TOPSIDE & PIPELINE FACILITIES DECOMMISSIONING

GUIDANCE ON CONDITIONING/ CLEANING PRIOR TO DECOMMISSIONING/ DISMANTLING

Prepared by WG4

MAY 2008
INDEX

Introduction

Overview

Flow Charts

1. Contract Strategy Decision
2. Inventory Checking
3. Resale / Reuse Decision
4. Define Cleanliness Standard
5. Topsides Cleaning Issues
6. Onshore Dismantle / Disposal
7. Pipeline Cleaning
8. Topsides Cleaning Techniques
9. Safety Management System
10. Safety Case Adjustments
11. Workforce Management

Appendices

Decommissioning Technology Forum (DTF) Report Extract (Jul-06) Session 1

Offshore Workshop Notes/ Participants (Oct-07) Session 2

Onshore Workshop Notes/ Participants (Jan-08) Session 3

Npf Break Out session Notes Session 4

Pipeline Workshop Notes (Feb-08) Session 5
Introduction

Part of OGUK/PILOT decommissioning initiative is to actively raise awareness about decommissioning issues; improve supply chain engagement and capture learning and experience where available as part of continuous improvement agenda.

This document is the first in what is hopefully a series offering guidance based on recent experience from operators, consultants and contractors on topside and pipeline conditioning or cleaning as part of the decommissioning process. This area was selected as several major projects have completed this activity phase.

It builds on an earlier document prepared by the Decommissioning Technology Forum based on Ekofisk; Frigg and NW Hutton experience.

The input was gathered by five workshop sessions as below:

1. DTF – Topsides Cleaning Workshop 9 May 2006
2. WG4 Workshop – Offshore Topside Cleaning 4 Oct 2007
3. WG4 Workshop – Onshore Topside Cleaning 31 Jan 2008
4. NPF Conference Topside Cleaning break out session 12 Feb 2008
5. WG4 Pipeline Cleaning Workshop 27 Feb 2008

More details on participants and detail output are contained in the appendices.

The document is intended to provide guidance on some of the issues faced, options to be considered and opportunities for improvement that could be realised. It is not intended as a prescriptive series of requirements or a comprehensive guideline on how to execute the activities.

To make the output accessible, usable and understandable the various areas covered have been discretely identified in the form of simple flowcharts. These charts are not exhaustive or necessarily complete but are intended to provide a rational flow in the preparation process to stimulate early thought and minimise late surprises.

It is hoped that the document provides a base to expand on as further experience materialises but any project will need to consider their own circumstances as different execution options maybe dictated by the overarching Project Execution Strategy rather than optimisation of a single activity.
Notes

The above tries to simplify represent how each of the detailed flowcharts are generally related and also highlights the key overlaps, however, in practice many other interlinks exist.

Each of the Detailed Flowcharts have identified which workshop sessions contributed to that specific area of the process, as indicated by workshop sessions numbers on previous page.

Session details and contributors can be found in Appendices.
WHAT IS OVERALL REMOVAL STRATEGY?
DO WE LIMIT REMOVAL OPTIONS OR LEAVE OPEN?

HOW WILL RISK OF QUANTITY UNCERTAINTY BE HANDLED
- IN THE CONTRACT?
- BY THE REGULATOR?

REDUCED OPPORTUNITY REUSE
MAXIMUM OPPORTUNITY REUSE

PIECE SMALL
REVERSE MODULAR
SINGLE LIFT

GREATER LEVEL OF OFFSHORE CLEANING
GREATER LEVEL OF ONSHORE CLEANING

WHY AND WHERE ARE WE CLEANING / CONDITIONING

WEIGHT UNCERTAINTY
HSE FOR PERSONNEL/ ENV RISK
IDENTIFY CONTAMINANTS & MINIMISE HAZARDS
ALLOW HOT CUTTING
REMOVE H-C SOURCES IMPACT ON HAZARD AND SAFETY CASE

OFFSHORE MANHOURS
LARGE NO OFFSHORE LIFTS
DOUBLE HANDLING
DECK ACCESS / INTEGRITY & STORAGE SPACE
WORKFORCE ACCOMMODATION

BLOCKERS
OPERATOR ‘RELUCTANCE’
UNPROVEN TECHNOLOGY
LIMITED OFFLOADING SITES
UNPROVEN COST

OPPORTUNITY
THE STANDARDS FOR SHUTDOWNS & TURNAROUNDS MAY BE EXCESSIVE FOR OFFSHORE PREPARATION – NOT SEEKING FLOW ASSURANCE, EQUIPMENT RELIABILITY & PERFORMANCE, INSPECTIONS REQUIREMENTS

OPPORTUNITY
JUST IDENTIFYING THAT CONTAMINANT IS PRESENT MAY BE SUFFICIENT. UNLIKELY THAT QUANTITIES WILL BE PREDICTED WITH GREATER ACCURACY OR CLEANED WITHOUT LEAVING TRACES

OPPORTUNITY
SUPPLY CHAIN CONSOLIDATION IF OFFSHORE / ONSHORE CLEANING / CONDITIONING IS A SINGLE SUPPLIER. THE SELECTION OF EFFICIENCY OF LOCATION WOULD BE MORE STRAIGHTFORWARD

OPPORTUNITY
NEED TO MAINTAIN PERSONNEL CONTINUITY BUT NEED TRAINING IN CHANGING MINDSET OF OPERATIONS TO DECOMMISSIONING

OPPORTUNITY
MINIMISE REQUIREMENTS FOR ACCESS – CAN BE BIGGEST OFFSHORE MANPOWER REQUIREMENT

OPPORTUNITY
IS FLUSH SUFFICIENT? WHERE IS IT OK.

OPPORTUNITY
GREATER CO-OPERATION & DOCUMENT INTERFACE BETWEEN OFFSHORE & ONSHORE EARLY IN THE PROCESS

Opportunities
Green – Opportunities
Pink – Observation / Consideration (Based on Current Experience)
Offshore Oil & Gas Facilities Decommissioning

RESALE / REUSE DECISION

1. Agree High Level Scope
   - Level of Cleanliness
   - Re-Use or Not
   - Mothball / NUI or Not
   - LQ Available or Not

2. Can Firm dates for supply of items for sale to ‘Beach’ be given
   - Yes
   - No

3. Does Decommissioning Strategy involve NUI Operations
   - Yes
   - No

4. Can all Appropriate paperwork be located (Maintenance Records)
   - Yes
   - No

5. Consider how to limit potential liability from being a ‘supplier of equipment’ and any legal obligations.

6. Reconsider Resale Strategy
   - Internal Resources
   - External Contractors
   - Evaluate (Cost x Effort) < Perceived Resale Value

