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<td>Carol Barbone</td>
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**Approvals**

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<th>Name</th>
<th>Date</th>
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<tr>
<td>Regulatory Affairs &amp; Stakeholder</td>
<td>Peter Lee</td>
<td>5 July 2018</td>
<td></td>
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<tr>
<td>Engagement Manager</td>
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**REVISION HISTORY**

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<td>For review and comment</td>
<td>Carol Barbone</td>
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1 Introduction

1.1 Purpose
This report describes the stakeholder engagement undertaken by Fairfield Energy ('Fairfield') to help inform the development of the options for decommissioning the Dunlin Alpha Concrete Gravity Base Substructure (CGBS) and recommendations for the proposed way forward. It is submitted in support of the statutory and public consultation on the Dunlin Alpha Draft Decommissioning Programme [1], alongside the Comparative Assessment Report [2] and the Environmental Appraisal Report [3]. The report provides an account of the stakeholder engagement journey to date, setting out how organisations and individuals interested in the formulation of the plans have been involved and their views and comments taken into account in order to build a robust programme.

1.2 Context
The Dunlin Alpha Draft Decommissioning Programme is one of five separate programmes covering the Greater Dunlin Area. These include three programmes for subsea infrastructure, approved by the regulator in late 2017\(^1\), and the draft programme for the Dunlin Alpha to Cormorant Alpha oil export line which is currently in preparation.

1.3 The Requirement for Consultation
When, as in the case of Dunlin Alpha, an offshore installation has reached the end of its economic life as a production facility, it is required to be decommissioned if there is no other viable option for reuse. The UK has a comprehensive regime controlling the decommissioning of offshore oil and gas installations which favours re-use, recycling or final disposal on land of offshore facilities. These provisions are requirements of European Union Directives, UK legislation, and the OSPAR Commission [4]. The multi-field Greater Dunlin Area facilities which are currently being decommissioned includes the Dunlin Alpha CGBS which forms the sole focus of the Draft Decommissioning Programme currently subject to statutory and public consultation.

The Department for Business, Energy and Industrial Strategy (BEIS) guidance requires that larger decommissioning programmes are supported by a wide-ranging public consultation process proportionate to the level of interest from stakeholders [5], citing the approach advocated in the Oil and Gas UK industry Guidelines on Stakeholder Engagement for Decommissioning Activities [6] as a guide. Details of how to respond to the consultation are contained in Chapter 6.

1.4 Approach to Stakeholder Engagement for Dunlin Alpha Decommissioning
Fairfield's intention from the outset of pre-planning in 2010 has been to engage pro-actively with stakeholders to explore the challenges, positive lessons learned and potentially feasible options for decommissioning. The main objectives of the engagement have been to facilitate dialogue with all interested parties so that views can be taken into account at each relevant stage of the decommissioning pre-planning process.

Good stakeholder engagement practice requires the earliest possible involvement of interested parties, recognising the changing dynamics within stakeholder organisations which may occur over the course of planning a major project and the need to keep them updated.

For Dunlin Alpha, Fairfield has emphasised the importance of the ‘Define – Agree – Implement’ approach advocated in the industry guidelines. This is in contrast with the now-outdated ‘Decide – Announce – Defend’ approach to consultation where stakeholders were unable to influence outcomes. The Fairfield engagement approach has been based on the following principles:

- Early, pro-active engagement to underpin future dialogue
- Inclusive approach to all interested parties
- Acknowledgement of all concerns
- Consistency
- Realistic commitments
- Joint fact finding
- Transparency and openness
2  The Dunlin Alpha Platform

2.1  Overview

Detailed descriptions of the Dunlin Alpha installation are given in the Draft Decommissioning Programme and principal supporting documents, with just a limited overview provided here for context.

Located in the East Shetland Basin of the UK Continental Shelf, Northern North Sea (see Figure 2.1), Dunlin Alpha was installed in 1977 and until cessation of production in 2015 exported over 522 million barrels of oil. Since 2008, the platform has been operated and owned by Fairfield and its partners.

![Figure 2-1: Dunlin Alpha Location](image)

The Dunlin Alpha platform, shown in Figure 2.2 overleaf, comprises 81 concrete storage cells at the base which underpin four 111 m concrete legs topped with steel transitions which extend through the water line or ‘splash zone’. These transitions are a unique feature of the Dunlin Alpha installation and were used in response to weight and buoyancy challenges for the tow-out of the structure from the construction site in Rotterdam. Internal steel reinforcement in the legs helps to withstand North Sea wave and weather conditions. The legs also contain pipework from the platform base through to the topsides, together with internal access down to the top of the cells. The 45 well conductors extend from below the seabed through to the platform topsides.

The 81 concrete storage cells that form the base of the structure are each 11 m long by 11 m wide, with a height of 32 m. 96,800 t of iron ore ballast within the cells provides additional anchorage and stability. The cells were originally used for oil storage until 1995. In 2007 a major oil recovery programme was initiated to recover the ‘attic oil’ which resided in the upper region of the cells above the oil extraction pipework. The size and limited interconnectivity of the cell design means that a small amount of oil remains in the cells. The walls and ceiling of the cells will have a build-up of waxy hydrocarbon residue. The floor will be covered in deposits of sand, clay and scale and this sediment layer on the cell floor is likely to contain hydrocarbons that adhered to the particulaties as they settled.

A large volume of drill cuttings (c20,000 m³) covers the south east portion of the top of the storage cells below and onto the seabed, extending to approximately 60 m from the base of the platform.
Figure 2-2: Dunlin Alpha CGBS
2.2 Decommissioning Recommendations

The recommendations for decommissioning which resulted from the Comparative Assessment evaluation of the four most feasible substructure and cell contents options are as follows:

1) Concrete Gravity Base Substructure (CGBS)
   After removal of the topsides and upper conductor sections, the recommendation is to leave in place all four concrete legs and the steel transitions which extend above the waterline, with navigation aids fitted to one of the legs. This was identified as the 'most preferred' decommissioning option when considered against four of the five primary criteria, namely Safety, Environment, Technical and Economic.

2) Cell contents
   The recommendation is to leave in place the residual contents of the Dunlin Alpha storage cells at the base of the CGBS, identified as the 'most preferred' decommissioning option (considered against more than 70 initial options examining recovery options, bioremediation, and capping possibilities). No credible options could be identified that would have enabled full removal of the residual cell contents, other than full removal of the entire structure.
3 Engagement Overview

3.1 Timeframe and Focus

Stakeholder engagement has been concentrated in two main time frames. The first phase of engagement took place between 2010 and 2012 and involved a series of stakeholder workshops, the initiation and sharing of technical studies resulting from the engagement, the formation of a Cell Contents Expert Discussion Group, early discussions with five OSPAR Contracting Parties, and a series of one-to-one meetings with stakeholders. This was part of a long-term approach to decommissioning, ahead of the circumstances that precipitated cessation of production (CoP) in 2015.

Since CoP was announced, engagement has focused on the revisiting of potential options for decommissioning. While stakeholder liaison was re-initiated for the subsea decommissioning programme in 2015 and Dunlin Alpha was mentioned peripherally, the second phase of engagement around the CGBS did not properly commence until May 2016. This took place in parallel with the refinement of potential decommissioning approaches and of options for decommissioning the cell contents housed within the base of the structure ahead of Comparative Assessment (CA) evaluation.

The key features of the second phase of engagement have included consultation on the scope of proposals for environmental impact assessment to inform further studies, and bilateral and multilateral meetings with stakeholders to better understand their interests and potential concerns. A major workshop to update the broader range of stakeholders and to better understand their views was held (November 2017) [7] ahead of the CA evaluation itself, and to ensure that the range of studies undertaken properly addressed all relevant points and provided a robust foundation.

Follow up meetings and discussions were held to answer areas of specific interest to stakeholders as far as possible, and to ensure that there were no gaps in the foundations for the eventual CA evaluation workshop held in March 2018. Access was provided to studies for this purpose, notably those covering the cell contents and drill cuttings. External stakeholders (notably regulators and regulatory advisors, and those representing other users of the sea, principally fishing and navigation) were invited to take part in the evaluation of options. The report on the emerging recommendations [8] from this meeting was circulated to all stakeholders for comment and as a pre-read for discussion at a second stakeholder workshop in May 2018. This second workshop was also the subject of a post-workshop report [9], issued for circulation to and comment by all stakeholders.

Details of all the engagement activity for both Phase 1 and Phase 2 is provided in Chapters 4 and 5.
4 Stakeholder Engagement Activity Details – Phase 1 (2010-11)

4.1 Summary of Activity

Stakeholder engagement began in 2010 in conjunction with the commissioning of initial studies to produce a reference case programme primarily to understand the costs, options and potentially credible outcomes for decommissioning at a later stage. These studies included reports on: reuse, refloat, \textit{in situ} deconstruction, derogation options (in case full removal was not possible), cells and cell entry, and leg entry, all of which fed into an options screening exercise in 2011. However, while a Draft Decommissioning Programme was produced and shared with the regulator at that time, it was not formally submitted.

The principal activity during the two years which followed are shown below in Table 4-1. Key elements of the activity are discussed in subsequent sections.

<table>
<thead>
<tr>
<th>Date</th>
<th>Engagement</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 2010</td>
<td>Workshop – Aberdeen</td>
<td>Comprehensive list of concepts identified</td>
</tr>
<tr>
<td></td>
<td>Wide range of stakeholders attended a workshop to introduce the Dunlin platform, set out the challenges and seek advice from stakeholders</td>
<td>Support for further work on cell contents and potential sampling</td>
</tr>
<tr>
<td>May 2010</td>
<td>Re-use Report [10] sent to all stakeholders for comment</td>
<td>No comments received</td>
</tr>
<tr>
<td>September 2010</td>
<td>Expert Discussion Group – Cell Contents Environmental Impact Assessment. Advice and way forward sought</td>
<td>Support for proposed scope of work for impact assessment report subsequently carried out by Intertek Metoc</td>
</tr>
<tr>
<td>November 2010 to July 2011</td>
<td>Consultation meetings with OSPAR Contracting Parties (France, Germany, Netherlands, Norway, UK)</td>
<td>Contracting parties familiarised with Fairfield and the Dunlin Alpha platform. Key concerns set out for Fairfield to take into account</td>
</tr>
<tr>
<td>August 2011</td>
<td>Second Refloat Report [13] issued</td>
<td>No comments received</td>
</tr>
<tr>
<td>October 2011</td>
<td>\textit{In Situ} Deconstruction Report [14] issued</td>
<td>No comments received</td>
</tr>
<tr>
<td>November 2011</td>
<td>\textit{In Situ} Decommissioning Report [15]</td>
<td>No comments received</td>
</tr>
<tr>
<td>Ongoing engagement</td>
<td>Regular ongoing dialogue with stakeholders with particular interest, notably regulatory at this stage, with publication of information on the Fairfield decommissioning webpages</td>
<td></td>
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</table>
4.2 Introductory Stakeholder Workshop, January 2010

Stakeholders were researched and each individual consulted on their level of interest and consultation method, preferred location of a meeting and issues of particular interest. As a result, an introductory one-day workshop was organised and held in Aberdeen (where most of the stakeholders were located). The participants were as follows:

- Aberdeenshire Council
- Centre for Environment, Fisheries and Aquaculture Science (Cefas)
- Decom North Sea
- Department of Energy & Climate Change (DECC) x 3
- Fairfield x 3
- Health & Safety Executive (HSE) x 2
- Independent facilitators x 2
- Intertek METOC x 2
- Joint Nature Conservation Committee (JNCC) x 2
- Marine Scotland x 2
- Maritime and Coastguard Agency
- MCX (Mitsubishi)
- Offshore Design Engineering (ODE)
- Oil & Gas UK
- Scottish Enterprise
- Scottish Environment Protection Agency (SEPA) (Marine)
- Scottish Environment Protection Agency (SEPA) (Radioactive Waste)
- Scottish Fishermen’s Federation x 2.

An independent facilitator, Andrew Acland, was engaged by Fairfield to ensure that the meeting was felt to be fair and equitable for all concerned.

Some 30 participants took part in the meeting which was carefully structured to ensure that the stakeholders gained a thorough understanding of the Dunlin Alpha and the particular challenges that would be faced when assessing the different decommissioning options available. The participants were also asked to brainstorm the issues that were of particular concern that they would like Fairfield to explore further.

The main focus of this initial stakeholder meeting was to set out the key facts relating to the Dunlin Alpha platform as then understood and also to become familiar with the main issues of interest and/or concern to stakeholders as Fairfield began the review of potential decommissioning options. The independent facilitator prepared a report of the meeting [16].

