

BRENT E-NEWS

Brent Decommissioning Project

Welcome to the fourth in the series of regular communications from the Brent Decommissioning Project Team

In this issue:

Introduction

An update from Austin Hand, Project Director

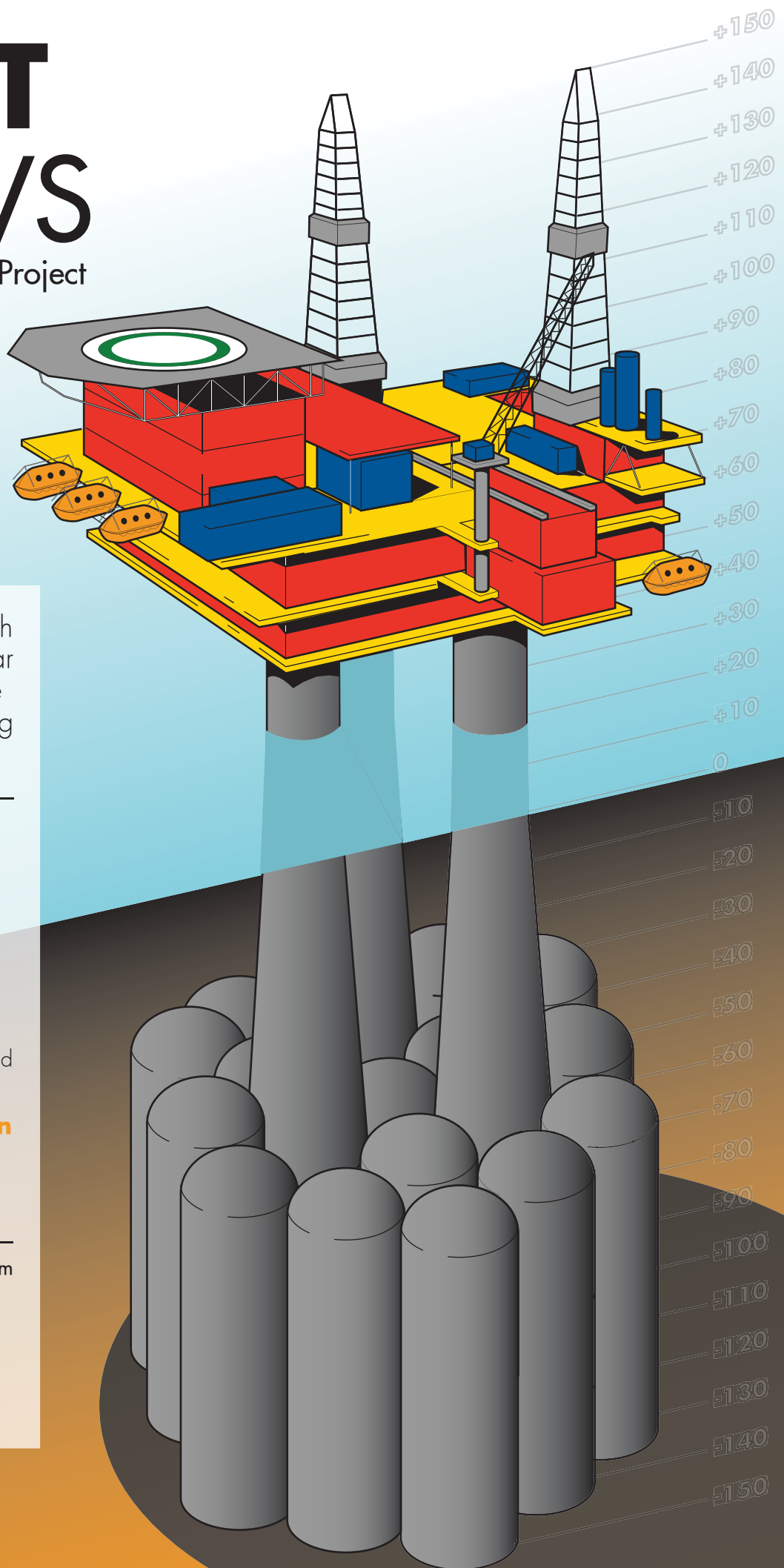
Gravity Base Structure (GBS) Storage Cells

An overview of the issues and options

GBS Cell Remediation

Frédéric Ducellier, GBS cell remediation team lead, discusses the project

www.shell.co.uk/brentdecomm



BRENT

Stakeholder Update

Welcome to the fourth in the series of regular communications from the Brent Decommissioning Project Team.

One of the biggest challenges facing the Brent decommissioning project is the content of the storage cells in the three concrete substructures known as Gravity Based Structures (GBSs).