7. Reactivating LQ & key equipment after a long period of being shutdown can be time consuming and expensive

8. Evaluate amount of effort required to locate paperwork
   - Considerable
   - Minimal

9. Establish ‘Ownership’ of perceived ‘Resale Value’ and how it will be shown on the “Bottom Line”

10. Proceed with Cleaning Process

11. Proceed via usual Asset Disposal route

12. Workshops Session – 1
   - Green – Opportunities
   - Pink – Observation / Consideration (Based on Current Experience)

Key

- Green – Opportunities
- Pink – Observation / Consideration (Based on Current Experience)
Develop a Decommissioning Strategy

Is there a Decommissioning Strategy

Yes

Develop Key Personnel for Decommissioning

No

Develop a Decommissioning Phasing Strategy

CONSIDER
- Developing / Agreeing Cleanliness and Pressure Handover Certificate Requirements with Operations.
- What happens to operational consents in NUI Mode, Length of time platform will be cold – i.e. maintenance of F&G systems, SCE Elements, Accommodation.
- End fluid / solid disposal plans – which may dictate system cleaning sequences and offshore cleaning permits. Optimise use of ‘Operational Discharge Consents’.
- Avoid decommissioning Simops with wells to finish, before cleaning up topsides. This avoids the requirement for sub-system isolation cleaning this is expensive / time consuming.
- Importing power / fuel gas to allow simpler NUI operations.
- How to leave the equipment after cleaning. Potential resale will impact on cleaning strategy.
- Mothballing / decommissioning decision as this will dictate level of cleanliness and whether or not to cut drain holes rather than breaking flanges.
- A residual waste survey to provide information to the onshore demolition yard.

Workshop Session – 1

Key Personnel are needed during the planning phase of the decommissioning works to retain operational familiarity and competence.

Will Equipment be Sold / Reused or Scrapped

Sale / Reuse

Scrapped

Proceed with Reuse / Resale Process

Develop Cleaning / Preservation Strategy on this assumption.

Offshore Oil & Gas Facilities Decommissioning

Topsides Cleaning Issues
Offshore Oil & Gas Facilities Decommissioning

ONSHORE DISMANTLE / DISPOSAL

Contract Strategy
Decision
Taken for Onshore / Offshore Workscope and Re-Use / Disposal

Key Drivers to Maximise Efficiency
- Early Involvement
- Establish Interface with Offshore
- Access to Engineering, As-Building Information
- Detailed Waste Inventory
- Waste Inventory Level of Detail

Establish Weight, Delivery Window Custody Transfer

Dismantle

Re-Use
Re-cycle

Manage and Track Waste

OPPORTUNITY
PARTNERSHIP / JV WITH OFFSHORE CLEANING AND ONSHORE DISMANTLING

OPPORTUNITY
SPECIALIST EQUIPMENT TO IMPROVE EFFICIENCY & SAFETY FOR PIECE SMALL REMOVAL

OPPORTUNITY
DISMANTLING FACILITIES CAPABLE OF RECEIVING > 10,000t STRUCTURES

OPPORTUNITY
OFFSHORE PREPARATION SHOULD BE TERTED CONDITIONING NOT CLEANING

OPPORTUNITY
ESTABLISH COMMON PROTOCOL AT HANOVER INTERFACES

OPPORTUNITY
IF NOT ESSENTIAL LEAVE TO ONSHORE – DO NOT DUPLICATE EFFORT

Blockers
- Limited Market Demand

Blockers
- Limited Specialist Waste Routes

Consider
- EARLY DIALOGUE WITH REGULATOR
- ACCURATE PASID’s MAINTENANCE RECORDS ASSIST IN PREDICTING CONTAMINATED AREAS
- CAPTURE OFFSHORE DOCUMENTATION OF STATUS FROM RECORDS
- OFFSHORE VISIT & EARLY LIASON WITH OFFSHORE STAFF

Consider
- LONG LEAD FOR TRAILERS Vs SCHEDULE FLEXIBILITY

Consider
- NATURE OF COATINGS IF HOT WORK PLANNED
- ARE CDM (Construction, Design and Management Regulations 2007) RELEVANT
- KEEP WALKWAYS / STAIRS AS FAS POSSIBLE TO MAINTAIN ONSHORE ACCESS

Workshop Sessions – 3 4

Key
Green – Opportunities
Pink – Observation / Consideration
(Based on Current Experience)
Preparation & Engineering Phase

Operations Input Documentation & History

Establish
- Likely Condition
- Remnants Requiring Treatment
- Criteria to be met
- Procedures to interface with existing operational practices

Execute

Dispose of Waste

CONSIDER
- ACCESS REQUIREMENTS OFTEN REDUCED BY MODIFICATIONS
- LAYDOWN AREA REQUIREMENTS
- HISTORY OF PIGGING / STATUS OF PIPELINE
- WASTE DISPOSAL ROUTES
- ESTABLISH CLEANLINESS REQUIREMENTS
- THINK PHYSICAL &/OR CHEMICAL TREATMENT
- TIE IN POINTS TO EXISTING SYSTEMS – UTILITIES & WASTE
- EARLY SITE VISIT
- LEAKING VALVES
- OTHER PLATFORM ACTIVITIES IMPACT
- BE AWARE OF CORROSION PRODUCTS eg. BLACK POWDER
- USE OF PLATFORM PUMPS & CHEMICAL STORAGE TANKS

OPPORTUNITY
MAKE BEST USE OF OPERATIONAL PIGGING IN LATE LIFE STAGES

OPPORTUNITY
PIG AT EARLIEST OPPORTUNITY PRODUCTION TO AVOID CHANGES TO REMNANTS AND REDUCED SERVICES

Key
- Green – Opportunities
- Pink – Observation / Consideration (Based on Current Experience)

Offshore Oil & Gas Facilities Decommissioning

Workshop Session – 4
**TOPSIDE CLEANING TECHNIQUES**

**Consider:***
- Volume of Waste and Disposal Routes – Can They Be Accommodated?
- Cleaning Location Drivers
  - Spill Risk
  - Health Risk
  - Safety Risk
  - Lifting Uncertainties
  - Effort
  - Access/Issues
  - OPERATIONAL DISCHARGE CONSENTS
- minimise occupational health hazards
- Risk assessment removal of different materials at different locations

**Workshop Sessions – 1 2 3 4**

- **Offshore Oil & Gas Facilities Decommissioning**
- **Opportunity:**
  - Consider using new/different technologies to cut drain holes/vents in piping to avoid breaking flanges/removing spools
- **Challenge:**
  - Operational Flushing Techniques are appropriate for Decommissioning

