 31st January 2012

Prepared for:

Brokers and Insurers

By:

The NRG Group of Companies

1 St. Devenicks Place

Cults

Aberdeen, AB15 9LN

	Name	Signed	Date
Prepared by:	D. Hamer		31/01/12
Reviewed by:	A. Mackay		31/01/12

CONTENTS

Introduction

Development of this document has been prompted by persistent difficulties in obtaining the appropriate data in order to conduct insurance risk reviews (IRR) as requested by the insurance industry.

In the majority of cases it appears that the communication is primarily between a representative of one of the brokers and their contact within the Applicant's organisation. As neither of these people are likely to be particularly technically aware of the well design and operations planning process it seems probable that some of the difficulty in obtaining the correct information is caused by a lack of appreciation for what is being requested and why.

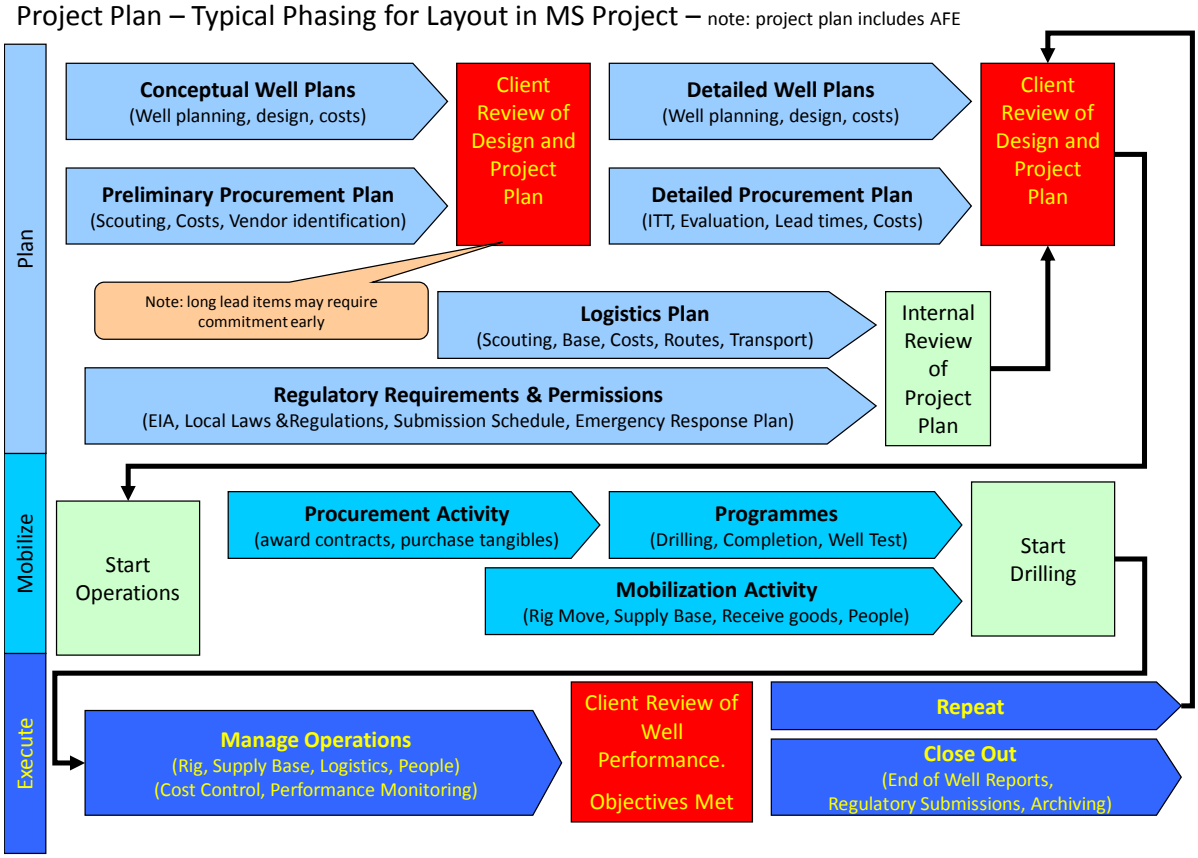
This document sets out to try and summarise in as brief a form as possible what that well design and operations planning process looks like and which key documents are typically generated as the process is followed.