We know that there is a layer of 'attic' oil sitting on top of some oily water, below which is some sediment. This sediment is solid or semi-solid material. We have modeled what we believe is present in the Brent Delta GBS storage cells based on analysis of sediments from various facilities like the Sullom Voe terminal which receives the oil from the Brent field.

However, the challenge is threefold. We need to achieve access to the cells to acquire a sample. We then need to verify our thinking and finally, determine the best course of action to deal with these contents: either removal or 'treat in place'.

Please take time to read and understand the challenges we face, and also to contact us with your thoughts and considerations.

Austin Hand
Project Director



Stakeholder dialogue sessions: **29 June and 01 July 2010**

The next Brent decommissioning stakeholder sessions are scheduled for 29 June in Aberdeen and 01 July in London. The Environment Council have sent out e-mail invites to all stakeholders.

For further information, please contact:
erica@envcouncil.org.uk or jim.niven@shell.com

BRENT

Unlocking the secrets of the subsea storage cells

Working on the Brent Decommissioning Project means getting to grips with some of the most complex technical challenges experienced by our engineers today. One such challenge is how to sample and manage the contents of the massive Gravity Base Structure (GBS) storage cells at the base of the Brent platforms.

Technical experts at Shell are currently investigating a variety of possible solutions for dealing with the contents of the field's GBS storage cells. The objective is to identify a range of acceptable solutions that satisfy the safety, regulatory, environmental, technical, societal and cost criteria which each element of the overall project is ranked against. Focusing initially on Brent Delta – the first of the field's four platforms to be decommissioned – the GBS Cell Remediation Studies team has identified a number of possible options.

In this newsletter, we go back to basics, recap on the cell remediation options to date, and meet the man leading the team working the issues.

As in the past, we will also continue to keep you informed on the progress of our various studies through stakeholder dialogue sessions and other communication channels.



Float out of GBS cells



Float out of GBS cells



Float out of GBS cells

BRENT

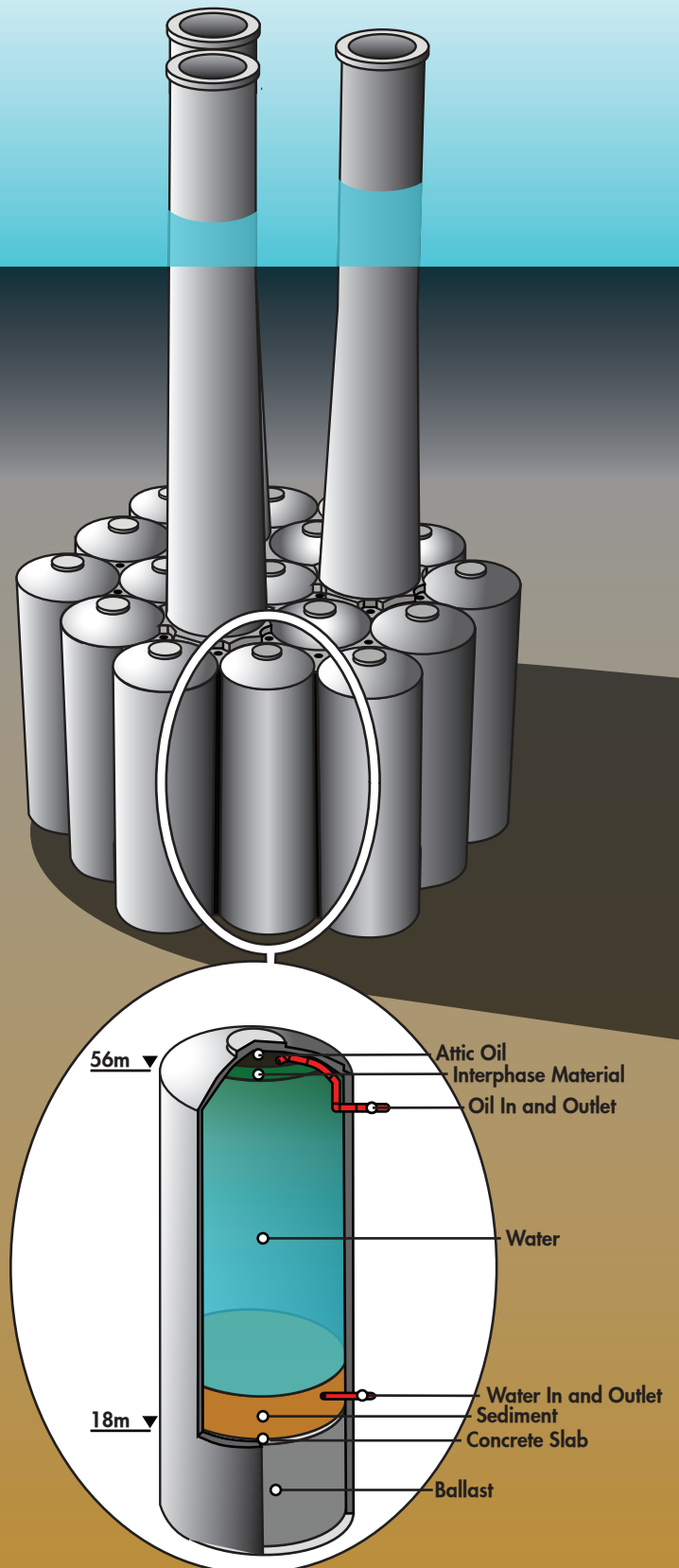
What are we dealing with?