A number of organisations were unable to attend the engagement workshop in Aberdeen (e.g. Greenpeace Research Laboratories). Individual meetings were subsequently held with these organisations.

Table 4.2 below summarises some of the main concerns raised by stakeholders at the Aberdeen meeting and how these have been addressed.
## Table 4-2: Main stakeholder concerns from 2010 introductory workshop

<table>
<thead>
<tr>
<th>Area</th>
<th>Concerns Raised</th>
<th>Where Addressed</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Best practice in handling drill cuttings</td>
<td>OSPAR Recommendation 2006/5 [4]</td>
</tr>
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<td></td>
<td>Ongoing monitoring</td>
<td>Decommissioning Programme [1]</td>
</tr>
<tr>
<td></td>
<td>Balancing costs of decommissioning and environmental protection</td>
<td>Comparative Assessment Report [2]</td>
</tr>
<tr>
<td></td>
<td>Cumulative impacts of leaving structures in place</td>
<td>Decommissioning Programme [1] and Environmental Appraisal Report [3]</td>
</tr>
<tr>
<td></td>
<td>Seabed survey data</td>
<td>Environmental Appraisal Report [3]</td>
</tr>
<tr>
<td>Other Users of the Sea</td>
<td>Navigation aids</td>
<td>In Situ Decommissioning Report [15]</td>
</tr>
<tr>
<td></td>
<td>Long term liability/residual liability fund</td>
<td>Acknowledged</td>
</tr>
<tr>
<td></td>
<td>Funding of UK Fisheries Legacy</td>
<td>Acknowledged</td>
</tr>
<tr>
<td></td>
<td>Every remaining structure makes life difficult for fishermen</td>
<td>Acknowledged</td>
</tr>
<tr>
<td></td>
<td>Dangers of cutting down to -55 m below sea level</td>
<td>Taken into account when assessing different options – Comparative Assessment Report [2]</td>
</tr>
<tr>
<td></td>
<td>FishSafe updating requirements</td>
<td>Acknowledged</td>
</tr>
<tr>
<td></td>
<td>Long term concern that structures left in place will crumble away</td>
<td>In Situ Decommissioning Report [15]</td>
</tr>
<tr>
<td></td>
<td>Loss of access</td>
<td>Acknowledged</td>
</tr>
<tr>
<td></td>
<td>Risks – health and safety, technology</td>
<td>Decommissioning Programme [1]</td>
</tr>
</tbody>
</table>
Area | Concerns Raised | Where Addressed
--- | --- | ---
 | Reuse and recycling options (e.g. windfarms, emergency response base, etc.) | Re-use Report [10]
Look at alternative decommissioning options | Second Refloat Report
Stakeholder Engagement Feedback to stakeholders/keeping informed | Ongoing

**Note:** All Cell Contents reports have now been consolidated into one ‘master’ Cell Contents Technical Report, February 2018 [11]

### 4.3 Cell Contents Expert Discussion Group

One of the main issues raised by stakeholders in January 2010 was the contents of the 81 storage cells in the base of the structure. The concerns voiced by the stakeholders focused on the options for sampling the cells and what might happen in the event of a major structural failure, as well as the impact of the eventual leakage of the contents into the marine environment as the cells degrade over time.

In order to address this issue thoroughly, Fairfield commissioned Metoc (now Intertek Metoc) to carry out a detailed environmental study into both the contents of the cells and their potential environmental impacts on the marine environment [12].

With agreement from the wider group of stakeholders, representatives from among them (see Table 4.3) were asked by Fairfield to form an Expert Discussion Group to look at the cells contents issue. To this end, a meeting was convened in September 2010 in Southampton at the National Oceanography Centre to review the proposed scoping report for the cell contents and environmental impact assessment. As with the previous workshop in Aberdeen, independent facilitators were asked by Fairfield to run the session. Although seven organisations were invited to participate, three were unable to attend on the day. Andrew Acland, the independent facilitator, followed up with each organisation to ensure their views were captured and taken into account.

**Table 4-3: Participants at September 2010 stakeholder meeting, Southampton**

<table>
<thead>
<tr>
<th>Participating Organisations</th>
<th>Organisations Approached Separately</th>
</tr>
</thead>
<tbody>
<tr>
<td>JNCC</td>
<td>DECC (now BEIS)</td>
</tr>
<tr>
<td>Cefas</td>
<td>Greenpeace Research Laboratories</td>
</tr>
<tr>
<td>National Oceanography Centre, Southampton</td>
<td>SEPA</td>
</tr>
<tr>
<td>Scarborough Centre for Coastal Studies</td>
<td></td>
</tr>
</tbody>
</table>

The main aims of the Expert Discussion Group were:

- To consider the preliminary results of the cells inventory evaluation, pathways and potential environmental impact
- To identify any further factors that should be risk assessed
- To identify any further environmental receptors
- To review with experts the approaches, methods, priorities, uncertainties and possible approaches to management and mitigation of risks and consequences.
A full report of the meeting [17] was compiled by the facilitator and published online.

Early on, Fairfield advised stakeholders that it would not be possible to access the sealed cells in order to take samples as attempts to do this would affect the structural integrity of the CGBS. If it were possible to access the cells, it would be necessary to take a great number of samples since the distribution of contents in the large cells volume would be different. In order to support this position, Fairfield carried out a study into the feasibility of accessing the legs and the cells [11], also published at that time on the Fairfield website.

The views from the Expert Discussion Group participants were taken into account by Intertek Metoc as it worked towards finalising the Cells Contents Impact Assessment [11]. The study was completed in May 2011 and issued to all stakeholders for comment. The study was also published on the website.

At the end of each of the stakeholder workshops in January and September 2010, the facilitator conducted an evaluation process of the workshop, summarising these as follows:

“Both workshops were well received with participants commending in particular the openness and transparency of Fairfield’s approach. A number of participants in the January 2010 stakeholder engagement workshop in Aberdeen would have liked the re-use options to have been developed in more detail, but there was also recognition that the decommissioning process was still at a very early stage. The September 2010 Expert Discussion Group in Southampton, held in response to suggestions made at the earlier workshop, was more technical in nature and less well attended but contribute to a shared understanding of the issues around cell contents and the challenges involved in resolving them. Participants assessed both workshops overall to be valuable, well-structured and well-facilitated.”

4.4 Engagement Resulting from Initial Stakeholder Contact

Following the first stakeholder workshop in January 2010, engagement with all stakeholders continued over the next two years. A number of studies were commissioned, some on advice from stakeholders, for example the CGB Re-use [10] and Cell Contents Reports [11], and were the basis for further engagement with stakeholders.

4.5 Preliminary OSPAR Contracting Party Consultation Process

Under the OSPAR Convention, OSPAR Decision 98/3 acknowledges that some platforms, for example large concrete gravity base platforms, cannot be removed [4]. In these circumstances the platform operator may apply for an exemption or ‘derogation’ to leave the structure wholly or partly in place. The Dunlin Alpha installation qualifies as a candidate for derogation.

As the early decommissioning study work progressed, and the difficulties of removal became clear, Fairfield took the view that it would be helpful to approach OSPAR Contracting Parties with an interest in decommissioning with the aim of providing an overview of the Dunlin Alpha platform and the main reasons why a derogation case was likely to be necessary. Contracting Parties were therefore contacted in September 2010 with the aim of setting up meetings to discuss the decommissioning issues. Table 4.4 summarises the meetings with OSPAR members which took place in 2010-11.
Table 4-4: Meetings with OSPAR Contracting Parties

<table>
<thead>
<tr>
<th>Date of Meeting</th>
<th>Location</th>
<th>OSPAR Contracting Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>November 2010</td>
<td>Oslo</td>
<td>Norway</td>
</tr>
<tr>
<td>January 2011</td>
<td>Paris</td>
<td>France</td>
</tr>
<tr>
<td>March 2011</td>
<td>Rijswijk</td>
<td>The Netherlands</td>
</tr>
<tr>
<td>May 2011</td>
<td>Aberdeen</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>July 2011</td>
<td>Hamburg</td>
<td>Germany</td>
</tr>
</tbody>
</table>

At each meeting, a presentation was given providing an overview of Fairfield and the key facts about the Dunlin Alpha platform, and the main decommissioning challenges were explained. Each of the Contracting Parties set out their primary areas of concern and expectations for any potential application for derogation from the UK government.

4.6 Other Bilateral Meetings

4.6.1 Centre for Environment, Fisheries and Aquaculture Science (Cefas)

Fairfield held an initial meeting with Cefas in 25 March 2010 to discuss options for assessing the cell contents and drill cuttings. This meeting stimulated thought which assisted with the development of the cell contents analysis of scope of work, and the potential value of toxicological testing with a synthetic ‘sludge’. The meeting also considered data requirements to enable a meaningful analysis of drill cuttings to be undertaken.

As reported above, Cefas were participants in the cell contents Expert Discussion Group and attended the meeting in September 2010 where there was further discussion on the merits of an experimental toxicological programme and the potential wide range of uncertainty in any results.

A subsequent meeting was arranged in 29 April 2011 to discuss the findings of the Intertek Metoc cell contents report. The meeting concluded that the analysis undertaken by Intertek Metoc was thorough and that a toxicological programme was unlikely to reduce the range of uncertainty in the cell contents.

4.6.2 Scottish Fishermen’s Federation (SFF)

Following SFF attendance at the January 2010 stakeholder consultation, meetings were held with their representatives in June 2010, May and October 2011 to brief them on progress of the development of decommissioning options for Dunlin Alpha. The findings of the Intertek Metoc report were also discussed together with the industry’s experience with aids to navigation installed on other derogated concrete gravity based structures. It was agreed that the SFF would also lead in commenting on behalf of the National Federation of Fishermen’s Organisations and the Northern Ireland Fishermen’s Federation.

4.6.3 Greenpeace Research Laboratories

Fairfield held meetings with Greenpeace Research Laboratories in February 2010, March and November 2011.

The initial meeting was arranged in order to provide a briefing on the company’s approach to the Dunlin Alpha decommissioning as Greenpeace had been unable to attend the Aberdeen stakeholder meeting in the January. Greenpeace were subsequently consulted on the scope of the cells contents study [10] and provided constructive comment on the draft report at the meeting held in 4 March 2011.
The draft In Situ Decommissioning Report [15] was discussed at the meeting of November 2011 meeting prior to the document being made available on the Dunlin website.

Greenpeace has consistently stressed the need to follow the process in applying OSPAR Decision 98/3 rigorously with respect to the concrete gravity base substructure, also expressing interest in the options for addressing the drill cuttings accumulations on and around the base of the platform. In 2011 Fairfield committed to evaluating all options for the drill cuttings within the Dunlin Alpha environmental impact assessment, at that time scheduled for the following year.

4.6.4 Northern Lighthouse Board

Fairfield first met with the Northern Lighthouse Board (NLB) in Edinburgh on 12 February 2010 to discuss the statutory requirements for Aids to Navigation systems on decommissioned structures left in place under the provisions of OSPAR Decision 98/3. This meeting produced a useful exchange of information and was recognised that the NLB’s views would be formally sought by the regulator within the statutory consultation process, should a formal application for derogation be submitted.

4.6.5 Marine Scotland

Fairfield met with the science division of Marine Scotland (formerly Fisheries Research Services) in March 2011. The purpose of the meeting was to discuss the cell contents study [11] following Marine Scotland’s attendance at the January stakeholder meeting. The meeting was also attended by Intertek Metoc who had carried out the study.

Marine Scotland discussed the range of possible environmental impact mechanisms arising from the cell contents, and examined the methodologies and assumptions applied by the Intertek Metoc study.

The meeting concluded with an expression of support by Marine Scotland for the method and conclusions of the cell contents study and, in particular, concurring with the specific conclusions of the study concerning the uncertainties of sampling techniques.
5 Stakeholder Engagement Activity Details – Phase 2 (2016-18)

5.1 Summary of Activity

General stakeholder engagement from 2012 onwards was relatively low level and confined principally to regulatory meetings. However, the pace accelerated in the wake of cessation of production in 2015 and, for the Dunlin Alpha platform after the subsea infrastructure decommissioning pre-planning for the Osprey and Merlin fields and the Dunlin Fuel Gas Import and Dunlin Power Import facilities were commenced. As such, there was a relatively knowledgeable base of understanding among regulatory stakeholders and other users of the sea because of their involvement in the broader Dunlin field decommissioning planning. The unique nature of the Dunlin Alpha installation and the unusual challenges facing its decommissioning meant, however, that a more wide ranging consultation process was required, bringing stakeholders up to date with contemporary activity, ensuring the consistent sharing of this across different interest groups.