A list of key documents required to perform an IRR is included at the back of this document.

Project Planning

Taking a high level view all well projects have a similar form and while the terminology may vary from company to company the process described here should be recognisable to most.

Project Plan – Typical Phasing for Layout in MS Project – note: project plan includes AFE



Design and Programming

In broad terms once a prospect has been identified and described in the **Geological Prognosis**, a **Basis of Design** document is generated that captures all the information needed to allow a well to be designed.

A Conceptual Design and Plan is generated which, following review, is modified into a Detailed Design and Plan. The output from this **Detailed Design** should be documented in a well design document which shows;

- All the casing stress calculations
- Load cases that underlie them
- Casing specifications which meet these load cases
- Well control considerations
- Tabulated kick tolerance by hole section

It is not until this Detailed Design has been agreed and documented that any **Procurement Process** activity can begin and the drilling programme can start to be drafted.

Understanding the procurement process, and especially how key contractors are selected, is often the only way to make any assessment of the competence of the contractors. The procurement process is normally defined in the applicant's management systems policies and standards.

Once key contractors are in place they can contribute to the **Drilling Programme,** and typically this programme will be assembled from multiple sources and not finalised until close to the spud date for the well.

Regulatory Compliance, Consents, Internal Compliance, Planning

One of the most fundamental requirements for any well project is the need to comply with local regulatory requirements. These requirements are likely to include some form of 'consent to drill' as well as associated health, safety and environmental approvals. Some applicants use Regulatory Compliance Registers as a way of assuring compliance and thereby mitigating risk.

Applicants will also have internal systems and requirements which, although not directly focussed on well management, also help to reduce the risks associated with well operations. Particularly important requirements in relation to pollution risk minimisation are the following:

- Plans to deal with accidental oil spillage. The titles used for these plans may vary depending on national regulation and internal company usage (for example; impact assessment, emergency response plan, oil spill contingency plan, etc). Regardless of title, objective guidance on best-practice scope and content of these plans has been increasingly well-defined within international guidance (International Maritime Organisation (IMO) and various Industry Associations).
- Since the Macondo and Montara incidents, there has been increasing attention paid to contingency planning in relation to well-capping and the drilling of relief wells in the event of a blow-out. Such plans help mitigate consequences in the event of a blow-out.

