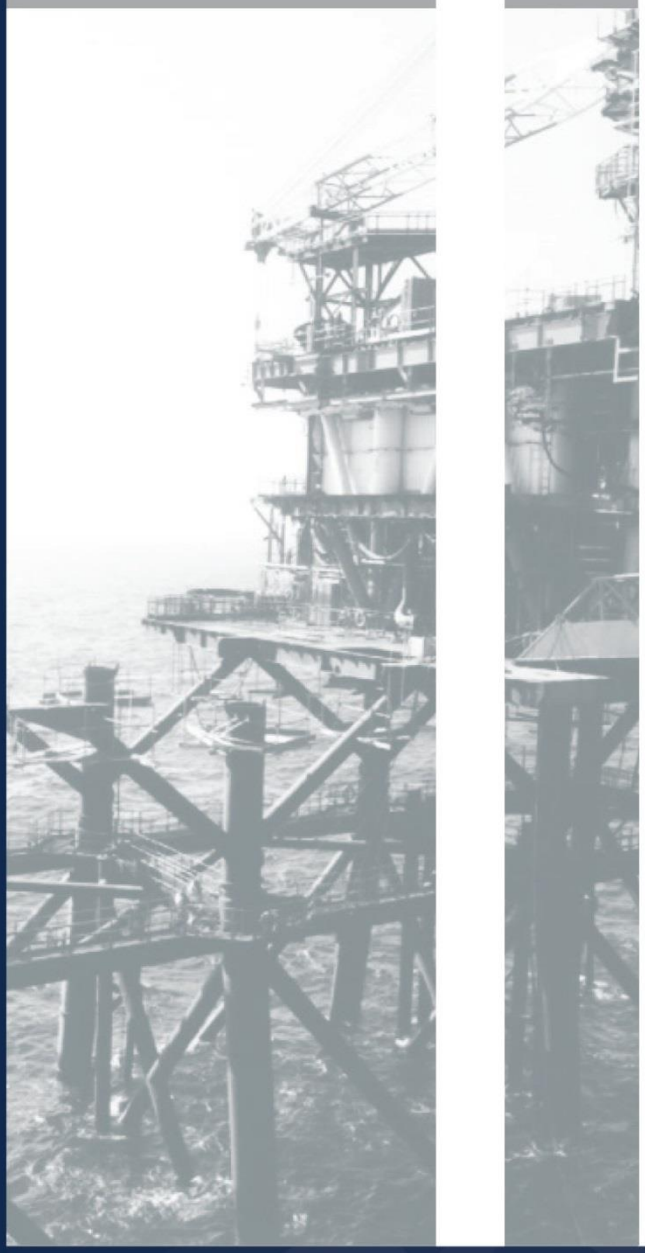
DECOMMISSIONING CONTRACT RISK ALLOCATION REPORT 2015



Oil & Gas UK
the voice of the offshore industry

DECOMMISSIONING CONTRACT RISK ALLOCATION REPORT 2015

OIL & GAS UK

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Background

Oil & Gas UK's Decommissioning Insight[1] forecasts that the removal of redundant structures will account for approximately 20 per cent of total industry decommissioning expenditure. Recognising that suboptimal risk allocation in operator and contractor removal contracts may lead to higher costs, and responding to the Wood Recommendations on cost effective decommissioning, Oil & Gas UK commissioned Dundas Consultants to undertake an independent study looking at the allocation of risk between contractors and operators based on a 'typical' removal case of a large fixed platform with subsea tie-backs.

Oil and Gas UK would like to acknowledge the valuable contributions of the following organisations in the development of this document: Dundas Consultants, the removal contractor community, participating operators, and members of Oil and Gas UK Decommissioning Industry Technical Group, Efficient Execution Workgroup.

Methodology

Key generic risks in a decommissioning removal project were categorised into different decommissioning phases based on the Oil & Gas UK Decommissioning Guidelines Work Breakdown Structure (WBS)[2]. They were then grouped according to risk type and ranked according to their potential impact and controllability level. Risk ownership was then assessed. As the ownership of the risk differs depending on the contract type being utilised, the assessment of risks covered two types of contracting models: an operator led reimbursable contract and a lump sum (Engineer, Procure, Remove, and Dispose) contract. An operator workshop and a series of one-to-one contractor interviews took place to gather views separately from operators and contractors on the appropriate allocation of risk to encourage candid responses.

Dundas Consultants collated the information and presented it in two separate reports, one with the operators' view and one with the contractors' view. The reports are included in full in this document and are titled:

1. Operator Workshop Proceedings, Decommissioning Contract Risk Allocation, J-OGU-2014-TN-002, carried out by Dundas Consultants in 2014

2. Contractor Survey Output, Decommissioning Contract Risk Allocation, J-OGU-2014-003-TN-003, carried out by Dundas Consultants in 2015

Detailed methodologies can be found in each report.

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[1] Oil & Gas UK's *Decommissioning Insight 2014* is available to download at www.oilandgasuk.co.uk/publications

[2] Oil & Gas UK's *Guidelines on Decommissioning Cost Estimation Issue 3*, September 2013 is available to download at www.oilandgasuk.co.uk/publications

Key Findings

Comparing the two reports, both operators and contractors agreed on the top six removal risks and shared similar views on the ranking of these risks on their associated impact and controllability. These are summarised in Table 1.1- Highest Ranked Risks. The top six risks are:

- Poor weather
- Restricted access to the structure (assumes contract provides unrestricted access)
- Uncertainty of drill cutting pile content and/ or volume prior to removal
- Unknown obstructions- obstructing access to pile cut location
- Changes to removal requirements beyond original scope of work
- Availability of the lifting vessel that has been contracted within the agreed period

The main views and recommendations from operators and contractors surveyed concerning removal risk reduction, ownership/ risk allocation, and contract type are summarised below.

Risk Reduction

- Early engagement with removal contractors helps towards developing a clear scope of work
- Cleaning the facility to an agreed level of cleanliness mitigates potential pollution risks
- Data uncertainties of the redundant structure can be reduced through:
- more robust data management and documentation process
- surveying the redundant structure before removal

Ownership/ Risk Allocation

- When removing potentially contaminated redundant structure, all contractors surveyed indicated the pollution risks should remain with the operator.
- The contractors surveyed highlighted that they were limited in their ability to dispose of waste i.e. they were able to dispose of non-hazardous waste but recommended a specialist disposal contractor be engaged. The contractors suggested that the ownership of the redundant structure should ideally be transferred between the operator and the disposal contractor, with the removals contractor only providing a service to remove but not accepting ownership.
- A consortium of the removals and disposal contractors was suggested but views differed on who should take the ownership of the platform/ structure and the associated removal risks.