A refresh of the original stakeholder base was therefore undertaken and its scope redrawn in order to ensure current relevance and accuracy. Approximately 100 stakeholder organisations were identified as being of particular relevance, listed in Appendix 1, many with several points of contact representing different interests. The main stakeholder groupings are as follows:

- Statutory consultees
- Regulatory bodies and advisory agencies (UK and Norwegian)
- Dunlin Alpha partners and commercial agreement partners for shared infrastructure
- Industry groups (e.g. oil and gas, marine, ports and harbours, enterprise and technology)
- Other users of the sea and non-statutory fishermen's organisations (UK and relevant EU)
- Research academics and relevant university departments
- Environmental interest groups

A summary of the principal engagement activity conducted in this second phase of engagement is shown in Table 5-1, with discussion of key elements in the sections which follow. The engagement was supported by a series of tools to aid communication, notably:

- A working model to show the options, scale and general layout of the installation
- 3-D virtual reality headsites to provide an appreciation of context
- Sharing of the 1970s film footage of the original construction of the Dunlin Alpha
- Creation of a short, animated film explaining the decommissioning challenge
- Regular updates to the Dunlin Alpha decommissioning pages of the website, including workshop reports and meeting documentation
Table 5-1: Phase 2 stakeholder engagement activity (2016 to 2018)

<table>
<thead>
<tr>
<th>Date</th>
<th>Engagement</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 2016</td>
<td>Dunlin Alpha website updated</td>
<td>Accessibility for wider public to information on pre-planning for the installation’s decommissioning, updating on progress</td>
</tr>
<tr>
<td>May 2016</td>
<td>Statutory Consultees: Introductory approaches through telephone meetings with Global Marine Systems, Northern Ireland Fishermen’s Federation, National Federation of Fishermen’s Organisations to supplement existing face-to-face contact with the Scottish Fishermen’s Federation established through other aspects of the field decommissioning pre-planning</td>
<td>Personal contact established with key representatives of each statutory consultee and pre-planning process outlined ahead of later contact</td>
</tr>
<tr>
<td>May 2016</td>
<td>UK Fisheries Legacy Trust Fund Ltd introductory meeting</td>
<td>Awareness raised of project focus and potential legacy implications</td>
</tr>
<tr>
<td>May 2016</td>
<td>Introductory call to SEPA to raise awareness of pre-planning activity</td>
<td>Meeting held to share project overview and explore SEPA expectations in more depth, especially on Duty of Care, trans-frontier shipment of waste, radioactive and hazardous waste</td>
</tr>
<tr>
<td>September 2016</td>
<td>International Association of Oil and Gas Producers CGBS Working Group</td>
<td>Sharing of lessons learned and current activity details between CGBS operators</td>
</tr>
<tr>
<td>October 2016</td>
<td>Scottish Environment Protection Agency: meeting to discuss Dunlin Alpha pre-planning in more detail and to gain regulatory insights to optimise project delivery</td>
<td>Questions answered on a range of regulatory expectations and advice received on process, including waste hierarchy and waste management strategy requirements</td>
</tr>
<tr>
<td>February 2017</td>
<td>Consultation on the Environmental Impact Assessment (EIA) Draft Scoping Report, shared with 17 environmentally-focused regulatory and NGO organisations</td>
<td>Comments received from BEIS (Environmental Management Team), JNCC, Marine Scotland, Scottish Fishermen’s Federation (SFF). Recommendations incorporated into scope for the EIA process and reported in Environmental Appraisal Report [3]</td>
</tr>
<tr>
<td>April 2017</td>
<td>‘Lessons learnt’ meeting with operator CNRI focusing on the Murchison topsides experience</td>
<td>Awareness raised within Fairfield team of project learnings from CNRI</td>
</tr>
<tr>
<td>September 2017</td>
<td>Briefing workshop on Dunlin Alpha for key stakeholders:</td>
<td>Enabled consolidation of understanding regarding Dunlin Alpha pre-planning to build on earlier contact which in some cases had been focused solely on the subsea rather than CGBS decommissioning</td>
</tr>
<tr>
<td></td>
<td>• BEIS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Independent Review Group</td>
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<tr>
<td></td>
<td>• Marine Scotland</td>
<td></td>
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<tr>
<td></td>
<td>• Northern Lighthouse Board</td>
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<tr>
<td></td>
<td>• OGA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Scottish Fishermen’s Federation</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>Engagement</td>
<td>Outcomes</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>October 2017 and February 2018</td>
<td>University of Edinburgh ANChor Project meetings with principal investigator</td>
<td>Dunlin Alpha models run to explore potential impacts on species seeding (e.g. for cold water coral <em>lophelia pertusa</em>) that may arise from a derogation outcome; led to discussions regarding opportunities for ground-truthing through sampling and monitoring which are now being progressed</td>
</tr>
<tr>
<td>October 2017</td>
<td>Offshore Contractors Association introductory meeting</td>
<td>Provided opportunity for mutual understanding of respective areas of interest</td>
</tr>
<tr>
<td>October 2017</td>
<td>Draft Environmental Impact Assessment Scoping Report shared with all stakeholders (whether attending or not) as a pre-read for the November stakeholder workshop, with comments invited. (Note: original distribution to 17 environmentally focused organisations, both regulatory and NGO, was carried out in February 2017 – see above)</td>
<td>No further comments received in response to re-circulation of Draft EIA Scoping Report. Clarification sought by KIMO on whether the risks both of removing and of leaving <em>in situ</em> the structure would form part of the EIA. Confirmation provided. See Environmental Appraisal Report [3] for full discussion</td>
</tr>
<tr>
<td>November 2017</td>
<td>Norwegian Environment Agency approached for potential engagement on Dunlin Alpha</td>
<td>Limited resource available in Norway for engagement but agreement by the Agency to share material with relevant governmental teams within the Norwegian administration</td>
</tr>
<tr>
<td>November 2017</td>
<td>Major stakeholder workshop attended by 63 external stakeholders presenting the current status of the project, a number of which had been involved in the Phase 1 engagement. Post-event report circulated to all stakeholders (not just attendees) for comment/correction</td>
<td>Opportunity for refreshing and informing awareness of the project, and to gain feedback from stakeholders of particular areas of interest and/or concern; final version of event report circulated to all stakeholders and put on line in January 2018; comments and queries, including questions on R&amp;D, addressed</td>
</tr>
<tr>
<td>November 2017</td>
<td>University of Aberdeen Decommissioning MSc Programme meeting to establish areas of potential collaboration</td>
<td>Sources of information and contacts shared by Fairfield to facilitate real-world experience of MSc students</td>
</tr>
<tr>
<td>October/November/December 2017</td>
<td>SEPA and Environment Agency (EA) liaison on Fairfield’s Waste Management Strategy</td>
<td>Waste Management Strategy confirmed as thorough and comprehensive. Further information (from EA) and discussion held (with SEPA) on latest guidance and expectations on recycling, waste and trans-frontier shipment procedures</td>
</tr>
<tr>
<td>December 2017</td>
<td>WWF meeting held to introduce installation decommissioning pre-planning</td>
<td>Queries raised with respect to Fairfield intentions, particularly on cell contents; note of meeting followed by further queries to which detailed feedback on installation decommissioning provided (see Appendix 2)</td>
</tr>
<tr>
<td>December 2017</td>
<td>Scottish Parliament short presentation made to MSPs and industry guests giving overview of Dunlin Alpha opportunities for the supply chain</td>
<td>Awareness raised of potential work stream opportunities for Scottish supply chain</td>
</tr>
<tr>
<td>Date</td>
<td>Engagement</td>
<td>Outcomes</td>
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<tr>
<td>-------------</td>
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<tr>
<td>December 2017</td>
<td>Oil &amp; Gas Technology Centre presentation to Fairfield to set out potential for collaboration; second presentation on potential participation in accelerated corrosion collaboration also attended later in December</td>
<td>Followed up in February with further contact on areas of potential interest including the broader Dunlin field decommissioning</td>
</tr>
<tr>
<td>January 2018</td>
<td>Scottish Environment Protection Agency meeting held as follow-up to November 2018 stakeholder workshop, exploring waste issues in more detail</td>
<td>Greater understanding gained by Fairfield of detail of revised regulatory expectations</td>
</tr>
<tr>
<td>January 2018</td>
<td>Decom North Sea Environmental Appraisal guidance review participation</td>
<td>Lessons from Dunlin Alpha decommissioning shared and greater awareness gained of forthcoming requirements for Environmental Appraisal that will replace previous approach to environmental reporting of impact assessment in support of decommissioning programmes</td>
</tr>
<tr>
<td>February 2018</td>
<td>Norwegian Petroleum Society Decommissioning Conference presentation and attendance</td>
<td>Sharing of experiences to date and capturing of learnings from others to input into ongoing development of decommissioning pre-planning</td>
</tr>
<tr>
<td>February 2018</td>
<td>Provision of Drill Cuttings Technical Report and Cell Contents Technical Report to WWF and Greenpeace to fulfil requests for additional information; also made available to all stakeholders</td>
<td>Reports requested by 15 stakeholders; minor comments received back from one organisation only, addressed in revised version of Drill Cuttings Report [18]</td>
</tr>
<tr>
<td>February 2018</td>
<td>Northern Lighthouse Board meeting held to introduce project and brief new staff member</td>
<td>Clarity provided in terms of stakeholder thinking in the context of the project overview provided, notably with respect to Aids to Navigation</td>
</tr>
<tr>
<td>February 2018</td>
<td>Provision of comprehensive set of pre-read documents to external participants (regulatory and other users of the sea) ahead of the March Comparative Assessment workshop</td>
<td>Enabled preparation and allowed examination of the detail of supporting material ahead of evaluation workshop</td>
</tr>
<tr>
<td>March 2018</td>
<td>Design 4 Decommissioning marine science and industry workshop attended for input into areas where innovation required and the development of potential solutions</td>
<td>Greater awareness of academic interest in key areas noted, with opportunities for follow up and joint industry projects as research develops</td>
</tr>
<tr>
<td>Date</td>
<td>Engagement</td>
<td>Outcomes</td>
</tr>
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<td>------------</td>
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</tbody>
</table>
| March 2018 | Comparative Assessment Evaluation Workshop held, including external participation from:  
  - Health & Safety Executive  
  - Independent Review Group  
  - Joint Nature Conservation Committee  
  - Marine Scotland  
  - Northern Lighthouse Board  
  - Oil & Gas Authority  
  - Offshore Petroleum Regulator for Environment & Decommissioning  
  (BEIS Environmental Management Team and Offshore Decommissioning Unit) | Opportunity for stakeholders to either participate in or to observe the scoring of the options for the installation decommissioning,  
  and to question and challenge assumptions and data where relevant; sensitivity tests performed on aspects of the evaluation,  
  reported separately in the Comparative Assessment Report [X]. Full access provided in advance to supporting studies and relevant documentation |
| April 2018 | Comparative Assessment Emerging Recommendations Report circulated to all stakeholders | Comments received from one stakeholder (see section 5.6 below)                                                                                                                                     |
| May 2018   | Second external stakeholder workshop held with 39 external participants; Emerging Recommendations from the Comparative Assessment evaluation workshop and sensitivity tests circulated as pre-read. Post-event report circulated to all stakeholders (not just attendees) for comment/correction | Outstanding issues of concern highlighted through structure of discussions at workshop, captured in report by independent facilitators for follow up by Fairfield |
| May 2018   | Leg Internals and Inventory Reports shared with SEPA at their request          | No comments received to date                                                                                                              |
| June 2018  | Comments on May Stakeholder Workshop Report received                           | See section 5.7 below                                                                                                                    |
| Throughout | Ongoing engagement with other operators and the regulator                     | Informed input into the pre-planning for the Decommissioning Programme and approach to supporting studies                                  |
5.2 Environmental Impact Assessment – Scoping Consultation

The draft Dunlin Alpha Environmental Impact Assessment Scoping Report for the project was circulated to 17 stakeholders with environmental responsibilities or interests in February 2017. A further 100 stakeholders were contacted in October 2017 with copies of the scoping report for additional comment. Comments were received back from four: BEIS Environmental Management Team, Joint Nature Conservation Committee, Marine Scotland and the Scottish Fishermen’s Federation. The comments, incorporated into the revised scope for the environmental impact assessment and reported in the Environmental Appraisal Report [3], covered the following:

- Regulatory responsibility clarifications
- Clarifications on species diversity and interpretations of modelling figures, and on marine mammal distributions
- The need for caution in interpretations of fishing intensity statistics because of the impacts of reduced activity during the timeframe of the Cod Recovery Plan and Scottish Conservation Credit Scheme
- Greater detail on fish and fisheries
- Legacy issues from any leave in situ decommissioning solutions
- Impacts on infrastructure from waste brought to shore
- Advice on resources that may be useful to inform the assessment and their availability (e.g. the National Marine Plan Interactive online resource (known as NMPi), landing statistics, and fishing effort reports
- A recommendation that potential impact pathways are considered in the final environmental report and, where possible, evidence-based conclusive statements are drawn in relation to whether there could/couldn’t be a likely significant effect on any of the designating features in relation to Nature Conservation Marine Protected Areas
- The need for conclusions to be given in relation to whether the proposed decommissioning activities are capable of affecting, other than significantly, the protected features of designated sites
- That alternative solutions to decommissioning Dunlin Alpha are included and discussed to enable understanding of alternative impacts on key receptors
- Recommendation that realistic worst case scenarios be used in the environmental report, including contingency plans which may be required, for example additional rock cover for stabilisation purposes for topsides removal or maximum number of anchors that may be used. Maximum values should be used to inform the assessment with some discussion provided as to the likelihood of their actual use
- Suggestion that key survey limitations and scope of surveys be included in the environmental report so that it is clear how the survey results have been interpreted
- The way in which *lophelia pertusa* cold-water coral should be considered in the environmental report, and the information required, notably assessment of the impact against threatened and declining habitats
- Recommendations that the environmental report should include drill cuttings survey information
- The requirement for both mitigation to be included and discussed in the environmental report
• The need for cumulative impacts to be considered (including timescale indication for decommissioning activity and interaction with other neighbouring installations and facilities which are being decommissioned, for example those resulting from vessel concentration

5.3 Update Briefing September 2017

A half-day briefing session was held in September 2017 to update representatives from regulatory bodies and other users of the sea on the progress of the Comparative Assessment process and the four options for decommissioning the Dunlin Alpha installation which had been screened from the nine possible options originally under consideration. The organisations represented comprised:

• Dunlin Alpha Independent Review Group
• Marine Scotland
• Oil & Gas Authority
• Northern Lighthouse Board
• Scottish Fishermen’s Federation

BEIS and JNCC, although invited, were unable to attend.

The meeting enabled a complete overview to be given to those previously involved with other aspects of the Greater Dunlin Area decommissioning, and for questions to be answered with respect to individual elements of the pre-planning.

Among the issues highlighted were the potential impacts of other users of the sea and ways in which safety could be protected, loss of seabed access for fishermen arising from any potential derogation option, navigational safety, practicalities of different options for removal and the special nature of the platform given the steel transitions rising from the concrete legs through the splash zone. A request for a strong visual approach to be taken to the presentation of the options and eventual recommendation was taken on board by the Fairfield team as a means of making documentation more accessible.

5.4 Stakeholder Workshop (1) – November 2017

In order to provide an update on current thinking to the full group of stakeholders, a stakeholder workshop was held in November 2017, attended by 62 people from 45 organisations, together with the project team. The formal objectives of the meeting, led by independent facilitators Resources for Change, were:

• To inform stakeholders (organisations with an interest or stake in the Dunlin Alpha decommissioning project) about the current status of the planning and the future steps in the decommissioning process
• To facilitate stakeholder understanding and acceptance of Fairfield’s preparations, reasoning and foundation for the eventual proposals, which will be set out in an application to the UK government authorities for permission to decommission
• For stakeholders to understand the decommissioning challenge being considered by Fairfield and to consider and discuss these challenges with other stakeholders and company representatives.
• For stakeholders to provide feedback on any issues raised from their perspective, so that these could either be addressed on the day, or understand the process by which these will be responded to by Fairfield at a later point.
- To help Fairfield to better understand stakeholder issues and concerns about the planning for Dunlin Alpha decommissioning and to use this knowledge to inform the CA evaluation of options for decommissioning

- To capture stakeholder perspectives which may usefully inform Fairfield’s exploration and assessment of decommissioning options more broadly

An offer of support from the Oil & Gas Innovation Centre to contact relevant academics to attend the workshop was accepted and resulted representatives from the Universities of Aberdeen, Dundee and Strathclyde attending the event.

A full report of proceedings [7] was prepared following the event, including details of those attending and their evaluation of the day, and circulated for comment to all stakeholders whether or not they attended the meeting, and a final, amended version of the report was circulated and made available online in early 2018.

Comments arising and the Fairfield response (beyond minor clarifications corrected in the final report and offers of support for further research) are listed in Table 5.2 below.

### Table 5-2: Stakeholder Workshop (1) Comments and Responses

<table>
<thead>
<tr>
<th>Comment or Query</th>
<th>How/Where Addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Further information on the potential for the reuse of the installation offered</td>
<td>Declined on the basis that a comprehensive study [10] into re-use possibilities [ref] had previously been undertaken and had concluded that no technically feasible or economically viable re-use for the platform existed. Since publication, there is no evidence to suggest that the situation has changed. Also addressed within the stakeholder workshop report.</td>
</tr>
<tr>
<td>Where will plans for materials’ disposal and recycling be captured and where will the asset inventory appear?</td>
<td>Covered in the post-workshop report; this is addressed in the Decommissioning Programme [1] and Environmental Appraisal [3]</td>
</tr>
<tr>
<td>Intentions regarding consultation on rock cover to be used in connection with broader field decommissioning where selected for pipeline safety mitigation should not be limited to the Scottish Fishermen’s Federation.</td>
<td>JNCC to be kept informed of discussions and proposals regarding rock cover size and type. Other nature conservation consultees to be kept informed on a by-request basis.</td>
</tr>
<tr>
<td>Presence of <em>lophelia pertusa</em> cold-water coral could be considered a benefit within a derogation solution. Dunlin Alpha may act as a potential larvae ‘donor’ for <em>lophelia pertusa</em> and other species.</td>
<td>Acknowledged in Environmental Appraisal. Collaboration with Edinburgh University ANChor Project initiated for sampling, deployment of monitoring equipment and review of survey footage.</td>
</tr>
<tr>
<td>Where will the potential risks associated with both removal and leaving the structure <em>in situ</em> be covered?</td>
<td>This is covered in the Environmental Appraisal [3]</td>
</tr>
<tr>
<td>Expertise from other removal operations (i.e. Maureen Alpha platform) should be captured</td>
<td>Discussions previously held with the company which had been responsible for this aspect of the Maureen project demonstrated extensive difficulties would be associated with such a solution for Dunlin Alpha.</td>
</tr>
</tbody>
</table>
**Comment or Query** | **How/Where Addressed**
---|---
What has been done beyond examination of Best Available Technology in terms of additional research into cutting reinforced concrete and can further studies be conducted? | Studies into concrete degradation were commissioned by Fairfield in conjunction with two other operators with the Universities of Dundee [19, 20] and Leeds (PhD thesis), but no further standalone research is being considered because of the low expectations for any significant breakthroughs in the near term. Copies of papers provided.

Many of the issues associated with the fishing community are common to other users of the sea, including recreational vessels. Royal Yachting Association Scotland would wish to be consulted about marking of the structure (if derogation applies) on electronic charts as well as Admiralty Charts for the benefit of recreational users – notwithstanding the relative lack of recreational craft in the area. Longevity of the structure also an issue. Aids to Navigation preference for ‘legs up’ option is for more than one leg to be marked with AIS signalling plus radar reflectors for all legs. | Noted. Aids to Navigation will be discussed and developed with the Northern Lighthouse Board and these options together with longevity of the structure will be considered within that context. Addressed in the Comparative Assessment Report and Decommissioning Programme.

To what extent are the reports underpinning the decommissioning to be made available? | These were made available at the stakeholder workshop and requests for documentation relating to the project accommodated on request; in addition, all reports cited in eventual Decommissioning Programme and supporting documents are available for inspection during the statutory and public consultation.

Novel techniques to predict the behaviour of the concrete structure and diagnose integrity over coming decades are available and can be shared on request. | While there will be periodic monitoring of the structure if left in situ in agreement with the regulator, studies identify that leg failure is likely to be so far into the future as to make short and medium term monitoring unnecessary. Invitation offered to present the new technologies to the Fairfield team for the benefit of learning and knowledge exchange more generally.

More detail on the decommissioning timeline would be helpful. | Fairfield’s decommissioning website to be updated as and when information is available.

Reference within Dunlin Alpha Decommissioning video shown at the start of proceedings included reference to having removed all the attic oil – yet not absolutely everything was removed. | Video edited to make clear that ‘almost all the oil’ was removed during the attic oil recovery programme in order not to give a misleading impression.

Meetings were also held with stakeholder organisations where no-one was available to attend the stakeholder workshop. These included introductory meetings with the Offshore Contractors Association, Maritime and Coastguard Agency, and an in-depth discussion with WWF to explore issues relating particularly to cell contents (minutes and subsequent exchanges from this latter meeting appear in Appendix 2).

### 5.5 Comparative Assessment Evaluation Workshop March 2018

Once the preparatory studies for the four principal decommissioning options were sufficiently mature, a CA Evaluation Workshop was convened in March 2018 by the Fairfield project team with external stakeholders and relevant consultants. The CA process to date was described and the evaluation of the remaining options was reviewed. This meeting enabled the invited stakeholders to refresh and/or gain familiarity with the evaluation methodology and the information which the supporting studies and
analyses had generated both through advance copies of documentation and through a presentation at
the start of the workshop. It also allowed the evaluation to be challenged in key areas and, at the
culmination of the workshop, outcomes for each of the decommissioning groups were presented.

The Evaluation Workshop was attended by representatives acting in the capacity of either decision-
making participants, or observers. The external attendees were as follows:

- JNCC
- Marine Scotland
- Scottish Fishermen’s Federation
- Northern Lighthouse Board
- Health & Safety Executive
- Independent Review Group
- Oil & Gas Authority
- BEIS Environmental Management Team
- BEIS Offshore Decommissioning Unit

Full details of the capacities in which representatives attended are contained within the Comparative
Assessment Report [2] where minutes of the meeting are also provided within the appendices.

5.6 Emerging Recommendations Report – April 2018

Following the Comparative Assessment Evaluation Workshop, an Emerging Recommendations Report
[8] was produced and circulated to the wider stakeholder base for their review. It also formed the pre-
read for a second stakeholder workshop described below.

Greenpeace Research Laboratories submitted direct responses to the report contents, described in
Table 5-3 below. These, together with Fairfield’s responses, are summarised below and shown in full
in Appendix 3.
Table 5-3: Emerging Recommendations Report – Greenpeace Comments and Fairfield Responses

| Option 9 is first compared against options 5 and 6 and then subsequently against option 4. This gives the impression that option 9 is somehow a preferred case against which other options should be compared, rather than as one of four options that were still on the table. This is unlikely to impact on the final outcome of the comparative analysis, but does look like preselection of an option against which others have to measure up, rather than as an entirely objective analysis. | Option 9 (Transitions Up) was compared firstly to options 5 (Shallow Cut) and 6 (IMO Cut), and then subsequently to option 4 (Full Removal), but this was not the stated intent of the two stage evaluation. At the start of the evaluation, option 9 was neither a preferred case nor a preselected option against which to judge the others. The intent of the first stage of evaluation was to determine the derogation option with most merit when considered against the five evaluation criteria. This proved to be option 9 when the Evaluation Workshop was conducted but might equally have been one of the other derogation options. The second stage of the evaluation was to comparatively assess the leading derogation option against the Full Removal case – option 4. The intent of the two stage evaluation was actually to have the Full Removal case (option 4) as the preselected case against which the ‘best of the rest’ would be evaluated. Fairfield believes that both the approach and analysis were entirely objective. Clarify of this logic has been made in the final version of the Comparative Assessment Report. |

In section 6.3 on page 64, it is stated that the assessment that Option 4 was the most preferred option against the Operational Marine Impacts criterion was “dominated by the potential for marine impacts from the removal and recovery of the drill cuttings from the top of the cell base, an inherent part of all cell contents removal options.” However, in section 6.4.3 on pages 69 onwards, which assumes that there are no drill cuttings to remove or disturb, the environment criterion for option 1 for the cell contents barely increases at all (from 3.9 to 4.3%). If the preference for option 4 had been strongly influenced by the presence of drill cuttings as suggested, then it would be expected that assuming no drill cuttings would have had a far bigger influence over the comparison of options 1 and 4 than it appears to have had from e.g. table 6.5. The sensitivity analysis described in section 6.4.2 was based on disregarding the drill cuttings in the evaluation of cell content management options. Table 6.4 summarises the impact of this sensitivity on the original evaluation of the options. Directionally, under the Operational Marine Impact sub-criterion, option 1 becomes stronger (actually less weak) in comparison to the other options when disturbance of cuttings is ignored. This is partially offset, however, by option 1 having less merit when considering the Legacy Marine Impacts sub-criterion – moving from stronger to neutral in comparison to other options as result of option 1 no longer having cuttings recovery as part of the option’s environmental impact. This offset explains why there is a slight, rather than significant, increase (3.9% to 4.3%) in the overall environmental score for option 1 under this sensitivity. The greater benefit to option 1 under this sensitivity is actually the improved societal assessment – resulting from no longer carrying the burden of bringing large volumes of drill cuttings ashore for processing. Further information is available on these aspects of the evaluation if required. Text has been amended in the CA Report to clarify. In response to subsequent correspondence [see Appendix 3] and further explanation on the sensitivity analysis, Fairfield identified that an error had been made in the presentation of Table 6.4 of the Comparative Assessment Report [2] which has now been amended. |
On a more general level, it would be good to see the cell contents and drill cuttings described in more detail in this decommissioning report; which chemicals did they contain and at what sorts of concentrations? Even if this is all in other associated report, but it would be really useful to have a summary here.