The Brent Delta GBS has 16 oil storage cells at its base, each measuring approximately 60 metres high and 20 metres in diameter. Though one-third of the capacity of each cell comprises gravel ballast sealed by a concrete slab, these cells provided potential storage for around a million barrels in total.

During the first 20 years of Brent field production, oil produced from the reservoir was stored temporarily in the storage cells before being exported. From the late 1990s, when the field was redeveloped to produce mainly gas, the oil that continued to be produced contained a much higher proportion of co-produced water, which was separated in the storage cells and the oil exported to Sullom Voe oil terminal, via the Brent Charlie platform and the Brent System pipeline.

After more than three decades of production, each cell is likely to contain:

- 'Attic oil' (a layer of oil trapped in the dome of the cell)
- Water, including "inter-phase" material between the oil and the water layers
- Sediment containing hydrocarbons
- At the bottom of each storage cell (above the ballast seal) we believe there could be up to several metres of sediment containing hydrocarbons – an inevitable by-product of long-term storage of produced fluids. The physical and chemical properties and volume are as yet unknown, but samples from other parts of the export system, and experiences elsewhere, suggest the material could be in solid to semi-solid state.



BRENT

What needs to be done?

Apart from at initial construction, no-one has ever seen inside the Brent storage cells.

The first stage is to assess from existing information the range of volumes, composition and characteristics of the fluids and sediments the cells contain. This will allow an initial evaluation of the options and will guide the planning for obtaining a physical sample of the sediments in the cells.

Understanding the properties of these sediments will help the team move to the next stage of the project, confirming the best approaches in dealing with the cell contents, and deciding on the optimal solution.

BRENT

What are the issues?

A key focus area for the GBS Cell Remediation studies team is gaining access to a cell. Once this is established, the team will then try to survey and sample the sediment, with a view to developing a possible plan to mobilise/extract the contents, should this prove necessary.

One way is via a subsea route of drilling of a hole in the roof of the cell. To do this successfully, we need to identify a satisfactory seal which would be placed between the drilling equipment and the concrete dome. An ineffective seal would risk leakage of seawater into the storage cell and possible flooding of the GBS leg. Onshore trials simulating offshore conditions are ongoing and a number of technical solutions are being explored. (For further information on the trials conducted and other ongoing trials, please get in touch with us by email on brentinfo@shell.com or via the Contact Us form on www.shell.co.uk/brentdecomm)

Another option is to use mini Remotely Operated Vehicles (ROVs), or pipe-crawlers, which can travel along the existing narrow pipework into the cell. Onshore trials of a number of modified versions of these devices have not been completely successful and this method is unlikely to be used for sampling. However, one crawler prototype has possibilities for use in surveying the cell using a camera and sonar device, and the team is now working with the developer to carry out modifications and testing in further onshore trials.

Currently, the team's preferred approach for obtaining a physical sample is via subsea access. It has already been established that for safety and technical reasons, access via the existing pipework is not desirable for sampling. Also, any sampling activity is likely to be carried out after the platform has ceased production.

BRENT

What are the GBS Cell Remediation options so far?

The team is investigating ways to recover the attic oil and transport it via the existing pipework and pipeline system using offshore facilities. Alternatively, if necessary the attic oil may be shipped to shore for combining with the main oil production stream.

Treating water and “inter-phase” materials will depend on factors such as oil content. If oil is present at levels below agreed limits it could be left in situ in the cells, as it is similar to oil levels in produced water discharges in current operations. If necessary however, the water and inter-phase material may be treated in situ or removed to the topsides or to a vessel offshore for treatment.