Contract Type

- Comparing the operator led reimbursable contract with the lump sum Engineer, Procure, Remove, Dispose (EPRD) contract, removal contractors preferred the operator led reimbursable type contract.
- With regard to the EPRD contract:
    - The operators surveyed considered the risks of 'poor weather' should be equally shared between operators and removal contractors, whilst the removal contractors considered this risk could be borne by themselves.
    - The contractors surveyed considered the risks associated with 'changes to removal requirements beyond the original scope of work' should be fully owned by the operator, while operators considered that this should be mostly owned by the operator.

More in-depth findings can be found subsequently in the individual operator and contractor reports.

The perceived ownership of identified risks is summarised in table 1.1 below, for both contractual scenarios:

Phase and No.	RISK	Risk Type	What's the potential impact to the project?		How controllable is the risk?		Operator led reimbursable contract		Engineer Prepare Remove and Demolition (EPRD)	
			Operator	Contractor	Operator	Contractor	Operator	Contractor	Operator	Contractor
5.04, 6.15, 7.16 & 9.16	Poor weather	Performance	3.1	3	4.2	4	Fully operator owned	Fully operator owned	Equal share	Fully removal contractor owned
6.02, 7.02 & 9.02	Restricted access to the structure (Assumes contract provides unrestricted access)	Performance	3.9	4	3.4	3	Fully operator owned	Fully operator owned	Fully operator owned	Fully operator owned
7.21	Uncertainty of drill cutting pile content and/ or volume prior to removal	Technical	3.0	3	4.2	4	Fully operator owned	Fully operator owned	Fully operator owned	Fully operator owned
7.23	Unknown obstructions- obstructing access to pile cut location	Technical	3.0	3	4.0	4	Fully operator owned	Fully operator owned	Fully operator owned	Fully operator owned
9.21	Changes to removal requirements beyond original scope of work	Contractual	3.0	3	4.0	4	Fully operator owned	Fully operator owned	Mostly operator owned	Fully operator owned
6.01, 7.01 & 9.01	Availability of the lifting vessel that has been contracted within the agreed period	Performance	3.7	4	2.8	3	Fully service company owned	Fully service company owned	Fully service company owned	Fully service company owned

Table 1.1- Highest Ranked Risks

Operator Workshop Proceedings

Decommissioning Contract Risk Allocation

J-OGU-2014-TN-002

Dundas Consultants

Revision	Description	Date	By	Chkd
A1	Issued for customer comment	27/11/14	RJW	BM
A2	Customer comments incorporated	08/12/14	RJW	BM
A3	Customer comments incorporated	03/03/15	BM	RJW

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CONTENTS – OPERATOR WORKSHOP PROCEEDINGS

1 INTRODUCTION

In March 2013 the Business, Innovation and Skills (BIS) Department of the UK Government, in conjunction with Department of Energy and Climate Change (DECC) launched a UK Oil and Gas Industrial Strategy with the intention of creating the right conditions to maximise opportunity and investment to the benefit of the UK economy.

BIS has developed an action plan that outlines a series of initiatives to achieve this strategy, one of which includes Decommissioning.

Industry champions from the oil and gas operating company and removal contractor communities have been engaged through Oil and Gas UK who in turn facilitated the division of actions and the creation of Task Groups. The Decommissioning Industry Technical Group held an initial workshop in November 2013 to determine areas that could potentially offer the greatest cost reductions. One of the topics that it was felt warranted further assessment and would form part of an overall Decommissioning strategy was risk allocation between removal contractor and operator.

Risk allocation in contracts between operators and removal contractors has long been debated and it is proposed that the unspecified allocation of risk has added cost but no real value to the industry. Oil & Gas UK has available a suite of LOGIC standard contracts, which was developed by CRINE, a subsidiary of LOGIC. These contracts aim to reduce the effort spent evaluating, qualifying and reviewing qualifications that are generic and allows focus to be put on the specific terms directly beneficial to the work being undertaken thus generating cost reductions.

It is proposed that a risk identification, ranking and allocation initiative will assist in the development of a high quality industry standard decommissioning contract. It is intended that the contract be targeted at removal scopes. For the initiative to succeed it will require input from the operators decommissioning and supply chain management functions and thereafter the removal contractor community.

The risk identification, ranking and allocation initiative is being undertaken in two phases. The first being an operator engagement workshop, which will inform the second phase with the removal contractor community. Two separate reports will be issued; this report, detailing the output from the operator engagement workshop and a second report covering the responses from the removal contractors.

The aim of the operator workshop was to identify, rank and allocate (i.e. operator or removal contractor) the key generic risks in a decommissioning removal project. This document records the proceedings and the output from the workshop.

2 WORKSHOP METHODOLOGY

2.1 Objective and Overview

The aim of the workshop was to identify, rank and allocate (i.e. operator or removal contractor) the key generic risks in a decommissioning removal project i.e. focussing on the removal scope only. It was decided to consider both an operator led reimbursable contract scenario and a lump sum (Engineer, Procure, Remove, Dispose) contract case. Upon completion of the workshop, key representative removal contractor companies will be issued with a risk survey before being engaged on a one to one basis to test the initial risk allocation against the experiences and interests of the removal contractors.

2.2 Deliverables

The required deliverables from the workshop were as follows:

- Agreed list of "phases" that are deemed to apply to the decommissioning removals process
- A list of the key risks that are considered to apply in each decommissioning phase
- Ranking of the risks in terms of ability to control and potential consequence
- Suggested contractual risk allocation position (i.e. operator or removal contractor)

2.3 Workshop Process

The workshop agenda and participant list are included in Appendix 1 and Appendix 2.

The workshop objectives were met by completing a structured brainstorming and discussion process designed to include the following steps:

Step 1: Identification of each significant "phase" of the decommissioning process. Significant effort has been expended defining a Work Breakdown Structure that can be used as a common basis amongst UK operators [1] (see also the figures in section 6). This step was expected to be brief and involved reminding everyone present what the phases are, and allowing for any changes to be agreed if so doing was believed to be beneficial to the process. The phases are listed below for reference. In accordance with the stated aims and scope of the workshop, the "greyed out" elements were not considered further.