The Comparative Assessment (CA) Emerging Recommendation Report is a record of the CA process and, most pointedly, the evaluation phase off that process. This document is not intended to be the repository for detailed information on either the cell contents or drill cuttings.

The cell contents and drill cuttings are described in overview within the draft Decommissioning Programme [1] and the components summarised in Chapter 2 of the Environmental Appraisal Report [3]. This will be accompanied by key supporting documents and amongst these will be the Cell Contents Technical Report and the Drill Cuttings Technical Report. These latter technical reports were made available to stakeholders in early February and all of the above will be made available online through the Fairfield website for the statutory and public consultation and beyond.

Further clarifications resulting from subsequent correspondence, detailing efforts to sample cell contents, appear in Appendix 3.

5.7 Stakeholder Workshop (2) – May 2018

The contents of the Emerging Recommendations Report were discussed more fully at the second stakeholder workshop held in May 2018. Attended by 40 people from 25 separate organisations, the meeting was designed to update stakeholders on the progress of the development of decommissioning proposals for the Dunlin Alpha installation, and on the emerging recommendations from the CA of options. A second objective was to collectively reflect on the work to date, and to identify whether there were any areas of outstanding concern which remained to be addressed before plans were finalised within a formal programme for statutory and public consultation.

Resources for Change who, once again, acted as facilitators, structured proceedings differently from the first workshop in November 2017. For this second workshop, the introductory presentations on the concrete gravity base substructure and the cell contents recommendations were followed by small group, round table discussions without members of the Fairfield team. This was designed to encourage participation and to give more opportunity for people to make contributions. Fairfield team members were available for questions of clarification, but were seated separately to ensure that the focus of the round table groups was on stakeholder discussion and comment in the first instance.

After considering reactions to the emerging recommendations from the Comparative Assessment process, key questions or issues were elicited by the facilitator and captured for feedback to the plenary session which followed, and for more detailed answers within the post-event report. The May 2018 Stakeholder Workshop Report [9] captures all the questions, issues and answers in detail. However, it is worth highlighting that the principal questions related to monitoring over time and long term liability, and the potential environmental impacts from the eventual release of cell contents. These are addressed in both the Decommissioning Programme [1] and in the supporting Environmental Appraisal Report [3].

A further key question related to the verification of cell contents through sampling to validate modelling. Fairfield is currently attempting (with some difficulty) to obtain samples of the contents from the topsides via internal pipework. External entry to the cells cannot be attempted until the topsides of the platform have been removed because of the risk of destabilisation of the legs that this would cause and the potentially fatal consequences for personnel on board the platform. Nevertheless, external entry
remains an option post-topsides removal should efforts to obtain samples internally before topsides removal prove unsuccessful.

Once again, a full report of proceedings including evaluation was produced and circulated widely with the opportunity for stakeholders to correct and/or comment upon the content before being put online. As a result, comments were received from stakeholders as described in Table 5-4 below.

Table 5-4: Stakeholder Workshop (2) Comments and Responses

<table>
<thead>
<tr>
<th>Comment</th>
<th>Response</th>
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<tr>
<td>A more informed answer to the question of liability in perpetuity could usefully be provided against section 3.4.6, incorporating details of the monitoring programme to be agreed with BEIS. Reference to the role of section 29 notice holders might also be usefully made to give confidence that in the long term there is control over liability.</td>
<td>Incorporated into final version of workshop report [9]</td>
</tr>
<tr>
<td>The provision of one Aid to Navigation (referenced in section 2.5.5) seems to be the optimal solution. Northern Lighthouse Board expectations would be based on expectation of an availability of 99.8% over any three year period, in accordance with relevant recommendations. This equates to a little over two days permitted downtime in any three year period, which in turn means that any failure will require immediate mobilisation of a repair initiative that will be good for at least the next three years, regardless of the current weather conditions. As such, it would be in Fairfield’s interest to provide fail-back capability, consisting of either a second live unit or a (testable) hot spare unit.</td>
<td>Fairfield intend to commission two Aid to Navigation assemblies and two docking frames. One active unit will be positioned on the structure and one standby unit will be held onshore under contract with the maintenance provider. The aid to navigation shall be located on leg C or D at approx. 23m above LAT. Two docking frames shall be installed on the selected leg to enable helicopter change out.</td>
</tr>
<tr>
<td>I have reviewed key parts of the [workshop report] and it is consistent with my personal observations and contributions throughout the stakeholder engagement sessions. The entire process was rigorous and open, enabling full dialogue with the stakeholders at appropriate times. The events were professionally set up and managed. Any questions outside of the forums were again professionally managed with effective responses.</td>
<td>Response noted</td>
</tr>
<tr>
<td>Main interests of our organisation relate to marine mammals and noise but based on the lack of relevant results in the report we don’t have any comments on the present document.</td>
<td>Advised that the Environmental Appraisal Report [3] covers environmental sensitivities in greater depth than the Stakeholder Workshop Report [9].</td>
</tr>
<tr>
<td>Perhaps a couple of general observations, which are not for Fairfield to answer, because they are much wider, more societal issues. Positions on these, however, may well have assisted Fairfield, or future decommissioning campaigns. The tension between the government’s liability to the abandonment of North Sea assets and obligations to society has not been extensively explored. Our society has progressed through several industrial revolutions. The Bings to the west of Edinburgh generated in the late 19th and early 20th century from the energy industry are a liability society is left to manage today. The CGB structures appear to be becoming the 21st century legacy from the energy industry. Perhaps, as a society would could be learning more from the past. The points above may be areas where further research could be done providing recommendations to government and industry.</td>
<td>Noted, and included here for wider awareness.</td>
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<tr>
<td>Comment</td>
<td>Response</td>
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<td>While the document does cover legacy this is confined to perpetual</td>
<td>Fairfield will consider plans for the documentation and how this will be managed beyond the statutory information that is required to be transferred and/or store. Guidance has now been provided by Capturing the Energy in order to make an assessment of the way forward.</td>
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<tr>
<td>liabilities, environmental effect etc. Has there been any consideration</td>
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<td>so far on legacy aspects with respect to key documents and plans for</td>
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<td>what happens to these once decommissioning has been completed? It would</td>
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<tr>
<td>be interesting to know what documents there are relating to Dunlin, both</td>
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<td>older pre-decommissioning documents and now during decommissioning</td>
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<td>planning.</td>
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5.8 Regulatory Meetings

5.8.1 BEIS and the Oil & Gas Authority

Throughout the decommissioning pre-planning activity, regular meetings have been held with the Offshore Decommissioning Unit at BEIS. Generally held on a quarterly basis, their frequency has increased since 2015 to enable practical matters to be addressed and an understanding of the level of detail required within the Decommissioning Programme and supporting documentation and studies to enable regulatory compliance. The Oil & Gas Authority have routinely been present at these meetings.

5.8.2 SEPA and the Environment Agency

As described within earlier tables, contact with the Scottish Environment Protection Agency gained pace from late 2018 with a meeting held to more fully understand expectations on waste strategies and Duty of Care. Copies of the Dunlin Alpha Waste Management Strategy [21] and various studies have been provided to SEPA for their review and met with approval. The Environment Agency has also had sight of the strategy and useful guidance provided to the Fairfield team on related issues to guide proposals for onshore recycling and disposal should materials be landed within England rather than Scotland.

5.9 Supply Chain and Industry Learning

While stakeholder engagement on the pre-planning has not been focused on the supply chain, it is worth noting that industry contact – both formal and informal – over the second phase of engagement has nevertheless been extensive in terms of the development and identification of potential solutions to overcome technical and other challenges. To this end, Fairfield has:

- Participated in the industry Share Fair
- Made presentations on a regular basis to industry conferences and meetings
- Attended seminars, working groups and conferences for learning and sharing of experience
- Held numerous one-to-one meetings with individual companies to explore ideas and understand potential offerings.
6 Statutory and Public Consultation

The Dunlin Alpha Decommissioning Programme is supported by a Comparative Assessment Report, Environmental Appraisal Report and Stakeholder Engagement Report. In accordance with regulatory requirements, statutory and public consultation is triggered by submission of the Draft Decommissioning Programme to the Department for Business, Energy and Industrial Strategy (BEIS) for their consideration. Regulatory consultation is conducted simultaneously by BEIS.

Stakeholders are invited to respond to the draft proposals during the six-week consultation which runs from 3rd August 2018. The closing date for responses is 14th September 2018. Comments should be sent by post or email to:

Peter Lee
Regulatory Affairs & Stakeholder Engagement Manager
Fairfield Energy Limited
19 Abercrombie Court, Prospect Road
Arnhall Business Park, Westhill
Aberdeen AB32 6FE
Stakeholder.Mailbox@fairfield-energy.com

The Draft Decommissioning Programme and principal supporting documents can be found online at www.fairfield-energy.com. Other documentation referred to within the consultation documents can also be made available for inspection by arrangement.

After collation of consultation responses and further discussions with BEIS, the Draft Decommissioning Programme and supporting documents will be updated and refined as required. Additional discussion with stakeholders may be needed depending on the comments submitted.

The Final Decommissioning Programme will incorporate details of comments from statutory and public consultees indicating how these have been addressed. Following approval from the Secretary of State, the final version of the programme will be made available online and stakeholders notified, as per those listed in Appendix 1 together with any further stakeholders who express interest.
7 References

   https://www.ospar.org/convention/agreements
[5] BEIS Offshore Oil and Gas Decommissioning Guidance Notes May 2018. NB the 2011 version of
   the Guidance Notes were followed for the majority of the decommissioning pre-planning until
   the 2018 revision was published
[6] Oil & Gas UK Guidelines on Stakeholder Engagement for Decommissioning Activities
   http://www.oilandgasuk.co.uk/
   http://www.fairfield-energy.com/operations/greater-dunlin-area/stakeholder-engagement/events-workshops
[9] Resources for Change Stakeholder Workshop Report May 2018
   http://www.fairfield-energy.com/operations/greater-dunlin-area/stakeholder-engagement/events-workshops
[14] Dunlin Alpha In Situ Deconstruction Report, October 2011
[16] Dunlin Alpha Stakeholder Workshop Consultation Report January 2010
    http://www.fairfield-energy.com/operations/greater-dunlin-area/stakeholder-engagement/events-workshops
    http://www.fairfield-energy.com/operations/greater-dunlin-area/stakeholder-engagement/events-workshops


8 Abbreviations

BEIS .................. Department for Business, Energy and Industrial Strategy
CA ...................... Comparative Assessment
CEFAS ............... Centre for Environment, Fisheries and Aquaculture Science
CGBS ................. Concrete Gravity Base Substructure
CoP .................... Cessation of Production
DECC .................. Department for Energy and Climate Change (now BEIS)
JNCC .................. Joint Nature Conservation Committee
NLB ................... Northern Lighthouse Board
OSPAR ............. The OSPAR Commission is the mechanism by which 15 Governments and the EU cooperate to protect the marine environment of the North-East Atlantic.
SEPA ................. Scottish Environment Protection Agency
SFF .................... Scottish Fishermen's Federation
APPENDIX 1  LIST OF STAKEHOLDERS CONTACTED FOR ENGAGEMENT