**Consider:**
- Are all systems to be cleaned identified?
- Does each system have an agreed cleanliness standard?
- Does the cleaning standard have to be met onshore or offshore?
- Agree required level of cleanliness for each system
- Identify all systems on the facility

**Develop specific Decommissioning Flushing Procedures**

- Consider chemicals & Mechanical Techniques
- Consider Waste Product Disposal

**Test Flushing Techniques or use a combination of cleaning methods**

- Consider 'Global Isolation' of Topside (e.g. install New 'tartan cables' to minimise risk/optimise isolations)

**Consider:**
- Consider using different tools to establish drains/vents (e.g. Wask Tee Set)
- Avoid breaking flanges wherever possible
- Consider the amount of time and effort required for cleaning

**Consider:**
- Corroded Flanges / Bolts increase chances of hand injuries (flogging spanners slipping)

**Key:**
- Green – Opportunities
- Pink – Observation / Consideration (Based on Current Experience)
Offshore Oil & Gas Facilities Decommissioning

SAFETY MANAGEMENT SYSTEM

Workshop Session – 1

Decision made to Commence Decommissioning

Review Proposed Decommissioning Strategy

Assess Operational Work Control Systems Vs Expected Work Types

Assess ISO 14001 implications of Decommissioning

May Need to Revise ISO 14001 Registration to Decommissioning

During Decommissioning there may be more SIMOPS/Hot Work/Lifting activities than usual during production operations

It is highly likely that Decommissioning will produce different waste types and waste volume increases

Can SCE’s (Safety Critical Equipment) be reduced/deleted

Yes

No

Assess Operational Work Control Systems Vs Expected Work Types

Assess ISO 14001 implications of Decommissioning

Continue using Controls until Milestone point is reached

Info

Info

Yes

No

Revise Safety Case Appropriately

Can SCE’s (Safety Critical Equipment) be reduced/deleted

Assess Operational Work Control Systems Vs Expected Work Types

Continue using Controls until Milestone point is reached

Are Deck Management Controls appropriate for volume/type of works

Continue using Controls until Milestone point is reached

This is a large brownfield site. As building may not be up to date all modifications may not have been recorded/approved. Expect the unexpected.

Assess impacts of health issues such as isocyanates, Hot Cutting, Asbestos Exposure, Sand Blast, Noise Effects, on other Worksites.

It is Highly Likely that some controls are too onerous given the state of the plant.

It is highly likely that some new controls may be required to address specific requests.

Consider developing a strategy to electrically isolate as close to the energy source as possible (Generators, Batteries etc).

Avoid individual field instrument isolations (Process, Electrical, Controls & Instrumentation) wherever possible.

Consider early how continuous HSE management is applied.

It is highly likely that some new controls may be required to address specific requests.

Consider developing a strategy to electrically isolate as close to the energy source as possible (Generators, Batteries etc).

Avoid individual field instrument isolations (Process, Electrical, Controls & Instrumentation) wherever possible.

Consider early how continuous HSE management is applied.

During Decommissioning there may be more SIMOPS/Hot Work/Lifting activities than usual during production operations.

It is highly likely that Decommissioning will produce different waste types and waste volume increases.

Assess ISO 14001 implications of Decommissioning.

Continue using Controls until Milestone point is reached.

Are Deck Management Controls appropriate for volume/type of works?

Yes

No

Revise Safety Case Appropriately.
Review SCE and their relevance for each identified milestone condition. Develop Management of Change procedure for Safety Case transitions. Can SCE’s be reduced / deleted? Use IVB/ICP to verify changes are acceptable. Revise Safety Case Appropriately.


Consider a full time HSE Manager required early to deal with regulator issues. Develop IVB/ICP Engagement Strategy for Safety Case / SCE Impact Assessments.


Revise Safety Case Appropriately. Use IVB/ICP to verify changes are acceptable. Can SCE’s be reduced / deleted?

Offshore Oil & Gas Facilities Decommissioning

SAFETY CASE ADJUSTMENTS

Workshop Session – 1

Key
Green – Opportunities
Pink – Observation / Consideration (Based on Current Experience)
Decision to Commence Decommissioning Studies

Identify Decommissioning Competencies needs

Identify Key Target Milestones where Crew Levels Can Be Reduced Eg. SCE Maintenance Schedule (Safety Critical Equipment)

Develop the Decommissioning Workscope Communications Plan

Develop Decommisioning Training Program

Liaise with Brownfield Engineering Contractor HR

Liaise with Operator HR

Liaise with Drilling Contractor HR

Commence regular communications program

Ensure that 'Management of Responsibility' of installation SMS is clearly defined

Develop Skill / Experience Retention Plan

Communicate early and support with transparent opportunity plan

Consider Retention Incentives

Are there other long term Employment Options Available

No

Yes

Consider more mature workforce who retire when Decommissioning is complete

Develop Management of Change Program to change experienced personnel out

Ensure "Decommissioning Strategy needs are identified for duration of the work eg. Tartan Cables may reduce EA Demand"

Ensure there are sufficient Electrical Authorities/ Permit Implementers / Signatories

Ensure that 'Permit Personnel are part of Decommissioning Workscope Development Team and they are appropriately authorised"
APPENDICES
Session 1

Decommissioning Technology Forum (DTF)
Report Extract (Jul-06)
Session 1
Contents

1.0 Introduction Page 3
2.0 Source of Data Page 3
3.0 Mindmap/Flowcharts Page 3
3.1 Decommissioning – Topsides Cleaning Issues – Mindmap Page 4
3.2 Decommissioning – Topsides Cleaning Issues – Strategy Flowchart Page 5
3.3 Decommissioning – Reuse/Resale Flowchart Page 6
3.4 Decommissioning – Topsides Cleaning Techniques Flowchart Page 7
3.5 Decommissioning – Define Cleanliness Standard Flowchart Page 8
3.6 Decommissioning – Workforce Management Flowchart Page 9
3.7 Decommissioning – Safety Management System Flowchart Page 10
3.8 Decommissioning – Safety case Adjustments Flowchart Page 11
3.9 Decommissioning – Inventory Checking Flowchart Page 12
1. INTRODUCTION

As the North Sea reaches maturity the issue of decommissioning facilities is becoming a more visible matter to be addressed. To date there have been a limited number of decommissioning projects of various sizes and complexities. As such each of the recent projects have had different issues to deal with, and each project has had to undergo a learning process, especially when experiences present challenges to be overcome that were unforeseen. This document is intended to act as a repository of the experiences gained by actual decommissioning projects, thus contributing to the transfer of knowledge/experience within the industry whilst decommissioning experience is gained.