Two principal concept scenarios (and their sub-concepts) are being studied:

Concept Scenario A: Remove and treat

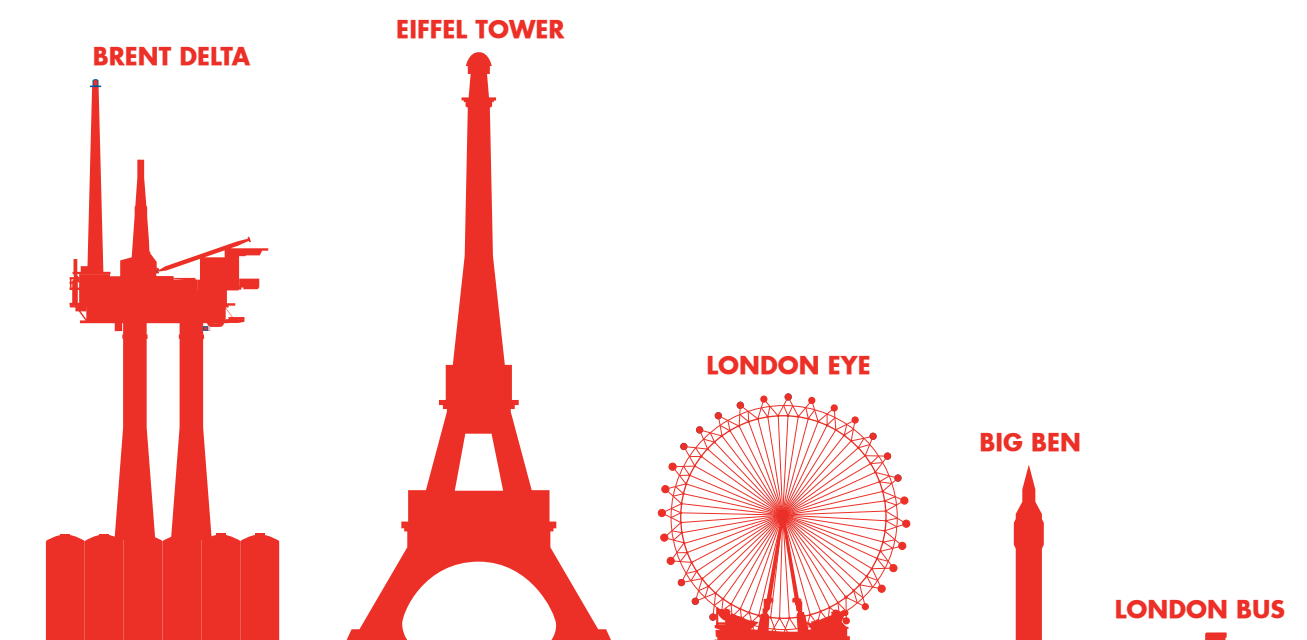
Following removal, the sediment may be reinjected down a waste disposal well; or treated offshore to remove hydrocarbons and

disposed offshore (to sea) if within licensed discharge levels.

Concept Scenario B: Leave in place

The sediment will be left within the existing structure, with the option of a capping agent being applied on top of the sediment. A long-term monitoring and verification process would also be put in place.

These scenarios are based on ongoing studies and are therefore subject to change. However, the options outlined appear the most feasible at present. At this stage no decisions regarding a preferred option have been made. As we progress with our studies, we will keep you updated via emails and/or on the website www.shell.co.uk/brentdecomm



BRENT

Frédéric brings learnings from Downstream decommissioning

“

“This is a very interesting project, not least because we are investigating something entirely new,” says Shell’s GBS Cell Remediation Team Leader, Frédéric Ducellier.

”



“All the technology we are exploring in terms of subsea access, or treating and dealing with the sediments, will be developed specially for this project. It’s therefore important that we think as widely as possible before focusing on specific solutions.”

Frédéric, who has a background in environmental science and engineering, joined the team in June 2008 from Shell’s Downstream business, where he specialised in soil and water remediation and waste management at the company’s onshore oil terminals and refineries.

“Downstream has been decommissioning far longer than Upstream, where it is an industry in its infancy. During my 15 years in the Downstream business, I learned a great deal about the processes, the legislation and how to design solutions that comply with all the necessary requirements,” he says.

In focusing on the Cell Remediation options, Frédéric and his team also need to be aware of the bigger picture.

“Within the overall project, the key issue is to make sure our solutions fit into the rest of the Brent Decommissioning story, in terms of the platforms’ phased ‘engineering down’, (shutting down the facilities and preparing the platforms

for removal) and topsides removal. The main thing here is to find a solution with the flexibility to accommodate that phasing.”

Central to the team’s activities is a ranking process which enables them to input all relevant data available for each solution, and ranks the solution according to how it measures against the project criteria mentioned above.

“The feasibility of the various solutions may change as more data becomes available,” Frédéric says. “As we progress, it is expected that choice of the best option will become clearer”.

Meantime, he adds, an important missing element is the sediment sample data. “While our various studies continue to explore all the cell content management options, finding a feasible means of obtaining a sample of the various cell contents is a priority.”

**For further information
on the Project, please visit:
www.shell.co.uk/brentdecomm
and/or get in touch with the team via the
‘Contact Us’ link on the website.**

< PREVIOUS