1. Operator project management
2. Facility running/ owner costs
3. Wells abandonment
4. Facilities/pipeline making safe
5. Topsides preparation
6. Topsides removal
7. Substructure removal
8. Topsides and substructure onshore recycling
9. Subsea infrastructure
10. Site remediation
11. Monitoring

Step 2: Identification of key associated risks for each (relevant) phase and relative ranking of the risks. Extensive work has already been carried out to identify the key risks associated with decommissioning [2]. It was therefore agreed that these pre-populated risks should form the basis for the review. Starting with the pre-populated list, the following were considered for each relevant decommissioning phase:

- **Identification:** review pre-populated risk list, remove items, make additions, and clarify or change risk descriptions as required.
- **Screen out irrelevant risks**: only risks relevant to the contract that is under development should be considered. Risks were considered from this perspective in turn and screened accordingly.
- **Categorisation**: review pre-populated risk categorisations using definitions developed by IMCA [3] (Contractual, Performance, Financial, Political, Technical, Geographical, Operator) and modify if required.
- **Ranking**: using a pre-populated list as a basis, each risk was ranked in terms of its potential impact and the ability for the risk to be controlled (see categories in Appendix 3).

Step 3: Allocation of the risk to the operator and/or the removal contractor, based on the premise of which party is best placed to manage and/or assume responsibility for that risk. For the allocation of risk, it was agreed that 5 main categories should be used in the allocation:

1. Fully operator owned
2. Mostly operator owned
3. Equal risk
4. Mostly removal contractor owned
5. Fully removal contractor owned

It was agreed that step 3 will be considered twice:

a) First from the perspective of an operator led, reimbursable contract;
b) Secondly in the context of an Engineer/Procure/Remove/Dispose lump sum contract.

Importantly, text describing the rationale for the risk allocation agreed by the group was recorded alongside each item – where relevant.

Step 4: The risks identified were compared and contrasted with those arising in construction projects. Where a risk also applies in the construction process, the nature of any differences were recorded.

The steps above were initially undertaken considering the case of a large steel jacket with a subsea tie-back. Additional facility types (e.g. small steel jacket, FPSO, gravity based sub-structure (GBS), spar, semi-submersible and TLP) were then reviewed identifying any unique aspects by exception.

3 WORKSHOP SUMMARY

The top 6 risks (in terms of "potential impact" x "ability to control") that were identified are listed below along with their proposed contractual allocation. It should be noted that several of these risks appear in multiple Work Breakdown Structure categories. As can be seen, the majority of the biggest contract risks are recognised by the operating companies as being allocated contractually to the operating companies.

Phase & No.	RISK	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk? - Reimbursable Contract	Who should own the risk? EPRD Contract	Comments
5.04, 6.15, 7.16	Poor weather (WoW)	3	4	Fully operator owned	Fully removal contractor owned	Allocation of risk depends on the contracting strategy e.g. schedule flexibility would be key differentiator
6.01, 7.01	Availability of the lifting vessel that has been contracted within the agreed period	4	3	Fully removal contractor owned	Fully removal contractor owned	Up to the removal contractor to agree limit of the liability. Assumes heavy lift vessel is part of contractor service
6.02, 7.02	Restricted access to the structure	4	3	Fully operator owned	Fully operator owned	Assumes contract provides unrestricted access.
7.21	Uncertainty of drill cutting pile content and/or volume prior to removal	3	4	Fully operator owned	Fully operator owned	Disturbance of cuttings pile also an environmental threat which would also be attributed contractually to the operator
7.23	Unknown obstructions - obstructing access to pile cut location	3	4	Fully operator owned	Mostly operator owned	If it is a known obstruction the risk may be transferred to the removal contractor at a price.
9.21	Changes to removal requirements beyond original scope of work	3	4	Fully operator owned	Fully operator owned	

4 WORKSHOP NOTES

The following points of discussion were recorded in addition to the primary workshop output tabulated in the following section.

- A discussion on risk "ownership" took place. It was proposed that a risk can be owned by the removal contractor but be covered by the operator insurance policy – i.e. it could be covered by allowing the removal contractor to have access to the operators insurance policy. Insurance is a risk mitigation and was not included in the workshop scope so was not discussed further.
- The following was assumed for the type of removals contract being discussed
  - Cleaning would not be a focus of the scope
  - Bearing the handover to the removals contractor in mind the work phase "Topsides Preparation" was included (but only from a removals perspective)
- The workshop discussions were premised upon a large steel jacket with a subsea tie back. The workshop output was subsequently critically assessed to see what additions or clarifications needed to be made for the case of a different substructure. The following comments were made
  - FPSO: whether it is leased or owned will have an impact on the ownership of the risk
  - Issues associated with GBS storage cell clean-up are not captured in the risk listing that has been prepared
  - Abandoning structures in situ has not been considered as structures left in situ are not covered by a removals contract
  - Any equipment for removal (e.g. on an FPSO) provided by the operator for use by the removal contractor is assumed to be fit for purpose. Therefore equipment provided by operator is an operator owned risk
- In general a wide generic approach and view has been captured and it is understood that a specific project case may be treated differently

The following clarifications were made to the instructions for Dundas relating to the next phase of work – i.e. the removal contractor engagement:

- Refinements to the risk titles made in the operator workshop should be incorporated in the questions that are issued to the removal contractors. i.e. comments that have been added by the operators may need to be incorporated into the risk title so that they are clearly understood
- Changes to the pre-populated risk register ranking that were made in the operator workshop should be provided to the removal contractors (excluding the risk ownership allocation).
- The list of removal contractors being contacted in the survey is to be distributed to operator workshop attendees (done)

5 WORKSHOP OUTPUT

The risks and their categorisations are listed below, grouped in accordance with the OGUK decommissioning work breakdown structure.
It should be noted that several of the risks are repeated in multiple WBS categories.

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?		Difference with comparable construction risk	Comments
					Operator led reimbursable contract	Engineer / Procure / Remove / Dispose contract		
Phase 5: Topsides Preparation								
5.01	Poor or incomplete execution of cleaning and decom phase	Performance	3	2	Fully operator owned	Fully operator owned	cleaning not relevant	Assumes contract does not include cleaning Documented cleanliness criteria
5.02	Unexpected Limitations/ restrictions of operator provided temporary infrastructure including bed space due to NUI/ MMI modes	Performance	3	3	Fully operator owned	Fully operator owned	NA	Reduction below agreed level i.e. below that agreed in the scope of work Assumes operator is providing the temp. infrastructure/equipment
5.03	Live Power/ HC system isolation (failure of)	Performance	3	2	Fully operator owned	Fully operator owned		Responsibility for isolation of system is with the operator
5.04	Poor weather (WoW)	Performance	3	4	Fully operator owned	Fully removal contractor owned	Decom is less schedule driven	Allocation of risk depends on the contracting strategy e.g. schedule flexibility would be key differentiator