It is intended to provide guidance on the issues that may need to be considered when developing topsides cleaning strategies as part of an offshore oil and gas field decommissioning programme. It is not a prescriptive series of requirements and should be noted that the flowcharts within this document may not always be strictly applicable to any particular decommissioning project – however it is hoped that by considering all the issues identified within the document that unforeseen issues when cleaning topsides may be minimized.

2. SOURCE OF DATA

The information contained within this document was gathered at the Decommissioning – Topsides Cleaning Workshop held at the Marcliffe Hotel, Pittfodels, Aberdeen on the 9th May 2006.

The attendees were as follows:-

<table>
<thead>
<tr>
<th>Name</th>
<th>Company</th>
<th>Decommissioning Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>David Hoare</td>
<td>BP</td>
<td>North West Hutton (Project Manager)</td>
</tr>
<tr>
<td>Katie Denny</td>
<td>BP</td>
<td>North West Hutton (Environmental)</td>
</tr>
<tr>
<td>Stuart Douglas</td>
<td>BP</td>
<td>North West Hutton (HSE)</td>
</tr>
<tr>
<td>Bob Hemmings</td>
<td>Shell</td>
<td>Decommissioning Advisor</td>
</tr>
<tr>
<td>Paul Brindley</td>
<td>Shell</td>
<td>Brent Decommissioning (Projects)</td>
</tr>
<tr>
<td>Per Brun Ellingsen</td>
<td>ConocoPhillips</td>
<td>Ekofisk (Projects)</td>
</tr>
<tr>
<td>Patrick Decosemaeker</td>
<td>Total Norge</td>
<td>Frigg</td>
</tr>
</tbody>
</table>

3. MINDMAP/FLOWCHARTS

A mindmap and series of flowcharts have been developed that summarise the information produced during the workshop. Actual experience input to the flowcharts is provided by the series of pink coloured boxes. These diagrams follow:-

MINDMAP

The following mindmap is provided to give guidance as to the interactions between the various issues, such as equipment resale strategy, waste disposal issues, resource constraints, demolition/removal strategies etc.

As can be seen there are numerous interactions that influence the cleaning strategy, especially when trying to define the level of cleanliness sought. Clearly there will be trade offs between these interacting issues – however there are one or two key decisions that will provide significant guidance to the cleaning strategy.

Resale or Scrap? – this decision is a prime driver on determining how to clean and what level to clean to. If the equipment is to be scrapped then it may not necessarily require a high level of cleanliness to be achieved offshore. If resale is considered viable identify what value you want/expect to get and think about how you are going to get it. Often aspirations of value fail to materialise (e.g. Maureen and Froy resale).

Removal Strategy – If the facilities are to remain offshore in a Care and Maintenance mode for a period of time, then the cleaning strategy has to ensure that ‘recharge’ of the hazard or new hazards is not an issue (e.g. vapour build up from degrading hydrocarbons, mercury ‘sweating’ etc.). If the facilities are to be removed to shore within a short time frame then the opportunity exists to reduce the level of cleaning to the minimum, and perform more cleaning onshore although onshore waste disposal may then become an issue/concern.

Waste Disposal Routes (Onshore) – the lack of acceptable disposal routes (e.g. LSA disposal capacity shortfalls) may dictate the cleaning strategy to be adopted. Consider carefully the use/release of existing offshore operational discharge consents. Develop a strategy that provides the ‘best value’ in terms of the offshore vs onshore disposal of wastes. This strategy should consider the cost and spaces issues of cleaning offshore or onshore. Remember that a ‘duty of care’ may exist from cradle to grave for all wastes.

Onshore Dismantle/Disposal - Decide early what the drivers are (HSE/Cost/Schedule etc.) and decide how to influence these activities to get ‘best value’.

Overarching all of the above is Risk Management – the cleaning strategy, especially draining and venting issues, can introduce significant offshore works that raise risk levels. There clearly is a need to balance risks between level of cleaning activities, perceived value of equipment, and location of cleaning activities.
<table>
<thead>
<tr>
<th>Name</th>
<th>Company</th>
<th>Title or Job Function</th>
<th>Email</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bob Hemmings</td>
<td>Shell</td>
<td>EDPL 5, Decommissioning Co.</td>
<td><a href="mailto:Bob.Hemmings@shell.com">Bob.Hemmings@shell.com</a></td>
<td>684877</td>
</tr>
<tr>
<td>Alistair Ingram</td>
<td>Shell</td>
<td>P. Engineer, Topsides Decommission</td>
<td><a href="mailto:Mark.A.Ingram@shell.com">Mark.A.Ingram@shell.com</a></td>
<td></td>
</tr>
<tr>
<td>Tom Robertson</td>
<td>Shell</td>
<td>Brent Field Topside</td>
<td><a href="mailto:tom.t.robertson@shell.com">tom.t.robertson@shell.com</a></td>
<td>077597 805776</td>
</tr>
<tr>
<td>James Broadribb</td>
<td>BP</td>
<td>Business Manager - Decommission</td>
<td><a href="mailto:james.broadribb@bob.com">james.broadribb@bob.com</a></td>
<td>722888</td>
</tr>
<tr>
<td>Stilianus Christians</td>
<td>Chevron</td>
<td>Facilities Engineer</td>
<td><a href="mailto:schristians@chevron.com">schristians@chevron.com</a></td>
<td>884166</td>
</tr>
<tr>
<td>Roger Esson</td>
<td>BP</td>
<td>Operations Manager - Decommission</td>
<td><a href="mailto:local.Esson@bp.com">local.Esson@bp.com</a></td>
<td>845226</td>
</tr>
<tr>
<td>Francisco Urea</td>
<td>PSN</td>
<td>Process Engineer - Miller Decom</td>
<td><a href="mailto:francisco.urea@pensw.com">francisco.urea@pensw.com</a></td>
<td>main reception</td>
</tr>
<tr>
<td>Erik Hsoon</td>
<td>TOTAL</td>
<td>MCP-1 Commission Mgr.</td>
<td><a href="mailto:erik.hsoon@total.com">erik.hsoon@total.com</a></td>
<td></td>
</tr>
<tr>
<td>David Hoare</td>
<td>BP</td>
<td>Decommission Mgr.</td>
<td><a href="mailto:david.hoare@bp.com">david.hoare@bp.com</a></td>
<td>01224 835119</td>
</tr>
<tr>
<td>Sue Dunlop</td>
<td>BP</td>
<td>NSEA Decommissioning Advisor</td>
<td><a href="mailto:sue.dunlop@uk.bp.com">sue.dunlop@uk.bp.com</a></td>
<td>833688</td>
</tr>
<tr>
<td>Catherine Morgan</td>
<td>Talisman</td>
<td>Development Engineering Team Leader</td>
<td><a href="mailto:catherine.morgan@talisman.co.uk">catherine.morgan@talisman.co.uk</a></td>
<td>01224 352975</td>
</tr>
<tr>
<td>Name</td>
<td>Company</td>
<td>Title or Job Function</td>
<td>Email</td>
<td>Phone</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------</td>
<td>---------------------------------</td>
<td>------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Alan Stokes</td>
<td>PSIV</td>
<td>Project Engineer</td>
<td><a href="mailto:alan.stokes@psiv.com">alan.stokes@psiv.com</a></td>
<td>777032</td>
</tr>
<tr>
<td>David Liddle</td>
<td>ITF</td>
<td>Technology Manager</td>
<td><a href="mailto:d.liddle@oil-ift.com">d.liddle@oil-ift.com</a></td>
<td>853403</td>
</tr>
<tr>
<td>Keith Mayo</td>
<td>BERR</td>
<td>Head of Decom. Unit</td>
<td><a href="mailto:keith.mayo@berrgisl.gv.uk">keith.mayo@berrgisl.gv.uk</a></td>
<td>254020</td>
</tr>
<tr>
<td>Ken Tanev</td>
<td>AMEC</td>
<td>Consultancy Services Manager</td>
<td><a href="mailto:ken.tanev@amec.com">ken.tanev@amec.com</a></td>
<td>291866</td>
</tr>
<tr>
<td>Allan Baird</td>
<td>AMEC</td>
<td>Engineering Manager</td>
<td><a href="mailto:allan.baird@amec.com">allan.baird@amec.com</a></td>
<td>291180</td>
</tr>
<tr>
<td>Kare Kristing</td>
<td>AK</td>
<td>DIRECTOR - DECOMM. UK</td>
<td><a href="mailto:kare.kristing2@nectira.com">kare.kristing2@nectira.com</a></td>
<td>4174861</td>
</tr>
<tr>
<td>Mike Forrests</td>
<td>AMEC</td>
<td>Decommissioning Manager</td>
<td><a href="mailto:mike.forrest@amec.com">mike.forrest@amec.com</a></td>
<td>414450</td>
</tr>
<tr>
<td>Eric McWilliam</td>
<td>SIGMA3</td>
<td>Topides Decommission PE</td>
<td><a href="mailto:eric.mcwilliam@sigma3.com">eric.mcwilliam@sigma3.com</a></td>
<td>817558</td>
</tr>
<tr>
<td>Bill Carpenter</td>
<td>BELL</td>
<td>Industry Manager</td>
<td><a href="mailto:bill.carpenter@bellis.co.uk">bill.carpenter@bellis.co.uk</a></td>
<td>254097</td>
</tr>
<tr>
<td>Iain Riach</td>
<td>WGE</td>
<td>Decommissioning Eng</td>
<td><a href="mailto:iain.riach@wedgegroup.com">iain.riach@wedgegroup.com</a></td>
<td>532743</td>
</tr>
</tbody>
</table>
Session 2