Aberdeen & Grampian Chamber of Commerce
Aberdeen City Council
Aberdeen Harbour Board
Aberdeenshire Council
Asociacion de Armadores
British Geological Survey
British Marine Federation
British Ports Association
Capturing the Energy
Cefas
Cetacean Research and Rescue Unit
Canadian Natural Resources
Comité National des Peches
Cromarty Firth Port Authority
Danish Centre for Marine Research
Danmarks Fiskeriforening PO (Danish Fish Producers)
Decom North Sea
Dunlin Alpha Offshore Installation Manager
East of England Energy Group
Edinburgh University
Energy Industries Council
EnQuest
Environment Agency
Equinor (formerly Statoil)
ExxonMobil
Faroese Fishermen's Association
Forth Ports
Friends of the Earth (Scotland)
Global Marine Systems
GMB Scotland
Greenpeace Research Laboratories
Health & Safety Executive
Heriot-Watt University
Highlands & Highlands Enterprise
Historic Scotland
International Association of Oil and Gas Producers
International Marine Contractors Association
International Maritime Organisation
Joint Nature Conservation Committee
KIMO UK
Lerwick Port Authority
Marine Alliance for Science & Technology for Scotland
Marine Conservation Society UK
Marine Scotland
Maritime and Coastguard Agency
National Federation of Fishermen's Organisations
National Oceanography Centre
Newcastle University - SEAFRONT Project
NOF Energy
Norges Fiskarlag (Norwegian Fishermen's Association)
North Sea Commission
North Sea Regional Advisory Council
Northern Ireland Fishermen's Federation
Northern Lighthouse Board
Norwegian Environment Agency
Norwegian Petroleum Directorate
Ocean Governance
Offshore Contractors Association
Oil & Gas Authority
Oil & Gas Innovation Centre
Oil & Gas Institute
Oil & Gas Technology Centre
Oil & Gas UK
OPITO
Opportunity North East
Peterhead Port Authority
Rederscentrale (Belgian Fish Producers Association)
RMT
Royal Yachting Association Scotland
RSPB Scotland
Scottish Association for Marine Science
Scottish Enterprise
Scottish Environment LINK
Scottish Environment Protection Agency
Scottish Fishermen's Federation
Scottish Wildlife Trust
Sea Source Offshore
Seas at Risk
Shell UK Limited
Shetland Oil Terminal Advisory Group (SOTEAG)
Siccar Point Energy
Society for Underwater Technology
Society of Maritime Industries
TAQA Bratani
UK Fisheries Offshore Oil and Gas Legacy Trust Fund
Unite the Union
University of Aberdeen (Centre for Research in Energy Economics & Finance)
University of Aberdeen (Decommissioning MSc Programme)
University of Aberdeen (School of Biological Sciences)
University of Strathclyde
University of West of Scotland
VisNed (Netherlands Fish Producers' Association)
WDC Whale and Dolphin Conservation
WWF
### APPENDIX 2  DETAILED RESPONSES TO WWF QUERIES

<table>
<thead>
<tr>
<th>WWF query:</th>
<th>WWF’s SUBSEQUENT COMMENT</th>
<th>FAIRFIELD’S RESPONSE TO COMMENT</th>
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<tbody>
<tr>
<td><strong>Why isn’t qualitative risk assessment done before comparative assessment (CA) to inform it?</strong></td>
<td>We believe QRAs can be done at any time but need to reflect the levels of uncertainties being dealt with. The CA process are single value numbers – there are no allowances for the ranges that exist within the studies conducted to support the CA process. The works up front, allowed limited time/discussion about the ‘CA’ process outcomes, with limited stakeholders, and no QRA input.</td>
<td>We would reiterate that both qualitative and quantitative risk assessments have been conducted at various stages of the Comparative Assessment process. Screening stage assessments have typically been qualitative in nature, whereas evaluation stage assessments have tended to be quantitative. Quantitative assessments are generally regarded as more robust as they are based on documented scopes of work. We therefore believe we have performed appropriate QRAs at each stage of the CA process.</td>
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<tr>
<td><strong>Quantitative assessments covering safety risk, environmental impacts, and cost are typically undertaken as inputs to the CA. Societal and technical risk assessment can be harder to measure quantitatively, and need to be modified according to the facility to be decommissioned. Descriptions don’t always work across different scenarios and can require adaptation to enable quantification. On safety, we undertake quantitative risk assessment based on stakeholder engagement and internal sessions, but challenges do exist, such as the 100m tunnels in the CGBS legs, which are particular to this project.</strong></td>
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**MINUTES RELATING TO ELEMENTS OF DISCUSSION ON THE DUNLIN ALPHA PLATFORM, held 8 December 2018**

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<tr>
<th>WWF’s SUBSEQUENT COMMENT</th>
<th>FAIRFIELD’S RESPONSE TO COMMENT</th>
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| **WWF comment:**
Our consultant says that FEED-level engineering should be applied before decision making.  
*Fairfield Energy response:*
There are various different phases of in a typical project but for decommissioning, FEED studies would be undertaken later. For development work, it is normal for operators to use conceptual engineering for selecting between alternatives, followed by FEED for the final investment decision. Detailed design and execution is carried out afterwards.

In terms of understanding the four CGBS options being explored for Dunlin Alpha, we do think they have been assessed to the appropriate level, and we have prepared full methods statements for each. Quantified analysis of risk to persons, environmental impacts, fuel use, emissions, noise in the marine environment, and cost and technical challenges as well as societal upsides have all been covered and we therefore think we understand the options for the CGBS very well. The full removal case is one of the options.

[The four options for decommissioning the CGBS were described at this point, with reference to the diagram showing all options in the stakeholder workshop report.] All feasible options explored back in 2010-12 were revisited and re-explored in 2015 and extra options added. The possibility of toppling was not considered acceptable. Leaving the module support frame in place was also examined for the potential of the structural role this could play in keeping the concrete legs together and enhancing longevity from 1000 to 1500 years. The question was whether one could rely on the structure over that period of time and the implications of constant maintenance.

It is not usual to make key decisions so early in the process based on ‘concept/feasibility studies’.

FEED studies demonstrate that you have a good understanding of the issues and have done some realistic works to try to come up with solution to problems. Feasibility levels works do not go to this level and usually identify areas requiring further efforts. The uncertainty bands for feasibility level works are so wide you cannot confidently make decisions – that is why FEED studies for more than one option are always done. Decommissioning is no different in this respect to any other project.

Maersk undertook more advanced studies for Leadon before making the final decision –there is no evidence of any attempt to address full removal of the bundle properly.

w.r.t. GBS – as there is no formal paperwork in the public domain past 2012 it is not possible to see if the works are adequate – based on 2012 and SID approach.

Many industry sectors employ a stage-gate process for decision making. The labels Appraise-Select-Define-Execute-Operate are commonly used in the Oil and Gas sector and the underlying principle is to mature available options sufficiently in order to make an informed decision between them. For investment decisions, this is typically done in the ‘Select’ phase of a project, based on feasibility level studies. It is simply not the case that FEED studies are always done for more than one option. FEED is typically performed in the ‘Define’ stage. We view decommissioning scopes in the same manner and believe we have an appropriate level of engineering definition to make an informed comparative assessment of the options.
### MINUTES RELATING TO ELEMENTS OF DISCUSSION ON THE DUNLIN ALPHA PLATFORM, held 8 December 2018

**WWF comment:**
The four options for the CGBS CA have used 50 years to truncate some of the study assessments since if you extend these to infinity the case becomes too hypothetical.

On cost, we understand the ongoing monitoring liability that any leave *in situ* solutions for installations and subsea infrastructure entails.

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<th>WWF’s SUBSEQUENT COMMENT</th>
<th>FAIRFIELD’S RESPONSE TO COMMENT</th>
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<tr>
<td>[You’ve] done the CA for the GBS – if so why not talk to stakeholders first?</td>
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<td>On ongoing liabilities – how can these costs be understood with no firm proposals or agreement with the Regulators?</td>
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<td>We note that you refer to the CA as a discrete one-off activity whereas we would contend that the CA is a multi-stage process. With reference to the CA evaluation step, this has not yet been undertaken for the Dunlin CGBS. While the CA process is an ongoing activity, the CA evaluation is scheduled to be held in March 2018. In preparation for this stage of the process, we have spoken extensively with stakeholders, not least the very well attended general workshop we conducted at the Aberdeen Exhibition Centre in Nov 2017, and of course our engagement with your Simon Walmsley in Dec 2017.</td>
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<td>We agree with your point that ongoing liability costs are uncertain in the absence of any firm agreement on a monitoring program with the regulators. That said, we do have some appreciation of what each derogation option might require by way of monitoring and, where necessary, navigation aid maintenance and have made cost estimates for these aspects. We believe these costs will be found to have little influence in the outcome of the evaluation. It might also be noted that the removal of costs is the first sensitivity analysis we would be expected to perform during the CA evaluation stage which might diminish the importance of any cost uncertainty.</td>
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<td>WWF query:</td>
<td>WWF’s SUBSEQUENT COMMENT</td>
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<td>Questions have been raised about in-perpetuity responsibilities at the Shell Brent workshops, particularly on monitoring and payment. Would you work this up? What are the expectations?</td>
<td>The answer on Liability in Perpetuity – if materials are brought to shore then the ongoing liabilities are well understood and would apply – so you don’t need to go on indefinitely.</td>
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<tr>
<td>Fairfield Energy response:</td>
<td>50 years limit is not agreed with anyone, nor it seems discussed with stakeholders before being applied, at any time and is an arbitrary value applied. If costs are discounted back to such a level they do not influence the decision then why not remove the liability now as money isn’t the issue?</td>
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<td>The regulator (OPRED) is currently talking about three to six year cycles for pipeline monitoring in the northern North Sea (two to four elsewhere), with five to ten years for the footings of steel piled jackets and ten years for CGBS, but a risk based approach is being taken to the ongoing monitoring of installations. On liability in perpetuity, it’s important to understand the options and their implications. If a structure is brought to shore, where do you stop on the waste stream in terms of accounting for the societal and environmental impacts. 50 years isn’t when those cease, but when assessing options for CA, execution of the scope and later monitoring needs to be bounded rather than go to infinity. The way future cash flows are discounted means that the costs further out become less relevant anyway.</td>
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<tr>
<td>MINUTES RELATING TO ELEMENTS OF DISCUSSION ON THE DUNLIN ALPHA PLATFORM, held 8 December 2018</td>
<td>WWF’s SUBSEQUENT COMMENT</td>
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<td><strong>WWF query:</strong> What about black swan events or decay, or a problem with the fishermen?</td>
<td>Not too sure that this is acceptable – the IMO regulations say that the structures needs maintaining to prevent collapse – that implies some 250+ years of ongoing liabilities etc. There needs to be much more clarity on how these issues will be managed – Regulators are not clear either except for the fact that the taxpayer won’t become liable.</td>
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<tr>
<td><strong>Fairfield Energy response:</strong> We have explored speculative scenarios, such as if derogation were applied for and granted, with the legs left up on the basis that they’d last 1000 years, but collapse (for whatever reason) occurred in 20 years. While the CA doesn’t include the costs of going back to fix the issue, that doesn’t mean we wouldn’t return to remediate it. We don’t include such scenarios in the definition of the option since by the time weightings for probability were applied it would be inconsequential in terms of how it affected the option scores. But we have thought through the possibility of a number of significant, if unlikely, incidents. With respect to risks to other users of the sea, not just the fishermen, we are well aware of the legacy impacts, but not every ‘worst case’ scenario has to be included because the low probability of them occurring means there would be low material impact on CA outcomes.</td>
<td>Please provide evidence of this activities?</td>
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<tr>
<td>WWF comment Sector wide, we would like to see more JIPs, not just for bundles but for cell contents.</td>
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<td><strong>Fairfield Energy response:</strong> We represent a relatively small percentage of bundles, but we do have a CGBS and so there is a higher responsibility for us to pursue investigations on these. We have therefore engaged with other operators to understand what they’re doing and the difficulties they encounter given the variation between the different structures. We are trying to set up a work group around cells and we were party to the IOGP work group last year.</td>
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### MINUTES RELATING TO ELEMENTS OF DISCUSSION ON THE DUNLIN ALPHA PLATFORM, held 8 December 2018