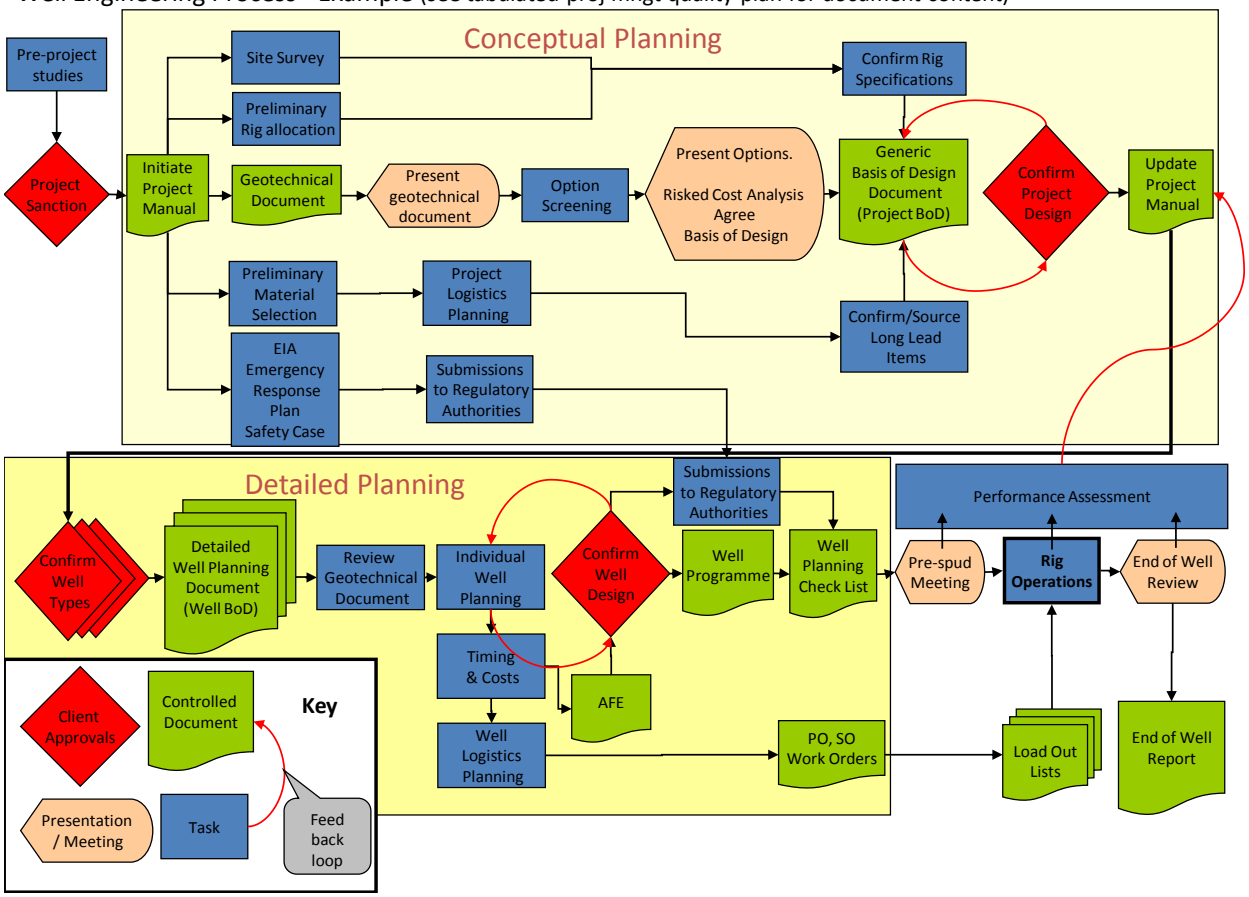
Increasingly both Applicants and Governments are requesting some form of independent examination (technical audit) of the whole well design and planning process. In the UK **Independent Well Examination** has been required by the legislation for several years as part of the 1996 DCR Regulations (design and construction regulations). Examination of well programmes is becoming the norm in many other areas of the world, apart from the UK, following the Macondo and Montara incidents.

It is important to recognise that Well Examination is a technical review of well design and programming for planned well operations. As such, it does not replace Insurance Risk Reviews which are quite separate and are intended for insurance assessment and insurance placement purposes only.

Key Documents and what they should contain

Looking at the design and planning requirements in a little more detail it is perhaps useful to have the following process map in place.

Well Engineering Process - Example (see tabulated proj mngt quality plan for document content)



Regulatory Compliance, Consents, Internal Compliance, Planning

Local Legislation / Applicant Policies and Standards

Local legislation will vary in scope and detail from country to country and it is difficult to generalise on the requirements. However, most countries with active petroleum industries, even if still at the exploration stage, are becoming increasingly sophisticated in terms of legislation.

It is also true that most competent International Applicants and larger Drilling Contractors will have Global Policies and Standards within their management systems. These will generally be written for compliance with the more rigorous legislative environments, such as that in the UK, and may well exceed some local legislation.