Offshore Workshop Notes / Participants (Oct-07)
Overview of the DTF work on Cleaning

Bob Hemmings introduced the work performed in the DTF forum. This comprises flowcharts to check key issues and aid decision making on cleaning.

Presentation by RBG

Provided an excellent overview on key factors that need to be considered in cleaning planning and execution.

Discussion

- Non intrusive Quantification
  - Are there ways of determining the amount of scale or other hazardous compounds without having to break into the vessels and pipework to be able to determine quantities.
    - Examples are LSA and mercury

- Access/Support
  - The cleaning aspect is relatively small compared to all the preparation required. This is particularly evident in terms of scaffolding required for access.
  - Offshore surveys are critical to ensure planning can be efficient.
  - Are there different access techniques? Scaffolding is labour intensive and slow.
  - Cranes play an important role. Often required to be refurbished. Decks may not be designed to take the loads for alternative cranes.
  - Laydown areas are critical in the planning.

- How to reduce the offshore manhours
  - Start earlier with planning. No silver bullet was identified here. It is more a matter of very thorough planning to ensure the most efficient offshore scope.
  - One opportunity is to start some of the decommissioning activities before Cessation of Production. This allows use of existing crews to perform some of the work.

- Identification of Technology Gaps.
  - Are there any gaps in our current techniques?
  - No major gaps were identified in the cleaning methods.
  - The techniques are currently conventional but RGB did note the future possibility of sonic techniques.
  - It is possible to hold a Cross Industry Cleaning Conference
    - Chemical Industry
      - There may be other cleaning solutions that we do not know about.
    - Refining
      - Cleaning is routinely carried out on refineries. There must be lessons learned here.
    - Nuclear
      - Regarded as the extreme end of the cleaning technology but again there may be lessons to be learned.

- Why are we cleaning?
  - Why are we doing it twice
    - Offshore and in the yard
- We are performing different degrees of cleaning offshore then onshore but is this optimized?
- Licencing. Currently have permits offshore which allow certain discharges. Onshore regulations are different.
- Disposal Routes for all products. There are still issues in this area to be dealt with, not least of which are LSA and mercury.

- Is cleaning the wrong word?
  - The cleaning is such a small part of the overall operation
  - Is it better to refer to this as preparation for removal
  - Does this provide a different mind-set to why and how we are cleaning?

**Key Opportunities**

- Create a Guideline on Cleaning
  - No plans at present but can be added to the list of possible future guidelines?
  - Standards of Cleanliness
    - What do we do offshore
    - What can we do onshore

- Get those involved in cleaning to be involved in the onshore dismantling
  - To ensure cleaning is not repeated where unnecessary
  - Transfer of knowledge and records from offshore work.

- Capabilities of Onshore Yards
  - This is both an issue and an opportunity in that not many yards have the water depth in the approaches to take deep draft vessels.
  - There are opportunities for UK yards to build a capability in this area and gain significant work.

- Refinery experiences in dismantling
  - This is an area that is routinely performed due to redesign and refurbishment.

- Information gathering from Operations Crew
  - This is a critical element of preparation. The existing crews have knowledge of equipment and contents that may not have appeared on the records or are buried in reports.
  - Turnarounds provide unique opportunities to gather information helpful to decommissioning
  - Brownfield modifications work may also inform future decommissioning and may offer opportunities for easy removal of redundant equipment. It will provide information on cleaning challenges.

- Integrated Team with Hook-down engineering and planning
  - Cleaning is such an integral part of the early phases of decommissioning so ensure cleaning is included in the Hook-down team

- Quantification of disposal quantities and keeping records is a key part of the workflow from offshore to onshore.