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?		Difference with comparable construction risk	Comments
					Operator led reimbursable contract	Engineer / Procure / Remove / Dispose contract		
5.05	Loss of or premature decommissioning of platform based equipment e.g. cranes and lifting equipment	Performance	4	2	Fully operator owned	Fully operator owned		Reduction below agreed level i.e. below that agreed in the scope of work Assumes operator is providing the temp. infrastructure/equipment
5.06	Disposal of unknown HMs/ hydrocarbons/ waste	Performance	3	3	Mostly operator owned	Mostly removal contractor owned		Depends on scope and contracting strategy
5.07	Transfer of inventory database	Performance	2	2	Fully operator owned	Fully operator owned		(Database covered in 5.9)
5.08	Accuracy of data/ surveys/ records, specially 'as-built' info, modifications and asset inventory	Technical	3	2	Fully operator owned	Mostly removal contractor owned		Difficult to allocate in generic way depends on mitigation measures, scope and risk allocation in the contract approach
5.09	HSE risks	Performance	3	2	Equal share	Equal share		Statutory HSE risks are responsibility of the executing party Negligence based for third parties

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?		Difference with comparable construction risk	Comments
					Operator led reimbursable contract	Engineer / Procure / Remove / Dispose contract		
5.10	Underperforming contractor(s)	Contractual	3	2	Equal share	Fully removal contractor owned		
5.11	Unexpected Limitations/ restrictions of contractor provided temporary infrastructure including bed space due to NUI/ MMI modes	Technical	3	3	Fully removal contractor owned	Fully removal contractor owned		Assumes removal contractor is providing the temp. infrastructure/equipment
5.12	Operator imposing non anticipated work methodologies e.g. ISSOW	Technical	3	1	Fully operator owned	Fully removal contractor owned		Requires clear scope of work for EPRD
Phase 6: Topsides Removal								
6.01	Availability of the lifting vessel that has been contracted within the agreed period	Technical	4	3	Fully removal contractor owned	Fully removal contractor owned	Decom is typically less schedule critical	Up to the removal contractor to agree limit of the liability. Assumes heavy lift vessel is part of contractor service

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?		Difference with comparable construction risk	Comments
					Operator led reimbursable contract	Engineer / Procure / Remove / Dispose contract		
6.02	Restricted access to the structure	Performance	4	3	Fully operator owned	Fully operator owned		Assumes contract provides unrestricted access.
6.03	Unexpected Limited/ restrictions of operator provided temporary infrastructures including bed space	Performance	3	3	Fully operator owned	Fully operator owned	NA	Reduction below agreed level i.e. below that agreed in the scope of work Assumes operator is providing the temp. infrastructure/equipment
6.04	Unexpected carry over work from outside of agreed scope	Performance	3	2	Fully operator owned	Fully operator owned		
6.05	Getting the right permits, licenses and consents in time	Political	3	2	Equal share	Equal share		Permits and consents register should identify for each if the removal contractor or operator is responsible and should be signed off by both sides
6.06	Uncertainties of weights and centre of gravity at point of lift	Performance	3	2	Mostly removal contractor owned	Mostly removal contractor owned		Contractor responsible for ensuring capabilities at point of lift

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?		Difference with comparable construction risk	Comments
					Operator led reimbursable contract	Engineer / Procure / Remove / Dispose contract		
6.07	Lifting points not fit for purpose (i.e. not as expected)	Technical	3	2	Fully operator owned	Fully removal contractor owned		Depends on scope and if removal contractor has had access to lifting points prior to award of contract
6.08	Transportation risks - Contractor materials	Performance	3	2	Fully removal contractor owned	Fully removal contractor owned		For example failure of sea fastening, failure of transportation equipment, collision, grounding, crew error
6.09	Transportation risks - Structures being transported	Performance	3	2	Fully removal contractor owned	Fully removal contractor owned		Scope of work must define this
6.10	Loss of asset integrity during lift	Technical	4	2	Fully removal contractor owned	Fully removal contractor owned		Scope of work must define this
6.11	Poor weather (WoW)	Performance	3	4	Fully operator owned	Fully removal contractor owned	Decom is less schedule driven	Allocation of risk depends on the contracting strategy e.g. schedule flexibility would be key differentiator

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?		Difference with comparable construction risk	Comments
					Operator led reimbursable contract	Engineer / Procure / Remove / Dispose contract		
6.12	Dropping load	Technical	4	2	Fully removal contractor owned	Fully removal contractor owned		
6.13	HSE risks	Performance	3	2	Equal share	Equal share		Assume the decommissioning safety case applies. Statutory HSE risks are responsibility of the executing party Negligence based for third parties
6.14	Spill to sea	Performance	3	2	Equal share	Equal share		Contractor responsible for spills relating to his own vessels and equipment. Operator responsible for spills from platform
6.15	Transfer of data regarding as built and current status	Technical	3	2	Fully operator owned	Mostly removal contractor owned		Difficult to allocate in generic way depends on mitigation measures, scope and risk allocation in the contract approach

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?		Difference with comparable construction risk	Comments
					Operator led reimbursable contract	Engineer / Procure / Remove / Dispose contract		
6.16	Underperforming contractor(s)	Contractual	4	2	Equal share	Fully removal contractor owned		equal share allocation depends on contractual detail (Operator Led) with respect to performance provisions
Phase 7: Substructure Removal								
7.01	Availability of the lifting vessel that has been contracted within the agreed period	Performance	4	3	Fully removal contractor owned	Fully removal contractor owned	Decom is typically less schedule critical	Up to the removal contractor to agree limit of the liability. Assumes heavy lift vessel is part of contractor service
7.02	Restricted access to the structure	Performance	4	3	Fully operator owned	Fully operator owned		Assumes contract provides unrestricted access.
7.03	Unexpected carry over work from outside of agreed scope	Performance	3	2	Fully operator owned	Fully operator owned		only a risk if topside removal and substructure removal contracts are separate
7.04	Getting the right permits, licenses and consents in time	Political	3	2	Equal share	Equal share		Permits and consents register should identify for each if the removal contractor or operator is responsible and should be signed off by both sides

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?		Difference with comparable construction risk	Comments
					Operator led reimbursable contract	Engineer / Procure / Remove / Dispose contract		
7.05	Uncertainties of weights and centre of gravity at point of lift	Performance	4	2	Fully removal contractor owned	Fully removal contractor owned		Contractor responsible for ensuring capabilities at point of lift
7.06	Unknown marine growth	Technical	2	2	Fully removal contractor owned	Fully removal contractor owned		Final marine growth survey assumed to be added to removal contractor scope
7.07	Unexpected protected marine species	Technical	2	2	Fully operator owned	Fully operator owned		
7.08	Change in jacket cutting plan	Technical	3	2	Fully removal contractor owned	Fully removal contractor owned		
7.09	Transportation risks - Contractor materials	Performance	3	2	Fully removal contractor owned	Fully removal contractor owned		For example failure of sea fastening, failure of transportation equipment, collision, grounding, crew error
7.10	Transportation risks - Structures being transported	Performance	3	2	Fully removal contractor owned	Fully removal contractor owned		Scope of work must define this