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<th>WWF's SUBSEQUENT COMMENT</th>
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<tr>
<td>WWF comment: Cell contents and drill cuttings are the two things we will always bring up and we may push more on these than on other areas. Based on the stakeholder workshop report, drill cuttings still seem to need more work to be done on the biology and implications for disturbance from benthic storms and bioturbation, and for BAT and sampling techniques to be able to take deeper samples. The Norwegians do very well on this.</td>
<td>The effort put into our drill cuttings pile sampling has enabled us to undertake a more thorough and accurate assessment of the Dunlin drill cuttings pile than has previously been undertaken for other drill cuttings piles decommissioned on the UKCS.</td>
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<tr>
<td>Fairfield Energy response: In fact we believe we have done rather well in this area with the number and type of samples obtained, and really went the extra mile over the course of a year on drill cuttings sampling. While we had trouble getting deep cores off the side we actually did take quite a number of samples. The company we used had thought the technology could deliver for us and we tried hard on this one. We spoke to BEIS EMT beforehand and their feedback was that we were doing more than others. At some point we will be able to provide you with the drill cuttings report and then discuss this further with you. A joint meeting with David Santillo at Greenpeace might be a useful way forward as he has expertise in this area.</td>
<td>The Murchison drill cuttings pile, for example, which was decommissioned in-situ, in compliance with OSPAR 2006/5, on the basis of data taken only 6 push core samples (three for fauna analysis and three to characterize the physical and chemical composition of the pile), none of which extended beyond 50 cm in depth. By comparison, we took three vibrocore samples (ranging from 3.0 to 3.8 metres in depth), four ROV push core samples (ranging from 0.35 to 0.725 m in depth) as well as twelve seabed sampling stations in and around the footprint of the Dunlin drill cuttings pile.</td>
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<td>Debatable about cutting sampling being ‘done rather well’ – not very deep samples taken. Fugro don’t have the right technology for deep coring drill cuttings. Drill cuttings report will follow usual oil industry assessments etc. (i.e. won’t address heavy metals etc.)</td>
<td>The survey strategy was developed collaboratively by Fairfield, Fugro and Xodus Group and in consultation with OPRED who approved the methodology prior to execution of the survey. The survey fulfills the requirements for a cuttings pile assessment as stated in OLF, 2003.</td>
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<td>Rather than Fugro not having the right technology for deep coring drill cuttings as is suggested in the comment, the equipment deployed was chosen to give the best chance of success taking into consideration previous experience of surveying the Dunlin cuttings pile where the flare boom and weather (blow on conditions) had prevented samples from being taken.</td>
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<td>Regarding WWF’s assumption that Fairfield won’t have addressed heavy metals, sediments collected were analysed for aluminium, arsenic, barium, cadmium, chromium, copper, lithium, lead, mercury, nickel, strontium, vanadium and zinc, as well as radionuclides. This is talked to in both the Fugro survey report and the Dunlin Alpha Drill Cuttings Technical Report (links to</td>
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<tr>
<td>MINUTES RELATING TO ELEMENTS OF DISCUSSION ON THE DUNLIN ALPHA PLATFORM, held 8 December 2018</td>
<td>WWF’s SUBSEQUENT COMMENT</td>
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### MINUTES RELATING TO ELEMENTS OF DISCUSSION ON THE DUNLIN ALPHA PLATFORM, held 8 December 2018

**WWF comment:**

Regarding cell contents on Brent (noting that the quantity of cell contents is far more significant in Shell’s case), we replied to Shell’s reply to the joint NGO submission by writing a letter to the OSPAR Contracting Parties’ heads of department. We have proposed to them that a two-stage decommissioning process be carried out, with sampling of the cells at the second stage. Shell have not done many samples and we would like to see a different approach explored by Fairfield to get an idea of what is in Dunlin Alpha, and to prevent release of the contents in hundreds of years. The Norwegians do cell content analysis differently.

**Fairfield Energy response:**

I am not aware of anyone else doing this sampling differently. We have had discussions with Enpro on their hub technology and they have contributed to our option definition work. We are continuing to work with them on the cell content sampling possibilities.

In terms of access to the cells, you are familiar with the structural requirement for differential pressure (achieved through drawdown). External penetration through cells has a potential impact. Normally, if there was a leak of the Enpro hub you’d pressure up the caisson but wouldn’t flood the legs which sit atop the cells. However, we have an irreparable breach in the conductor cooling system in a 6” GRP (glass reinforced plastic) line. This is one of the integrity issues which shut down the platform alongside Brent System issues and low oil prices. This breach means that whatever pressure we see in the cells is experienced in leg A. A sea to cell leak would therefore flood leg A to LAT, requiring flooding of the other legs. This would necessitate down-manning of the installation.

We are currently conducting the plugging and abandonment (P&A) of the wells - isolating the reservoir is our first responsibility to prevent release, but we’re only half way through and won’t externally penetrate cells and risk compromising the P&A. It would be possible to go back after P&A, but then we have to ask ‘what’s the value of the information that we’d obtain?’

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<tbody>
<tr>
<td>Seem to have completely missed the point of a 2 stage programme. Enpro use is based upon sampling whilst in operation –same issue as Brent</td>
<td>Our approach to the characterisation of the cell contents has sought to be as robust as possible, where the inventory is validated through alternative means such as modelling or physical sampling. This is explained in more detail in the Cell Contents Technical Report (Rev A2) in Chapter 3, pg 110 onwards.</td>
</tr>
<tr>
<td>Need 'legal compliance of delivering an accurate inventory (BEIS and OSPAR expectation) –is this making the argument that there is no or limited value in sampling.</td>
<td>The project stance is that the data we have is sufficient to inform the recommendation on the preferred management option for the cell contents. We are however endeavoring to obtain further data through sampling via the existing pipework (rather than creating new external penetrations) in which to further validate the inventory and provide supporting evidence should a derogation be sought to leave the structure and contents in place.</td>
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<td></td>
<td>The requirement for independent assurance of the supporting data has been addressed, iner alia, through the appointment of an Independent Review Group (IRG). We have also appointed an independent body to oversee aspects such as Chain of Custody if we are successful in obtaining direct survey and sample information from within the cells.</td>
</tr>
</tbody>
</table>
**WWF comment:**
A JIP on this would be useful.

**Fairfield Energy response:**
Unfortunately a JIP on this would be too specific to this particular platform. We looked at this as a possibility in 2010-12 through the cell contents discussion group. The view then was that the Attic Oil Recovery Programme had been done well.

We have looked again at what is in the cells in recent times and assessed the adequacy of the CO2 removal of the attic oil: 75 cells, internal compartments each contain steelwork with 36 mini sections within the 100ft tall cells. There are 2700 little pockets, with a delivery pipe some 4-5m below, inhibiting further removal. Shell (via Sigma3 and SWACO) introduced chemicals to deliver the CO2 to get to the stranded attic oil. We've looked, remodeled, done everything we could think of to assess from different perspectives and have to say that Shell did a pretty good job of removal. So then we have to ask ‘do you go back and do it again?’

There will inevitably be some mobile oil – there will always be a layer/water breakthrough because of coning and cusping. The model says that there is a layer of less than 2cm of oil. We have erred on the side of caution and assumed 5-10cm for our modelling, but we're probably into uncertainty because of the scale and so have now exhausted modelling options. We know there is oil, and we are trying to understand where it is, how concentrated it is, how it would come out in cases of acute release. We're also looking at the fate of wax and sediment. We are trying to build up a 3D picture of where the hydrocarbon is and how change occurs over time, working through scenarios.

On sediment, Shell blew the Brent reservoir down; this wasn’t done on Dunlin so we don’t have anywhere near the same amount of sediment. There will probably be some sediment in the four cell groups, mainly where the rundown lines terminate in each group. We have modelled the flow characteristics and the sediment particulates will typically not have travelled far through the cell groups. In the four cells where the rundown lines terminate, the modelling says there could be 90cm in the first cell, whereas the sediment in more remote cells would be much less. There are two key things here that account for this: first, the port jumps [cell interconnections] at an elevation of 28m and the settlement of particulates in the first cell, inhibiting passage.

**WWF comment:**

Vitrification and solidification of wastes – where is the evidence of

The residual oil layer in the tops of the cells is likely to have been changing significantly in nature over the last
<table>
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<tr>
<th>MINUTES RELATING TO ELEMENTS OF DISCUSSION ON THE DUNLIN ALPHA PLATFORM, held 8 December 2018</th>
<th>WWF’s SUBSEQUENT COMMENT</th>
<th>FAIRFIELD’S RESPONSE TO COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>That explains the remark about AORP down to ALARP in the stakeholder report – although I don’t like the term ALARP in this context.</td>
<td>these assessments. No existing stakeholder engagement makes this difficult to assess.</td>
<td>ten years, becoming more viscous and less mobile. The project considered delivery of gelling agents into the cells, similar to the concept considered by Shell during development of the Attic Oil Recovery Project (AORP), however this concept was never taken any further as it was not technically feasible to deliver the gel through the cell matrix. The project also considered capping of the sediment, this was screened out and is further discussed in the Cell Contents Technical Report (Rev A2) in Sections 4.9 and 4.12.3, pg 223 onwards and pg 255 onwards respectively. Any option to manage the cell contents requires new external access points to the cells. Assessment results showed that should the decision be made to create this access then the most effective option thereafter was to remove the contents as far as possible, balancing the resources used and creation of waste materials against the residual inventory, rather than delivering more materials into the cells to manage the contents <em>in situ.</em></td>
</tr>
<tr>
<td>Fairfield Energy response:</td>
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<tr>
<td>Agreed – it is an awkward use of the concept.</td>
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<tr>
<td>WWF question:</td>
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<tr>
<td>Have you considered vitrification and solidification of waste in the cells?</td>
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<td>Fairfield Energy response:</td>
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<td></td>
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<tr>
<td>Yes.</td>
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### MINUTES RELATING TO ELEMENTS OF DISCUSSION ON THE DUNLIN ALPHA PLATFORM, held 8 December 2018

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<th>WWF question:</th>
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</tr>
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<tbody>
<tr>
<td>Have you done anything on bioremediation?</td>
<td>Poor quality input data (production records) = poor output report by default.</td>
<td>The option to bioremediate the residual contents has been considered in our planning. The treatment methodology considered the materials that would need to be delivered into each of the cells, taking account of the limited means of circulating them within the cell groups and how they would need to be delivered, as well as maintenance that would be required after initial deployment. The project findings were that in order to deliver the materials, new access points would need to be created in the cell tops, but with no guarantee of their efficacy over time. Furthermore there would be repeated future intervention requirements to top up reagents and monitor the biological processes, with an impact in terms of vessel emissions, etc. The bioremediation option was therefore screened out.</td>
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**WWF’s SUBSEQUENT COMMENT**

- Bioremediation – always difficult to assess what to do when you don’t really know what you are dealing with. It is however a much better option than doing nothing as there is some 1000 years for things to happen before any releases.

**FAIRFIELD’S RESPONSE TO COMMENT**

- This is discussed in full in the Cell Contents Technical Report (Rev A2) in Sections 4.8 and 4.12.3, pg 218 onwards and pg 255 onwards respectively.

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*WWF question:*

Have you done anything on bioremediation?

*Fairfield Energy:*

Yes, we have looked at both bioremediation and capping. There is also a ‘leave alone’ option. Other options include further mechanical intervention (recovery of mobile oil, wax, water and sediment phases). On cell by cell basis we have a picture of where we think the contents are and some 70 options/permutations of different scales of recovery are currently being screened to see which has most merit. There can be no full oil recovery from the cells other than via the entire removal of the structure. Penetration of each cell (as in Brent) would only get a maximum of 50%. How much effort do you go to? Different options have different recovery efficiencies, for example related to whether or not drill cuttings have to be moved, and the 500-page cell contents report, currently being finalized, speaks to this. On recovery, it is external penetration-based recovery that would be done post-P&A. If we were to do it, we wouldn’t get everything – it would be 25-50% and the drill cuttings would also need to be removed with hydrocarbon release implications (which we’ve also modelled) via different release mechanisms.

On bioremediation and capping, we looked at this for the hydrocarbon phase and then at capping of the sediment, but by the time you drill a hole to deliver the capping medium, you’d be as well to try to get the contents out. We think the sediment is in the initial cells so we would need to go in and try to excavate, hoover, or somehow fluidise them. It would be necessary to prove up the technology and upscale it first, however - assuming we could do this. We are questioning whether there is merit in doing this. On bioremediation, the ‘quick view’ is that by the time you make the hole you’d probably opt for conventional recovery rather than bioremediation which would entail ongoing management and significant resources for a very small return, especially in the absence of any heat.
### MINUTES RELATING TO ELEMENTS OF DISCUSSION ON THE DUNLIN ALPHA PLATFORM, held 8 December 2018

#### WWF’s SUBSEQUENT COMMENT

**WWF comment:**
There are seeded species that work at low temperatures.

**Fairfield Energy response:**
Yes, but there is no current passing through the cells and so they couldn’t be distributed and just wouldn’t get through. There is no piping there to circulate contents.