It is normal for the Applicant to keep a register of legislative compliance and to include the preparation and submission of key documents in their project planning. This is necessary because the lead time for making these submissions in some cases can be 9 to 12 months in advance of any drilling activity.

Sight of such registers of legislative compliance provides the reviewer with an insight into how much the local regulatory regime influences the safety and risk mitigation required.

It is therefore a requirement to see both the applicants policies and standards and the regulatory compliance register document.

Spill Response Planning

Oil Spill Contingency Plan (OSCP)

Sometimes addressed within an Environmental Impact Assessment or included as part of an Emergency Response Plan, best-practice guidance requires that the following information be documented:

- A detailed description of the surrounding environment including any economic resources that may be impacted in the event of an oil spillage.
- Modelling work that describes how a potential spillage would be distributed as a result of local tidal, wind and weathering effects.
- Spill response strategies based on the above (e.g. drilling contractor interface, remote surveillance arrangements, use of dispersants, in-situ burning, etc) – these strategies will typically have been subject to advance discussion and, where necessary, approval by local regulators.
- Contractual arrangements with 3rd party spill responders (particularly so-called Tier 2 and 3 capability responders).
- Results of response exercises and other methods of advance assessment of preparedness.

Blow-out Relief Plans (BORP)

The need for more extensive work in relation to BORP is a relatively recent requirement as a result of the Macondo and Montara incidents; the level of detail required will vary according to the circumstances:

- It is generally in the contingency planning documents that reference will be made to arrangements with a well control company (e.g. Boots & Coots, Wild Well Control etc).
- Remoteness of the area, available infrastructure and local regulatory requirements all play a large part in how detailed these plans need to be. For instance drilling offshore Greenland is generally confined to the ice free season and the authorities demand that two rigs be present since the time required to mobilise a rig for relief well drilling from the next nearest source is likely to be several weeks.

Internal Compliance and Planning

Well Operations Management System

An Operations Management System generally sets down the applicant's policy statements and standards governing the planning and implementation of all well designs and operations from conception through to final well abandonment, including well intervention operations.

It would be expected to contain policies and associated standards which are to be used when the applicant carries out any well operations for governing the management, planning and execution of well designs and operations. Specifically in relation to the safety of well operations on site, including policies on well control, and include policies on the maintenance of well integrity throughout well operations.

The Policy statements are designed to manage the safety critical aspects of well design and operations as well as environmental compliance.

Well Design Standards

Such a document generally describes the policies and standards for achieving fit for purpose well design, including well-related equipment design. Focussing on, well integrity design and the design of well-related equipment necessary to ensure compliance with the regulations.

A well is defined in terms of its pressure containment boundary. Adequate well design construction and operational monitoring and future maintenance of the pressure containment boundary should ensure well integrity through the well life cycle. This would include a statement on the minimum barrier requirements for the design of wells and throughout the life cycle of the well.

Procurement Policy

Sight of the procurement policy and process is helpful to the reviewer to gauge the selection criteria for Third Party and equipment procurement.

Geological Prognosis, Design and Programming

Sometimes referred to as the Drilling Prognosis this document is usually generated by the Geology and Geophysics specialists and essentially describes what will be drilled through and the expected characteristics of the various formations.

Generally may also contain regional geology and geological evaluation, as well as a Lithology Column, other information normally found in this document includes the prediction of pore pressures, fracture gradients, formation temperatures and reservoir fluid properties.

The document provides the Design Engineer with the basic information needed to design the well. It is also likely that the well objectives will be defined in this document.

Offset Well Analysis

The geological prognosis, especially in the case of an exploration well, will be largely a model of expectations based on conversion of a seismic survey into a geological model.

To try and verify these predictions and constrain uncertainties it is normal to draw upon data from relevant offset wells, if any suitable ones are available. This data may be quite local or can be of a more regional nature, but often it is the best information available until the first well has been drilled into a structure.