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?		Difference with comparable construction risk	Comments
					Operator led reimbursable contract	Engineer / Procure / Remove / Dispose contract		
7.11	Dropped object removal/recovery	Performance	2	2	Fully removal contractor owned	Fully removal contractor owned		
7.12	Loss of asset integrity during lifting sequence	Technical	4	2	Fully removal contractor owned	Fully removal contractor owned		Scope of work must define this
7.13	Poor weather (WoW)	Performance	3	4	Fully operator owned	Fully removal contractor owned	Decom is less schedule driven	Allocation of risk depends on the contracting strategy e.g. schedule flexibility would be key differentiator
7.14	Dropping load	Technical	4	2	Fully removal contractor owned	Fully removal contractor owned		
7.15	HSE risks	Performance	3	2	Equal share	Equal share		The decommissioning safety case no longer applies. Statutory HSE risks are responsibility of the executing party Negligence based for third parties

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?		Difference with comparable construction risk	Comments
					Operator led reimbursable contract	Engineer / Procure / Remove / Dispose contract		
7.16	Underperforming contractor(s)	Contractual	4	2	Equal share	Fully removal contractor owned		equal share allocation depends on contractual detail (Operator Led) WRT performance provisions
7.17	Uncertainty of drill cutting pile content and/or volume prior to removal	Technical	3	4	Fully operator owned	Fully operator owned		Disturbance of cuttings pile also an environmental threat which would also be attributed contractually to the operator
7.18	Transfer of data regarding as built and current status	Technical	3	2	Fully operator owned	Mostly removal contractor owned		Difficult to allocate in generic way depends on mitigation measures, scope and risk allocation in the contract approach
7.19	Unknown obstructions - obstructing access to pile cut location	Technical	3	4	Fully operator owned	Mostly operator owned		If it is a known obstruction the risk may be transferred to the removal contractor at a price.

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?		Difference with comparable construction risk	Comments
					Operator led reimbursable contract	Engineer / Procure / Remove / Dispose contract		
Phase 8: Topsides and Substructure Onshore Recycling								
8.01	Poor or incomplete execution of cleaning and decom phase	Performance	3	2	Fully operator owned	Fully operator owned	cleaning not relevant	Assumes contract does not include offshore cleaning Documented cleanliness criteria Assumes specialist subcontractor
8.02	Multiple cross border disposal legislation	Political	2	2	Equal share	Equal share		Contracts should identify responsibilities depending on scope and the legislation may dictate where responsibility lies
8.03	Ownership risk of controlled waste materials	Operator	2	2	Fully operator owned	Fully operator owned		Operator remains owner until it is contractually transferred or disposed of in accordance with legislation
8.04	Inaccurate platform inventory data	Performance	3	2	Mostly operator owned	Equal share		Risk could be transferred to the removal contractor depending on the contract terms and scope

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?		Difference with comparable construction risk	Comments
					Operator led reimbursable contract	Engineer / Procure / Remove / Dispose contract		
8.05	Blockage of harbour during offloading	Performance	3	2	Fully removal contractor owned	Fully removal contractor owned		
8.06	Disposal of unknown HMs/ hydrocarbons/ waste	Performance	3	2	Mostly operator owned	Mostly removal contractor owned		Depends on scope and contracting strategy
8.07	Lack of availability of equipment for offloading within the agreed period	Performance	3	2	Fully removal contractor owned	Fully removal contractor owned		Assumes removal offloading and disposal is under the same contract
8.08	Use of inappropriate services for hazardous work (i.e. in house services to save money)	Contractual	3	2	Fully removal contractor owned	Fully removal contractor owned		
8.09	HSE	Performance	3	2	Fully removal contractor owned	Fully removal contractor owned		Statutory HSE risks are responsibility of the executing party Negligence based for third parties

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?		Difference with comparable construction risk	Comments
					Operator led reimbursable contract	Engineer / Procure / Remove / Dispose contract		
8.10	Underperforming contractor(s)	Contractual	3	2	Mostly operator owned	Fully removal contractor owned		Normally lump sum. Subject to nature of "underperforming"
Phase 9: Subsea Infrastructure (pipelines, umbilicals and mattresses and SSIV)								
9.01	Availability of the lifting vessel that has been contracted within the agreed period	Performance	4	3	Fully removal contractor owned	Fully removal contractor owned	Decom is typically less schedule critical	Up to the removal contractor to agree limit of the liability. Assumes heavy lift vessel is part of contractor service
9.02	Restricted access to the structure	Performance	4	3	Fully operator owned	Fully operator owned		Assumes contract provides unrestricted access.
9.03	Unexpected carry over work from outside of agreed scope	Performance	3	2	Fully operator owned	Fully operator owned		

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?		Difference with comparable construction risk	Comments
					Operator led reimbursable contract	Engineer / Procure / Remove / Dispose contract		
9.04	Getting the right permits, licenses and consents in time	Political	3	2	Equal share	Equal share		Permits and consents register should identify for each if the removal contractor or operator is responsible and should be signed off by both sides
9.05	Uncertainties of weights and centre of gravity	Performance	3	2	Fully removal contractor owned	Fully removal contractor owned		Contractor responsible for ensuring capabilities at point of lift
9.06	Unknown marine growth	Technical	2	2	Fully removal contractor owned	Fully removal contractor owned		Final marine growth survey assumed to be added to removal contractor scope
9.07	Unexpected protected marine species	Technical	2	2	Fully operator owned	Fully operator owned		
9.08	Change in cutting plan (e.g. pipeline manifold)	Contractual	3	2	Fully removal contractor owned	Fully removal contractor owned		

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?		Difference with comparable construction risk	Comments
					Operator led reimbursable contract	Engineer / Procure / Remove / Dispose contract		
9.09	Transportation risks - Contractor materials	Performance	3	2	Fully removal contractor owned	Fully removal contractor owned		For example failure of sea fastening, failure of transportation equipment, collision, grounding, crew error
9.10	Transportation risks - Structures being transported	Performance	3	2	Fully removal contractor owned	Fully removal contractor owned		Scope of work must define this
9.11	Seabed clean up scope greater than anticipated	Performance	2	2	Fully operator owned	Mostly operator owned		Scope of work must define this
9.12	Loss of equipment integrity during lifting sequence	Contractual	3	2	Fully removal contractor owned	Fully removal contractor owned		Scope of work must define this
9.13	Poor weather (WoW)	Performance	3	4	Fully operator owned	Fully removal contractor owned	Decom is less schedule driven	Allocation of risk depends on the contracting strategy e.g. schedule flexibility would be key differentiator
9.14	Dropping load	Contractual	3	2	Fully removal contractor owned	Fully removal contractor owned		