We undertook screening for all options including a leave *in situ* scenario, but capping and bioremediation have been screened out and the further recovery options do not look attractive. We think the conclusion by most observers will be that ‘the orange has been squeezed’.

**So without any discussions options screened out?**

**FAIRFIELD’S RESPONSE TO COMMENT**
We have consulted a number of parties, including academia, throughout the CA process to verify that our basis for screening out options has considered appropriate information and facts. This has included a review of new developments in biotechnology and species able to work outside of their niche environmental conditions. None of these are available on an industrial scale and, even if they were, they would still require access to the cells to deploy initially and then future intervention as discussed in the response directly above.
APPENDIX 3  DETAILED RESPONSES TO GREENPEACE RESEARCH LABORATORY QUERIES

Extract from exchange of correspondence, 18 June 2018, in response to initial queries of 2 May 2018

Greenpeace Research Laboratories:  (1) In section 5.2 on page 49, option 9 is first compared against options 5 and 6 and then subsequently against option 4. This gives the impression that option 9 is somehow a preferred case against which other options should be compared, rather than as one of four options that were still on the table. This is unlikely to impact on the final outcome of the comparative analysis, but does look like preselection of an option against which others have to measure up, rather than as an entirely objective analysis.

Fairfield:  You are correct to observe that option 9 (Transitions Up) was compared firstly to options 5 (Shallow Cut) and 6 (IMO Cut), and then subsequently to option 4 (Full Removal), but this was not the stated intent of the two stage evaluation. At the start of the evaluation, option 9 was neither a preferred case nor a preselected option against which to judge the others. The intent of the first stage of evaluation was to determine the derogation option with most merit when considered against the five evaluation criteria. This proved to be Option 9 when the Evaluation Workshop was conducted but might equally have been one of the other derogation options. The second stage of the evaluation was to comparatively assess the leading derogation option against the Full Removal case – option 4. The intent of the two stage evaluation was actually to have the Full Removal case (option 4) as the preselected case against which the 'best of the rest' would be evaluated. We believe both the approach and analysis were entirely objective. We will clarify this logic in the final version of the Comparative Assessment Report.

Greenpeace Research Laboratories:  (2) In section 6.3 on page 64, it is stated that the assessment that Option 4 was the most preferred option against the Operational Marine Impacts criterion was “dominated by the potential for marine impacts from the removal and recovery of the drill cuttings from the top of the cell base, an inherent part of all cell contents removal options.” However, in section 6.4.3 on pages 69 onwards, which assumes that there are no drill cuttings to remove or disturb, the environment criterion for option 1 for the cell contents barely increases at all (from 3.9 to 4.3%). If the preference for option 4 had been strongly influenced by the presence of drill cuttings as suggested, then it would be expected that assuming no drill cuttings would have had a far bigger influence over the comparison of options 1 and 4 than it appears to have had e.g. table 6.5.

Fairfield:  The sensitivity analysis described in section 6.4.2 was based on disregarding the drill cuttings in the evaluation of cell content management options. Table 6.4 summarises the impact of this sensitivity on the original evaluation of the options. Directionally, under the Operational Marine Impact sub-criterion, option 1 becomes stronger (actually less weak) in comparison to the other options when disturbance of cuttings is ignored. This is partially offset, however, by option 1 having less merit when considering the Legacy Marine Impacts sub-criterion – moving from stronger to neutral in comparison to other options as result of option 1 no longer having cuttings recovery as part of the option’s environmental impact. This offset explains why there is a slight, rather than significant, increase (3.9% to 4.3%) in the overall environmental score for option 1 under this sensitivity. As you will have noticed, the greater benefit to option 1 under this sensitivity is actually the improved societal assessment – resulting from no longer carrying the burden of bringing large volumes of drill cuttings ashore for processing. Please advise if you need any further information on these aspects of the evaluation.

Greenpeace Research Laboratories:  On a more general level, it would be good to see the cell contents and drill cuttings described in more detail in this decommissioning report; which chemicals did they contain and at what sorts of concentrations? I guess that is all in other associated report, but it would be really useful to have a summary here.
**Fairfield:** You will appreciate that the Comparative Assessment (CA) Emerging Recommendation Report is a record of the CA process and, most pointedly, the evaluation phase off that process. This document is not intended to be the repository for detailed information on either the cell contents or drill cuttings. As you suggest, it is our intention to describe the cell contents and drill cuttings within the draft Decommissioning Programme to be submitted for consultation in the coming months. This will be accompanied by key supporting documents and amongst these will be the Cell Contents Technical Report and the Drill Cuttings Technical Report. These latter technical reports were made available to stakeholders in early February and all of the above will be made available online through our website for the statutory and public consultation and beyond.

**Exchange of Correspondence, 3 July 2018, in response to 18 June exchange of emails**

**Greenpeace Research Laboratories:** So far, I have had chance only to look at the cell contents report. There is an impressive amount of modelling and specification of assumptions and uncertainties there, but am I correct in understanding that so far there have been no validation samples collected from either the sediments or the water phase? It is so far based entirely on models with input from past records of production rates and volumes and chemicals used, is that right? I thought I saw some data but then realised that those were from Brent.

**Fairfield:** That is correct – no physical samples (of oil, water, wax or sediment) have been taken from within the cells. The compositional basis used for these materials has been validated by both analogous sampling from similar projects and operational sampling from Dunlin. The sediments recovered from the topsides separators during vessel cleaning have been used to enhance our understanding of the nature and location of the sediment materials in the cells and similarly the historical produced water discharge sampling has also been used. We have further validated the basis through the use of dynamic simulation on the oil recovery operations to understand how the fluids would have behaved within the cells and whether this correlates with the observations during the operations.

**Greenpeace Research Laboratories:** I realise that there are substantial technical difficulties in collecting samples, but I feel this is going to remain a fundamental limitation unless and until it is possible to get some real, representative materials for empirical analyses. Most of the contents in the cells would have accumulated over times before the introduction of the HMCS, as far as I can tell, such that records on precisely which chemicals were used and in what quantities may well have been much more limited. The validation that has been carried out so far is, as far as I am able to tell, further desk-based validation rather than empirical validation, and if so, this will always feel a bit like pulling oneself out of the mud by one's bootstraps.

From Page 331, it appears that there is still a plan to collect and analyse some real samples, though it's not clear when, nor whether any final decision on decommissioning will have been taken before the results of any such analyses may become available. It is also not clear what range of contaminants would be included in the analyses conducted, and using which methods. Would be great to hear more about those plans and how the results could influence the decision-making given that the proposal is likely to be submitted for consultation in advance of sampling and analysis.

**Fairfield:** The project is currently progressing projects to obtain physical evidence from within the cells. A number of challenges have been encountered during both the deployment of a neutron backscatter tool into the J-tubes in Leg D and ROV access to the rundown lines in Leg B. The status and forward plan to address these challenges is as follows:

- There are high pressures in the rundown pipework and difficulties have been encountered with safely venting these gas phases due to their volume and sour composition. Additional risk mitigations are being put in place and an engineered venting solution is under development.
• Attempts to flow fluids from the umbilical connected to the STATS plug in rundown line B have encountered wax pellets, creating a blockage to flow. It is now looking unlikely that a representative fluid sample will be able to be extracted from the B rundown line, but this is under further investigation.

• Further investigation is also required into the inhibitor gel inserted into the rundown line pipework to understand if an ROV can navigate through this material or whether it will first need to be displaced. Further engineering will be required to develop this scope.

• Offshore testing of the neutron backscatter technique to see through the pipework into the structure has been performed for a single cell to support data interpretation and calibrate the readings with respect to material type (concrete, gas, oil, emulsion, wax or water) and location (due to how the tool detects the different material phases). Should the issues with data interpretation be resolved, Fairfield would look to deploy the tooling on a number of J-tubes to survey selected cells.

In preparation for if physical samples are obtained, the project has defined a list of the physical, chemical and biological parameters that would be analysed in the samples and how the survey information would be interpreted. The samples would be independently analysed. Due consideration would be taken to ensure the safe custody and transportation of all samples, from the time that the sample tooling is retrieved until the time the samples are formally accepted and logged by the analytical laboratory. The recovery, storage, transport and handover of the samples would be witnessed by an independent third-party. The intent is to evaluate the results from the planned survey / sample operations and then consider whether further evidence is required. If further evidence is required, new external penetrations in the cell tops would need to be considered. As external penetrations create the potential for a sea to cell leak, which ultimately would necessitate abandonment of the installation, such a programme would only be contemplated after the topsides have been removed.

Greenpeace Research Laboratories: I’ll take a look at the drill cuttings report as soon as I get chance.

In relation to the responses [of 18 June]:

(1) that is now clearer to me, but would definitely benefit from the additional clarification in the text. As I said, it is unlikely to have a difference in the final assessment, but could be significant in relation to how those assessments are viewed and understood.

Fairfield: Thank you for your comments. We will endeavour to make this point clear in the final revision of the Comparative Assessment Report.

Greenpeace Research Laboratories: (2) I see what is being said here, but I feel that is an artefact of the method...if it is a positive to remove something under one scenario, then the same positive rating should apply if that thing was not there to be removed in the first place. As it stands, it seems that the fact that there is no longer this improvement to be made has counted against that option. In other words, assuming there are no cuttings has pushed one criterion up and another simultaneously down. That seems like a bias. I would be interested to know how the assessment would look if that neutral rating was not applied to offset but instead was left as a positive, given that the legacy impacts would be expected to be the same for there being no cuttings as there would be in the case that cuttings were there initially but were removed. Otherwise it feels as though Option 1 is in a no-win scenario in relation to this aspect.

Hope that makes sense. Very happy to arrange a call at some stage to talk any of this through, if it could help resolve these questions more simply.
In the meantime, thanks again for making sure that I have had the opportunity to see and comment on all this information, despite my lack of availability for the stakeholder meetings. It is much appreciated.

**Fairfield:** As stated earlier, the sensitivity analysis portrayed in section 6.4.2 was based on disregarding the drill cuttings in the evaluation of cell content management options. This sensitivity was conducted to better understand whether the best long term management option for the cells was dependent or independent of the presence of the drill cuttings. With drill cuttings disregarded, the relative merits of each option will naturally change. It would be inappropriate to only disregard the cuttings when it favours a particular option. Put in simple terms, keeping the virtues while ignoring the disadvantages of a single option would seem like the very definition of bias. Building on your point regarding a positive to remove something staying a positive if that thing is not there to be removed in the first place, why would that positive (ie no cuttings present) only apply to option 1? Options 2, 3 and 4 could also lay claim to this positive, if somewhat fictitious, assumption. As a result, the comparative assessment of the options on this aspect would rightly be neutral – just as we concluded in the sensitivity analysis.

That said, your comments made us reflect on why there was any discernible improvement in option 1 under the environmental criterion for the ‘no drill cuttings’ sensitivity. While the wording in table 6.4 accurately reflects the sensitivity case we performed and describes how the two environmental sub-criteria offset one another, and how the societal evaluation of option 1 improved as a result of not bringing large volumes of drill cuttings ashore for processing, we have realised that the bar chart actually portrays the set of assumptions you have proposed. For clarity, the stacked bar chart which shows the environmental evaluation increasing from 3.9% to 4.3% is already based upon the following inputs:

(i) disregard the cuttings disturbance required for option 1, thereby making option 1 stronger (less weak) under ‘Operational Marine Impacts’ in comparison to the other three options which would, in reality, require no cuttings disturbance; and

(ii) retain any benefit of removing cuttings for option 1, thereby leaving option 1 stronger under ‘Legacy Marine Impacts’ than the other three options; and

(iii) disregard the adverse societal impacts of bringing large volumes of drill cuttings ashore for processing, thereby making option 1 stronger under the ‘Societal’ criterion

As outlined above, we believe that the above suite of assumptions is demonstrably biased in favour of option 1. As the text and chart are not precisely aligned, we propose to revise the Comparative Assessment Report to include the bar chart which should have been presented in table 6.4. This will show that the environmental evaluation for option 1 was unchanged under the ‘no drill cuttings’ sensitivity analysis, with the only difference in the overall assessment being from the societal benefit of no longer handling the drill cuttings waste stream. We have included the correct chart below and apologise for the error in the original report. In summary, we would contend that the long term management option for the Dunlin cells is insensitive to any assumptions on the presence or management of the drill cuttings.