It is likely that the offset well review will draw upon **hazard identification** and **risk assessment** data which will help the Design Engineer during the well design and planning process.

Basis of Design Document

This document is generated by the Design Engineer and forms an intermediate step between the Geotechnical Document and the Detailed Design document. It is the place where the Design Engineer gathers all of the information he will use to design the well and adds other engineering aspects to the information he extracts from the Geotechnical document.

Access to this document makes it easier to spot any deficiencies or uncertainties in the design.

APPENDIX 4 Glossary of Abbreviations and Acronyms

AFE	**Authorisation for Expenditure**
ALARP	**As Low As Reasonably Practicable**
APPEA	**Australian Petroleum Production & Exploration Association**
BAOAC	**Bonn Agreement Oil Appearance Code**
BEIS	**Dept for Business, Energy and Industrial Strategy, formerly DECC, (UK)**
BORP	**Blow-out relief plan**
CAD	**Canadian Dollar**
CER	**Commission for Energy Regulation**
COGOA	**Canada Oil and Gas Operations Act**
CPRA	**Canada Petroleum Resources Act**
C-NLAAIA	**Canada-Newfoundland and Labrador Atlantic Accord Implementation Act**
C-NLAAINLA	**Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act**
CNOSPRAIA	**Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act**
CNSOPRAI(NS)A	**Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation (Nova Scotia) Act**
C-NLOPB	**Canada-Newfoundland and Labrador Offshore Petroleum Board - www.cnlopb.ca**
CNSOPB	**Canada-Nova Scotia Offshore Petroleum Board - www.cnsopb.ns.ca**
NEB	**National Energy Board**
COW	**Control of Well**
CV	**Curriculum Vitae**
DCCAE	**Department of Communications, Climate Action and Environment formerly DCENR**
DECC	**Department of Energy & Climate Change (UK)**
DKK	**Danish Kroner**
EEA	**European Economic Area**

EEZ	**Exclusive Economic Zone**
EC	**European Council**
ELD	**Environmental Liability Directive**
EP	**Environmental Plan**
ERP	**Emergency Response Plan**
EU	**European Union**
FPSO	**Floating Production Storage and Offloading unit**
FR	**Financial Responsibility**
HSE	**Health & Safety Executive (UK)**
IADC	**International Association of Drilling Contractors**
ICES	**International Council for Exploration of the Sea**
IOOA	**Irish Offshore Operators Association**
IOPCF	**International Oil Pollution Compensation Fund**
IRCG	**Irish Coast Guard**
IRR	**Insurance Risk Review**
ITOPF	**International Tanker Owners Pollution Federation Limited**
IWCF	**International Well Control Forum**
JOA	**Joint Operating Agreement**
MEI	**Major Environmental Incident**
MODU	**Mobile Offshore Drilling Unit**
MPE	**Ministry of Petroleum and Energy**
MRC	**Marine Rescue Centre**
MSFD	**Marine Strategy Framework Directive**
NE	**North East**
NOPSEMA	**National Offshore Petroleum Safety and Environment Management Authority**
NRD	**Natural Resource Damage**
NRDA	**Natural Resource Damage Assessment**

OD	**Norwegian Petroleum Directorate**
OGA	**Oil & Gas Authority (UK)**
OGUK	**Oil & Gas UK (formerly UK Offshore Applicants Association)**
OILMAP	**Oil Spill Model and Response System**
OPEP	**Oil Pollution Emergency Plan**
OPGGS	**Offshore Petroleum and Greenhouse Gas Storage Act 2006**
OPOL	**Offshore Pollution Liability Association Ltd**
OSCAR	**Oil Spill Contingency and Response model**
OSCP	**Oil Spill Contingency Plan**
OSIS	**Oil Spill Information System**
OSPAR	**Convention for the Protection of the Marine Environment of the North East Atlantic**
OSPRAG	**Oil Spill Prevention and Response Advisory Group**
OSRL	**Oil Spill Response Limited**
PEES	**Irish Petroleum (Exploration and Extraction) Safety Act 2015**
SCAT	**Shoreline Cleanup Assessment Team**
TPL	**Third Party Liability**
UKCS	**UK Continental Shelf**
USD	**US Dollars**
WellEx	**Well Examination**