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?		Difference with comparable construction risk	Comments
					Operator led reimbursable contract	Engineer / Procure / Remove / Dispose contract		
9.15	HSE risks	Performance	3	2	Equal share	Equal share		Statutory HSE risks are responsibility of the executing party Negligence based for third parties
9.16	Underperforming contractor(s)	Contractual	3	2	Mostly operator owned	Fully removal contractor owned		Subject to nature of "underperforming"
9.17	Changes to removal requirements beyond original scope of work	Contractual	3	4	Fully operator owned	Fully operator owned		
9.18	leakage from subsea facilities (pipeline or umbilical)	Performance	3	2	Fully operator owned	Fully operator owned		Operator responsible for spills from subsea facilities
9.19	Changing conditions and number of stabilisation features e.g. mattress or grout bags	Technical	3	3	Fully operator owned	Mostly operator owned		
Phase 10: Site Remediation								

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?		Difference with comparable construction risk	Comments
					Operator led reimbursable contract	Engineer / Procure / Remove / Dispose contract		
10.01	Availability of the lifting vessel and access to the structure	Performance	4	3	Fully removal contractor owned	Fully removal contractor owned	Decom is typically less schedule critical	Up to the contractor to agree limit of the liability. Assumes heavy lift vessel is part of contractor service
10.02	Restricted access to the structure	Performance	2	3	Fully operator owned	Fully operator owned		Assumes contract provides unrestricted access.
10.03	Unexpected carry over work from outside of agreed scope	Performance	2	2	Fully operator owned	Fully operator owned		
10.04	Getting the right permits, licenses and consents in time	Political	2	2	Equal share	Equal share		Permits and consents register should identify for each if the contractor or operator is responsible and should be signed off by both sides
10.05	Seabed clean up scope greater than anticipated	Performance	2	2	Fully operator owned	Mostly operator owned		Scope of work must define this
10.06	Poor weather (WoW)	Performance	2	2	Fully operator owned	Fully removal contractor owned	Decom is less schedule driven	Allocation of risk depends on the contracting strategy e.g. schedule flexibility would be key differentiator

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?		Difference with comparable construction risk	Comments
					Operator led reimbursable contract	Engineer / Procure / Remove / Dispose contract		
10.07	HSE risks	Performance	2	2	Equal share	Equal share		Statutory HSE risks are responsibility of the executing party Negligence based for third parties
10.08	Underperforming contractor(s)	Contractual	2	2	Mostly operator owned	Fully removal contractor owned		Subject to nature of "underperforming"

Table 5-1: Risk Allocations

The table below presents that risks that were included in the pre-populated list [2], but which were not considered to be relevant to the removals contract (either in general or for that particular part of the WBS) – and hence were removed from further consideration in the workshop.

WBS Phase	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?
5	Overoptimistic decommissioning plans agreed with regulator	Political	3	2
5	Poor retention of knowledge & skills in the operating co	Performance	3	3
6	Unproven lifting technologies	Technical	4	2
6	Unknown marine growth	Technical	2	2
6	Cutting preparation (jacket)	Technical	3	2
6	Seabed clean up subject to survey	Performance	2	2
6	Poor retention of knowledge & skills in the operating company	Performance	3	2
7	Limited/ restrictions of temporary infrastructures including bed space	Performance	3	2
7	Unproven lifting technologies	Technical	4	2
7	Lifting points may not exist or be in poor condition	Technical	3	2
7	Poor retention of knowledge & skills in the operating company	Performance	3	2
8	Reverse construction' (as opposed to disposal and/ or recycling)	Performance	3	2
8	Reputation	Operator	4	2
8	Retaining knowledge & skills	Performance	3	2
9	Limited/ restrictions of temporary infrastructures including bed space	Performance	3	2

WBS Phase	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?
9	Unproven lifting technologies	Performance	4	2
9	Lifting points may not exist or be in poor condition	Contractual	3	2
9	Poor retention of knowledge & skills	Performance	3	2
10	Limited/ restrictions of temporary infrastructures including bed space	Performance	2	2
10	Unproven lifting technologies	Performance	4	2
10	Uncertainties of weights and centre of gravity	Performance	4	2
10	Unknown marine growth	Performance	2	2
10	Lifting points may not exist or be in poor condition	Contractual	3	2
10	Cutting preparation (jacket)	Contractual	3	2
10	Transportation risks	Performance	3	2
10	Asset integrity risks	Contractual	3	2
10	Dropping load	Contractual	4	2
10	Poor retention of knowledge & skills	Performance	3	2

Table 5-2: Risks Not Considered Relevant to Removals Contract

6 WORK BREAKDOWN STRUCTURE

The following work breakdown structure [1] was used as a means of grouping the risks according to category of activity. The items marked with a red cross were excluded from consideration in the workshop as these activities were deemed to be non relevant for the removals contract that is under development. The figure below shows the previous version of the WBS (upper section) and how it relates to the most recent model (lower section).