- Downhole disposal.
  - For Hazardous waste and hydrocarbons.
Possible Forward Meetings

- LSA Management
  - Still the major uncertainty in cleaning estimates where present.
  - Regulation
  - (Check with environmental committee)
  - Managing LSA Scale
    - Disposal Routes for LSA

- Onshore Disposal
  - Yard availability and capability
  - Types of access
    - Vessel draft
  - LSA handling

- Pipeline Cleaning

- Removal
  - If we use Single Lift then what are the implications for disposal
  - How do we handle the facility near shore to onshore

- Cross Industry Discussion on Cleaning
  - As per discussion section.

- Tank Cleaning
  - Hydrocarbon Storage Tanks
  - Engage regulators

- Health Issues
  - New guidelines coming out next year?

- Timing of Removals
  - This is still an issue not resolved but we need to keep an eye on this one.
  - There have to be upcoming opportunities on cooperation

- Interaction of the Elements of Decommissioning
  - Synergies
  - Efficiencies
  - Links

- Southern North Sea
  - Shallow Water does not need the Heavy Lift
  - More benign conditions
  - Smaller Facilities
  - GOM Low technology may be more appropriate

- Sub-Sea Structure Removal
  - Opportunities to reduce costs in this area.
Session 3

Onshore Workshop Notes/ Participants (Jan-08)
Work Group 4, Onshore Dismantling Workshop
ConocoPhillips, Rubislaw House, 31/01/08.

Meeting Notes.

Glyn Wheeler, Able

- Decommissioning of all marine structures
- Waste management, Camelot CB jacket refurb/reinstallation
  - LSA, accumulate and dispose
  - Licensed waste haulier
  - Asbestos
  - Landfill site close by

- Well sited, deep water birth, River Tees estuary.
- Corrus steel works close by
- Site 126 acres, 24 acre dry-dock
- 1km from nearest property
- No height restrictions
- 20mtrs of water at quay
- Good onshore access
- Involved with TEAG, TERRC ecological advisory group

Answers

- Deliver as Big as possible, avoid piece small
- Engineering details a critical must
- Detailed client documentation.
- Reuse potential, minimise offshore dismantling. Linked to documentation.
- Detailed waste inventory required
- Good onshore/offshore interface.
- Pro-active agency management
- TFS not a show stopper
- Less work offshore achieves more efficiency onshore, ALARP
- Resource utilisation, balanced schedule to maximise safety and efficiency

Bengt Hildisch/Jan Algarheim AF Decom.

- 2,200 employees
- Revenue $1billion.
- ISO 9001 approved
- ISO14001 certified
- Onshore disposal services at AF Vats
- LSA Scanner
- Water purification plant
- Discharge permit for NORM. Asbestos handling approved.

**Answers**
- Have onshore dismantler involved in Deconstruction of Offshore Facilities
- Bring Contractor onboard as early as possible.
  - Contractor should takeover facility as soon as possible ie close to COP
  - Benefits, reduced safety exposure
  - Reduced cost due to no double dipping of operations.
  - The earlier the contractor is on board, less repair of structure for safety reasons.
  - Need easy exchange of information, Operator / Contractor.
  - Need easy access to documentation
  - Increased re-use

**Managing Waste.**
- Safety for environment and personnel
- Good mapping of waste early in process
- Open communication between authorities and parties involving independent borders.
- Rules and regulations should be updated for decommissioning processes.
- Company has to define exact requirement related to the waste management
- Contractor has to have adequate tracking and reporting systems for waste management

- Operators should review their contracting strategy, allow dismantling contractor to be “Key Contractor” instead of leaving it to the HLV contractor

**Trevor Smith, AkerKvaerner**
- Coatings usually give off toxic gases, safety issue
- Asbestos and PCB’s
- Good experience with mapping asbestos on FRIGG, watch for hazardous materials getting out of control
- Progressive dialogue with companies
- Watch for hazardous material in unexpected locations
- As built information, often lost by the time facility is decommissioned, quite often the knowledge lies with people and not so much with the paper.
- Establish databases of key hazardous material locations.
- LSA/NORM/Mercury, all mapped easier with access to accurate P&ID’s.
- Keep maintenance documentation available
- Secure as many of the senior company operating personnel to be part of the decommissioning process.
- Does size matter? – Yes, Direct correlation between methodology of removal and number of interfaces where cleaning will have to be addressed.

**Murdo MacIver, SBS Logistics.**

- Decommissioning facility
- ISO 140001 and ISO 188001

**Answers.**

- Can receive anyway possible. Capable of handling piece small and piece medium.
- Piece large ie FRIGG MSF 8,500tns
- Trailer or skid load in, not a problem
- Need the best estimate on weight
- Need best estimate and design envelope
- Structural dwgs/3d CAD
- Details of delivery method, barge furniture info, grillage location
- Lifting campaign window
- Trailers scarce and need long lead time booking
- Advise vessel delivery details as soon as known.
- Advise on who is responsible for manoeuvring tugs
- Early inclusion of off-load contractor
- Transboundary shipment legislation was never envisaged to be used for decommissioning waste.
- Vessel stopping en route to destination, carrying waste could have a major regulation problem.
- Disposal of LSA, not a good solution to date
- Enormous amount of pre-planning and re work due to missing documentation.
- History of vessels/pipework usage not always known.
- Any LSA/norm analysis been performed, different levels, different legislation.
- Important to understand what coating systems have been used over the facility life.
- Communications are the key, piece large operations have significant FEED requirements.
- Free and open exchange of info
- The future. Is 20mtr water depth at quay the answer, would operators use it.
- Engagement with planning phase
HSE guidance on CDM regulations as not being relevant, considered opinion is that CDM regulations would be re engaged.

OPEN GROUP DISCUSSION.
Note the separate heading on the additional subjects that may become topics for Workshops

- CDM Regulations. Can be seen to be an advantage. Not yet a policy issue but requires some debate.
- Transhipment may be able to influence the regulations to make this easier to manage.
- Re-sale of equipment
  - Transfer of equipment to smaller companies
  - Assessment of “Fit For Use”
- If it’s not essential don’t do it, leave to onshore handling.
  - Perform minimum cleaning offshore
  - May impact recycling efficiency
  - Best method will depend upon the deconstruction facility and removal method
- Time delay between COP and removal, is a key safety factor. Common issue with Structural Integrity.
- Offshore Cleaning.
  - The focus should be the conditioning of process facilities for transportation rather than cleaning.
- Transfer of Custody. Critical to understand custody through the Decom. Phases.
- Common Protocol for interfaces. This may help in ensuring risks are managed properly and reduce conflicts.
- NORM re-injection into well formation. Common discussion that this should be available as an option.
- Operators should influence Authorities into allowing offshore disposal for all NORM
  - RSA-93 act covers more than LSA NORM
  - Not an attractive market to supply, due to commercial risks.
  - Cooperation between Oil Companies and Waste Industry required.
- Knowledge transfer/capture
  - Documentation
  - People / access
  - How to manage the projects
- Timing of decommissioning schedules, it would be useful if the Contractors knew what the time frame was for upcoming decommissioning projects.
  - Ongoing issue but not easy to solve.
  - Operators will pay the price for lack of future planning
  - Manage the portfolio
  - Continuity of work
Further Industry Engagement Topics.