APPENDIX 5 ASSESSMENT PROTOCOLS

FINANCIAL RESPONSIBILITY - ASSESSMENT PROTOCOL

A. TECHNICAL & SPILL COST

No	*Protocol Element*		*Observations & Recommendations*
1	**Capping Stack**	❖ Has the applicant made contractual arrangements guaranteeing access to suitable capping stack equipment? ❖ Has the applicant made contractual arrangements for the deployment of the capping stack, associated debris clearance and subsea dispersal equipment and suitably qualified personnel to ensure optimal utilisation of this equipment? ❖ Has the applicant made contingent contractual logistics arrangements to ensure access to suitable marine craft to deploy the Capping Stack and Associated Equipment? ❖ Has the Applicant prepared a credible mobilisation and deployment plan, including time required, for the Capping Stack and Associated Equipment and Personnel? ❖ What level of financial responsibility has the Applicant assumed for this element and are details included of how this has been calculated?	

2	**Relief Well**	❖ Has the applicant as an integral part of well planning prepared a relief well plan identifying casing design weights grades and quantities required? ❖ Has the Applicant prepared a minimum rig specification (allowing for the additional pumping and other specialist equipment and consumables storage requirements which may be necessary on that rig) as part of relief well pre-planning to minimise post incident reaction time? ❖ Has the applicant purchased or made contingency contractual arrangements to source in short order the necessary drilling tangibles (normally classed as long lead items)? ❖ Has the Applicant prepared a credible conceptual schedule for the delivery of the relief well? ❖ What level of financial responsibility has the Applicant assumed for this element and are details included of how this has been calculated?	

3	**Spill Modelling**	❖ Has the Applicant referenced the latest version of the Safety Case and is this the version upon which CER has issued a Safety Permit? ❖ Has the applicant provided justification for their choice of model? Is this justification reasonable? ❖ Has the applicant provided justification for the blowout flowrate and fluid properties that are to be modelled? Are these choices reasonable ? ❖ Is the modelled duration of blowout consistent with stated capping stack deployment or relief well drilling duration (as appropriate)? ❖ Is the modelled blowout location the same as the wellsite location and has account been taken of whether the blowout is likely to be surface or subsea? ❖ Is the stochastic modelling work that has been completed sufficient to identify a reasonable worst-case scenario (e.g. number of runs, duration of runs, oil thickness, output data presentation)? ❖ Has the applicant provided justification for their choice of metocean data (inc. relevant seasons that are being modelled)? Is this choice reasonable ? ❖Are the worst-case scenario deterministic run(s) that have been carried out sufficient to identify all potentially impacted shorelines, environmentally sensitive marine & coastal environments, marine protected areas, including any transboundary impacts (e.g. duration of runs, oil thickness, output data presentation)? ❖Do the outputs provide information on the volumes of oil or emulsion deposited on the sea bed, stranded and left in the water column?	

4	**Estimated Cost of Oil Spill Response & Clean-up**	❖Are the costs of scientific studies to determine the nature and extent of the environmental impact included (in addition to those required to determine the appropriate spill response)? ❖If spill modelling identifies potential damage to protected species and habitats (under EU Habitats and Birds Directives), are the costs of studies to determine whether or not reinstatement measures are necessary and feasible included? ❖Are the scientific studies assumed to continue for a reasonable length of time? ❖ Where accepted models from other jurisdictions have been used, has the applicant justified why these models are applicable to the relevant Irish situation? ❖ Where accepted models have been adapted in order to more closely match the Irish situation, have these modifications been clearly identified and have references been provided in relation to additional sources of information that have been utilised? Are these data sources and associated changes reasonable? ❖ Where direct estimates of response & clean-up costs have been made based on the results of deterministic modelling, has the applicant clearly defined the additional data sources that have been utilised (eg clean-up cost data, waste disposal data)? Is this data reasonable?	