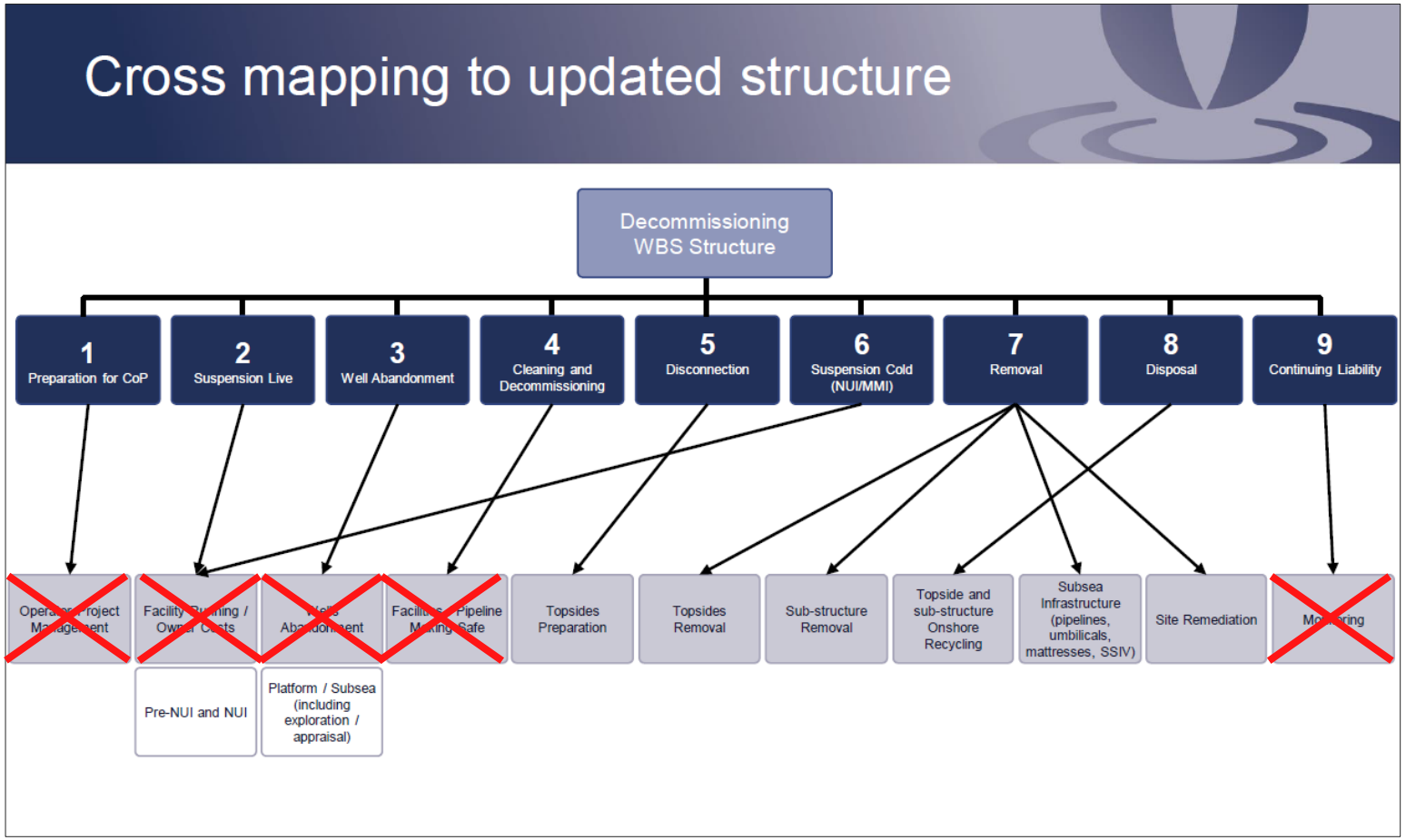

Figure 6-1: Work Breakdown Structure

Overall Decimmissioning Work Breakdown Structure

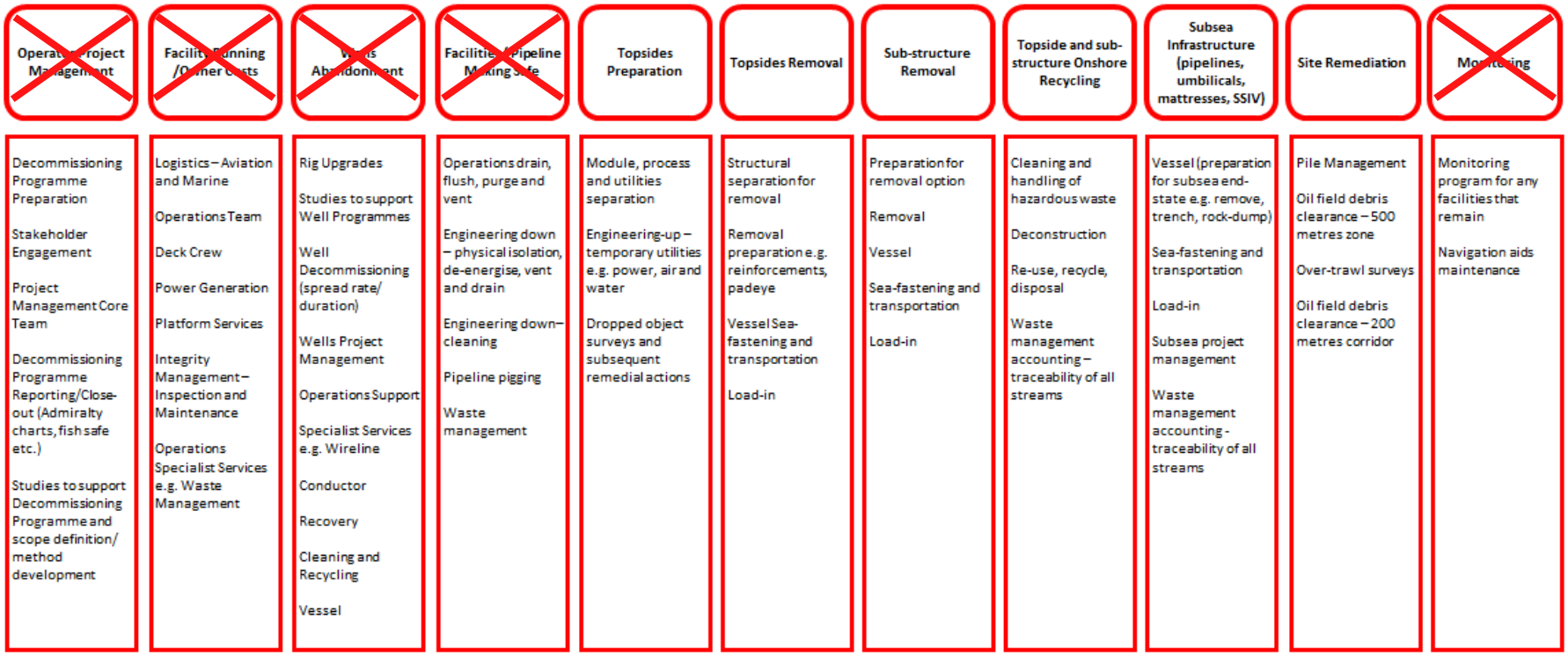

Figure 6-2: Work Breakdown Structure - Detailed

7 REFERENCES

1. “Guidelines on decommissioning cost estimation”, OGUK, Issue 3, September 2013.
2. “Remuneration Models Survey Results”, Decom North Sea, Accenture, September 2012.
3. “Identifying and assessing risk in construction contracts”, International Marine Contactors Association, July 2006

8 APPENDIX 1 - AGENDA

The workshop agenda is shown below.