- Contracting Strategy
- Risk Management and Mitigation
- Hazardous Waste. Transhipment issues
- Use of CDM regulations and interpretation thereof.
Session 4

Npf Break Out session Notes
DEFINITION PHASE – define cleanliness/ hazards Group 1

Level of Accuracy?

• Is something present - Yes or No is sufficient in many instances. – could be impacted by contractual terms/ strategy
• Start early to build inventory – routine operations/ shutdown opportunities/ vendors at design delivery.
• Strategy can depend on regulation interpretation – how accurate does regulator need before comfortable?
• Retention of Key personnel to assist
• Interrogate shipping experience
• If hazard contained leave it to onshore
• Explore improved non intrusive mapping techniques – what are they- do they exist?
• Do not underestimate access difficulties
• Risk assess removal implications to decide onshore/ offshore (or leave)
• Disposal contractors need to understand HSE implications – get their input early

Regulations?

• Trans boundary shipment can drive inventory assessment – get early mutual interpretation with regulators in all possible landing countries.
• Providing flexibility in interpretation quantities and presence should not be allowed to dictate. Need to identify process to audit streams and disposal routes available for any expected material.

PREPARATION PHASE - why do we clean? Group 2

Why Do We Clean:
- Following on from COP we need to minimise hazards which are still prevalent within the Topsides i.e. static hydrocarbons, NORM/LSA, asbestos, mercury, isocyanates etc.
- These hazards are a risk to occupational health and as such need to be addressed.
- Apart from the occupational health issues there is both legislative and environmental constraints which call for some degree of cleaning to be carried out.
- We need to ensure that all surfaces are free from hydrocarbon oils and gases, chemicals, contaminants, biological growths, metal scales, pyrophoric scale and NORM/LSA as far as reasonably practicable.
- The extent of offshore cleaning should be covered in the Topsides Contracting Strategy:
  - Single Lift = Minimum offshore cleaning.
  - Piece Small = Maximum offshore cleaning.
  - Reverse Engineering = ?? (Somewhere in between Max / Min).
- The interface between activities i.e. P&A and Topsides Cleaning should also be considered. If it is possible to transfer "waste" to redundant wells then this should be maximised to negate any need for transportation and disposal onshore.

What Do We Clean:
- As a starting point the platform inventory will address and identify the fluids/gasses/waste.
- Apart from the platform inventory there are also by-products such as NORM/LSA, mercury etc.
- A qualitative risk assessment and environmental assessment should be carried out to determine the degree/scope of what needs to be cleaned.
- Again, the Contracting Strategy will have a major impact on the degree of cleaning.
- Anything which has a risk of spill during separation or transportation should be cleaned.

What Can We Do To Improve:
- Early Contracting Strategy and all-party involvement would provide clearer understanding to Project requirements.
- Maximise local (platform) knowledge and access operational/maintenance history.
- Focus on learning's (UKCS, Norway, GOM). Stop reinventing the wheel.
- If there is onshore cleaning ensure that the offshore extent is fit for purpose i.e. no double cleaning.
- Challenge existing practices. Prescriptive may not be effective.

**EXECUTION PHASE Group 3**

*General Execution*

- Cannot separate out execution Strategy from Definition and Preparation
  - Comments in execution relate to other phases.
- Plan to perform the maximum work onshore
  - It is easier to manage and probably cheaper than offshore
- Key common theme is documentation and data. Critical in determining the methods and risks. Not knowing what is there

**Cleaning Guidelines**

- There is a need for some cleaning guidelines
  - These will give guidance on what to consider
  - Key to cleaning is to understand the deconstruction method
    - Are you Cleaning only to make hotwork safe?
    - Are you cleaning for Safety at Lift separation – no free hydrocarbons
  - Only do it once – flow of data offshore to on; create database, define handover documents
  - How clean is clean – provide guidance for different stages incl transportation
  - Standards for cleaning – why needed and how much acceptable
  - Link onshore and offshore cleaning activities
  - Perhaps the DTF Guidelines could be expanded for this purpose?

**Technology**

- Can we improve cleaning products?
  - Is there value in investing in new or improved cleaning products?
• Can we develop better sealing foams to be used to seal pipes for transportation.
• Asbestos survey improvements. Is there a way of obtaining better information ahead of dismantling?

Scale
• NORM (LSA Scale) – onshore or offshore?
  o General consensus is that the cleaning work should be done onshore
  o However the product should be injected into the wells offshore as potentially the best environmental option.

New Techniques?
• Injection into reservoir
  o Ideally injection of contents of facilities, cleaning products and scale?
  o Time IS an issue – injection potential/knowledge/documentation. Need to know in early planning whether to have wells available for this purpose.

Other Opportunities

• Contracting Strategy
  o There is some value in ensuring that the onshore dismantling contractors are involved in the offshore cleaning somehow.
  o Are there different ways of organising the contracting arrangements to ensure these potential efficiencies actually happen?
• Deal with trans boundary issues early
  o This is to ensure that any approvals are started early enough to ensure they do not become the critical path.
• Standards for grillage if spillage
  o This is a detail where we need to consider standards for grillage to ensure we do not have
uncontrolled leakage during transport, if we do not clean completely offshore.

- Maintain Access for onshore
  - Try to ensure that the module access is maintained to the extent possible so that easy access can occur in the dismantling yard.

Discussion Facilitated by Bob Hemmings/ Iain Raich/ Chris Gray
Session 5

Pipeline Workshop Notes (Feb-08)
Pipeline Cleaning Workshop. 27.02.2008

J P Kenny. Alan Ransom

- Major Challenges
  - Access. This is an issue due to limited space on many facilities. Access may have been reduced through later platform modifications.
    - Key Issues at Engineering Phase
      - Status of pipelines
      - Historical data
      - Access to temporary pipe work
  - Lay-down areas. As above these are important for cleaning operations.
  - Waste disposal. Products generated from the cleaning have to be disposed off and a viable, environmentally acceptable route must be established.
  - Communications and Modifications. Need to have more discussion with the host Operations group.
  - Pig at the earliest opportunity. If your sole objective is cleaning then performing the job as early as possible is preferable.
  - Passing valves. This is a risk which can add a significant cost to rectify.
  - Cleanliness standards, how clean is clean. What objective are we working to?
  - Confirmation of cleanliness being achieved. How do we know when we have done enough.