5	**Estimated Cost of Impacts on Fisheries & Aquaculture**	❖ Is the applicant's estimate of potential fisheries & aquaculture impact costs based on accepted models utilised in other jurisdictions (e.g. scoring models) or on direct estimates using the results of relevant deterministic spill modelling? ❖ Where accepted models from other jurisdictions have been used, has the applicant justified why these models are applicable to the relevant Irish situation? ❖ Where accepted models have been adapted in order to more closely match the Irish situation, have these modifications been clearly identified and have references been provided in relation to any additional sources of information that have been utilised? Are these data sources and associated changes reasonable? ❖ Where direct estimates of potential fisheries & aquaculture impact costs have been made based on the results of deterministic modelling, has the applicant clearly defined the impact data sources that have been utilised (e.g. value of fish landings, aquaculture value for each potentially impacted county)? Is this data comprehensive and reasonable?	
6	**Estimated Cost of other economic impacts**	❖ Has the applicant considered other economic impacts that may be the subject of legitimate third party claims? ❖ Where direct estimates of potential impact costs have been made based on the results of deterministic modelling, has the applicant clearly defined the impact data sources that have been utilised ❖ Where accepted models from other jurisdictions have been used, has the applicant justified why these models are applicable to the relevant Irish situation?	

7	**Financial Responsibility (FR) Cost Estimate**	❖ Has the applicant provided an overall FR cost estimate which is consistent with the sum of all the various elements described above? ❖ Where any concerns or reservations have been identified in the course of this assessment (as documented above), the assessor should document their view regarding whether or not these concerns or reservations could be material to the overall FR figure. ❖ The assessor should state whether or not the applicant's total FR estimate is reasonable. In the event that the assessor believes that FR should materially increase then then this conclusion should be clearly documented.	

B. INSURANCE

No	*Protocol Element*		*Observations & Recommendations*
1	What method is being used to demonstrate financial responsibility?	❖ Insurance ❖Self-Insurance - Audited Financial Statements & Credit Rating. ❖Letter of Credit from a Financial institution approved by DCCAE ❖Bank Letter of Guarantee with DCCAE noted as beneficiary ❖ Indemnity Bond or other surety with funds payable on demand ❖Any other form that is satisfactory to the Regulator.	
2	Has an evidence of insurance, signed by broker or insurers been provided?		
3	Do the limits specified in the insurance documentation meet the amount of FR required following the modelling stage?		
4	Is the insurer security adequate?	Minimum "A-" Standard and Poor's (or equivalent) is required. If unrated captive insurer is put forward, reinsurance security needs to meet "A-".	
5	What insurance coverage is being provided?	❖ Applicants Extra Expense Insurance, including - Contol of Well Insurance - Seepage & Pollution, Cleanup & Contamination - Redrilling/Extra Expense Insurance ❖ Third Party Liability Insurance ❖ OPOL insurance, as applicable (if applicant is OPOL member)	

6	Are "standard" market forms and extensions being used?	
7	Are the territoral limits of the policy appropriate?	
8	Does Third Party Liability policy wording include coverage for fines, penalties, punitive damages etc.?	
9	Does the Third Party Liability policy wording have the exclusion for costs arising from well control etc. deleted?	
10	Are DCCAE named as Co-Insured?	
11	Is there a Waiver of Subrogation in favour of DCCAE?	
12	Are the Cancellation Conditions "standard"?	
13	Has provision for insurers to "pay on behalf" of the insured been included in the Applicants Extra Expense policy?	
14	Has evidence of OPOL membership been provided? If so, is the coverage specified in the supporting documentation?	

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