Halliburton, Pipeline Services. Allan Browne

Allan described the issues through several actual cleaning jobs and case studies. Most of the experience to date is with cleaning for flow assurance purposes as opposed to decommissioning. Allan gave a good idea of the range of issues that can arise with different pipelines in different service. The presentation also raised the issue of how much cleaning do you need to perform for decommissioning versus re-establishing flow.

Completed Projects or Studies discussed:
Venture - Audrey to LOGGS.
Shell – Gannet D
Total – MCP01
ENI- Onshore EWG1
BP- Miller Studies

Decommissioning and Flow Assurance topics:

- Chemical cleaning with Gel Technology
- Mechanical cleaning
- Thermal cleaning
- De-oiling techniques
  - Intervention?
  - Issues
    - Decontamination
    - Pig tracking
    -
B J Services, Jim Alexander.

BJ presented the alternative to Physical Removal techniques and proposed chemical treatments. (See the presentation for more details)

- Decommissioning Philosophy.
- Field Conditions.
- Manning Levels.
- Confirmation of accurate details, latest revisions.
- Site visit to confirm.
- Lay-down areas.
- Tie in points.
- water/electrical power/air.
- pig launching and receiving facilities.
- pumping equipment.
- Disposal of liquid and gaseous fluids from the pipeline.
- Where is it routed to.
- how is it disposed of.
- Sampling and Analysis of fluids.
- Who where when and how.
- Clear and accurate P&ID’s to establish relevant method statement and technical procedures.
- Pig Launching and Receiving Facilities.
- Pumping Equipment to be supplied by BJPPS.
- Flow / Pressure monitoring Equipment to be supplied by BJPPS.
- Do other Installation activities affect decommissioning.
- Do other production activities affect the decommissioning i.e. Infield Import or Export Lines.
- Are there any leaking or inoperable valves that may effect the decommissioning.
- Pressure Rating of the Pipeline system.

Discussion Session

Note some of these discussions occurred during each presentation and have been rolled into this section.

- The technology is available today to clean pipelines.
  - Possible Effectiveness of GELS?
  - Less aggressive pigging or flushing techniques?

- The key issue remains how much cleaning do we need to perform for decommissioning purposes.
  - Pipelines need to be flushed to 30ppm
    - Is this a valid assumption?
  - How clean is clean?
    - Is there a need for a guideline?

- Waste Management
  - Waste routes on and offshore.
    - Questionable whether we have got the best routes for this.
  - Issue of removing/cleaning mercury contamination from pipeline.
  - We can re-inject scale into well formation providing the scale remains offshore and is directly connected through intra field lines.
  - If chemical solutions are brought on shore, it is possible to concentrate the solution and make blocks of concrete (to minimise leaching)
  - LSA Scale will always need to be dealt with, in solution or as a solid.
  - Disposal of corrosion products such as black powder.
Cost reduction, where do we target??
- Planning, preparation
- Challenge the givens
- Injection in other offshore facilities
- Landfill issues
- Removal of Wax, exothermic chemicals
- LSA, minimise the dispersal footprint
- Remaining liabilities / Company image

Potential Best Practices and Lessons Learned:
- Note the comments above from the presenters
- Make best use of Operational pigging
- Optimise the time between Cessation of production and cleaning
- Do work while utilities are still operational.
- Develop pigging facilities, look at sub-sea
- Design of facilities for pigging.
- Understand your waste material.
- How do you get rid of H₂S
- Post project decontamination can be very costly.
- Pigging programmes during ongoing operations could be made more aggressive towards the end of life.
<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chris Gray</td>
<td>UK Decommissioning</td>
<td>ConocoPhillips</td>
</tr>
<tr>
<td>Chris Level</td>
<td>Wick Decom</td>
<td>BJ PPS</td>
</tr>
<tr>
<td>Jim Alexander</td>
<td>BNM NGA</td>
<td>BJ</td>
</tr>
<tr>
<td>John Teazill</td>
<td>Development Planning Engineer</td>
<td>Baker Tidyout</td>
</tr>
<tr>
<td>Jennifer Chanton</td>
<td>Manager, Decommissioning Unit</td>
<td>TOTPL</td>
</tr>
<tr>
<td>Christian Roux</td>
<td>Development Planning Engineer</td>
<td>USAIR</td>
</tr>
<tr>
<td>Gill Cattynagh</td>
<td>Industry Development</td>
<td>Aker Evergreen</td>
</tr>
<tr>
<td>Allan Brownie</td>
<td>Flow Assurance</td>
<td>Halliburton PS</td>
</tr>
<tr>
<td>KARE Kristing</td>
<td>Director, Decom UK</td>
<td>Halliburton PS</td>
</tr>
<tr>
<td>Scott Connick</td>
<td>BD Manager</td>
<td>Subsea 7</td>
</tr>
<tr>
<td>Dave Causer</td>
<td>Operations Manager</td>
<td>Halliburton PS</td>
</tr>
<tr>
<td>Mark Rasmussen</td>
<td>Europe, European Manager, PSR</td>
<td>PSO</td>
</tr>
<tr>
<td>Cameron Boyd</td>
<td>Torpede Decommissioning Engineering</td>
<td>PSN</td>
</tr>
<tr>
<td>Jill Shaw</td>
<td>Environmental Hygiene</td>
<td>PSN</td>
</tr>
<tr>
<td>Alan Stakes</td>
<td>Decommissioning</td>
<td>Tidewater</td>
</tr>
<tr>
<td>Alan Stansom</td>
<td></td>
<td>WGE</td>
</tr>
<tr>
<td>Alan Ritchie</td>
<td>Principal Pipeline Eng</td>
<td>Chevron</td>
</tr>
<tr>
<td>Stilianos Christodimos</td>
<td>Facilities Engineer</td>
<td>Chevron</td>
</tr>
<tr>
<td>David Hoare</td>
<td>Project Manager</td>
<td>BP</td>
</tr>
<tr>
<td>Bob Hemmings</td>
<td>EOFL/Decommissioning Advisor</td>
<td>Shell</td>
</tr>
<tr>
<td>Evelyn Pizzolla</td>
<td>Environmental Manager ECOs</td>
<td>BERR</td>
</tr>
<tr>
<td>Ken Tylor</td>
<td>Consultant Services Manager</td>
<td>AMEC</td>
</tr>
<tr>
<td>Colin Ross</td>
<td>Recom Eng</td>
<td>Subsea 7</td>
</tr>
<tr>
<td>Jon Webster</td>
<td>Recom Eng</td>
<td>Subsea 7</td>
</tr>
<tr>
<td>John Lawson</td>
<td></td>
<td>Chevron</td>
</tr>
</tbody>
</table>