Tuesday 25th November 2014 (9 am - 5 pm)

"Bistro 210", 210 Market St, City Centre, Aberdeen, AB11 5PQ

Start	Finish	Topic
09:00	09:15	Introduction
09:15	09:30	**Step 1** - Phase identification
09:30	12:30	**Step 2** - Identification, categorisation, and ranking
12:30	**13:00**	**Lunch**
13:00	16:00	**Steps 3, 4** - Allocation of risk, with supporting rationale & contrast with construction
16:00	16:45	Review for different substructure types
16:45	17:00	Workshop review and closeout

9 APPENDIX 2 - WORKSHOP PARTICIPANTS

The team comprised:

Name	**Company**
Richard Woodhouse	Dundas Consultants
Frank Kelly	BP
Dave Nunn	Talisman Sinopec UK Ltd
Janine Jones	OGUK
Don Orr	BP
Mike Corcoran	CNR
Graeme MacDonald	Talisman Sinopec UK Ltd
Darren Nicol	Talisman Sinopec UK Ltd
Melanie Thom	TAQA
Kirsty Olson	Maclay Murray & Spence LLP

10 APPENDIX 3 – RISK CLASSIFICATION

The following risk classifications were used:

Applicable to LOGIC Removals Process Contract?	Yes	Y
	No	N

Risk Type	Contractual	Con
	Performance	Perf
	Financial	Fin
	Political	Pol
	Technical	Tech
	Geographical	Geo
	Operator	Op

What's the potential impact to the project?	Minimum / no impact	1
	Minor impact, manageable	2
	Serious impact, considerable effort to remediate	3
	Major impact, very difficult to address, serious threat to the project	4
	Very significant impact, project stopper	5

How controllable is the risk?	Fully controllable	1
	Mostly controllable	2
	Partly controllable	3
	Mostly uncontrollable	4
	Fully uncontrollable	5

Who should own the risk?	Fully operator owned	1
	Mostly operator owned	2
	Equal share	3
	Mostly removal contractor owned	4
	Fully removal contractor owned	5

Note – DNS study [2] showed 1="bad", 5="good" on how controllable the risk is. The categorisation was changed for the workshop to make consistent with "impact to project".

Contractor Survey Output

Decommissioning Contract Risk Allocation

J-OGU-2014-003-TN-003

Dundas Consultants

Revision	Description	Date	By	Chkd
A1	Issued for client comment	29/01/15	BM	RJW
A2	Updated risk allocation section	16/02/15	BM	RJW
A3	Customer comments incorporated	03/03/15	BM	RJW

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CONTENTS- CONTRACTOR SURVEY OUTPUT

11 INTRODUCTION

In March 2013 the Business, Innovation and Skills (BIS) Department of the UK Government, in conjunction with Department of Energy and Climate Change (DECC) launched a UK oil and gas industrial strategy with the intention of creating the right conditions to maximise opportunity and investment to the benefit of the UK economy.

BIS has developed an action plan that outlines a series of initiatives to achieve this strategy, one of which includes decommissioning.

Industry champions from the oil and gas operating and service company communities have been engaged through Oil and Gas UK who in turn facilitated the division of actions and the creation of task groups. The Decommissioning Industry Technical Group held an initial workshop in November 2013 to determine areas that could potentially offer the greatest cost reductions. One of the topics that it was felt warranted further assessment and would form part of an overall decommissioning strategy was risk allocation between contractor and operator.

Risk allocation in contracts between operators and service providers has long been debated and it is proposed that the unspecified allocation of risk has added cost but no real value to the industry. Oil & Gas UK has available a suite of LOGIC standard contracts, which was developed by CRINE, a subsidiary of LOGIC. These contracts aim to reduce the effort spent evaluating and reviewing qualifications that are generic and allows focus to be put on the specific terms directly beneficial to the work being undertaken thus generating cost reductions.

It is proposed that a risk identification, ranking and allocation initiative will assist in the development of a high quality industry standard decommissioning contract. It is intended that the contract be targeted at removal scopes. For the initiative to succeed it will require input from the operators decommissioning and supply chain management functions and thereafter the service contractor community.

The risk identification, ranking and allocation initiative has been undertaken in two phases. The first being an operator engagement workshop, which was used to inform the second phase with the contractor community. Two separate reports have been issued; a first report detailing the output from the operator engagement workshop and this report, covering the responses from the contractors.

The aim of the operator workshop was to identify, rank and allocate (i.e. operator or contractor) the key generic risks in a decommissioning removal project. Based on the operator workshop/input a contractor survey was generated capturing the risks (including their ranking and clarification comments) but excluding the operator views on allocation of risk (i.e. operator or contractor). The service contractors were asked to evaluate risk allocation independently. Where possible the survey respondent was also interviewed to ensure that all comments and opinions were captured. This document records the survey results and the comments captured through contractor interviews and email correspondence.

12 SURVEY METHODOLOGY

12.1 Objective and Overview

The aims of the survey were as follows:

- Allocate (i.e. operator or contractor) the key generic risks in a decommissioning removal project (independently of the operator allocation)
- Review pre-populated risk fields (e.g. potential impact of a risk on a project and the controllability of the risk) and amend as appropriate
- Provide comments and clarification as required
- Identify additional risks not captured in the survey

As with the operator workshop, it was decided to consider both an operator led reimbursable contract scenario and a lump sum EPRD (Engineering, Preparation, Removal and Demolition) contract case. The removals service contractor companies were issued with a risk survey before being engaged on an individual basis to gather feedback.

12.2 Deliverables

The required deliverables from the survey were as follows:

- Validated list of "phases" that are deemed to apply to the decommissioning removals process, as agreed by the operators
- Validated list of the key risks that are considered to apply in each decommissioning phase and identification of any additional risks that are deemed applicable
- Ranking of the risks in terms of ability to control and potential consequence
- Suggested contractual risk allocation position (i.e. operator or contractor)

12.3 Survey Process

The following guidance was provided to the contractors for the survey.

1: Identification of each significant "phase" of the decommissioning process

The Decommissioning Removal Programme is broken down into Work Breakdown Structure (WBS) phases. The phases adopted for this survey are taken from "Guidelines on decommissioning cost estimation", OGUK, Issue 3, September 2013 [Ref 1] and are listed below. Based on the output of the operator workshop, the "greyed out" elements were not considered further in the survey.

1. Operator project management
2. Facility running/ owner costs
3. Wells abandonment
4. Facilities/pipeline making safe
5. Topsides preparation
6. Topsides removal
7. Substructure removal
8. Topsides and substructure onshore recycling
9. Subsea infrastructure
10. Site remediation

11. Monitoring

Each contractor was asked if any of the greyed out phases should be considered further and if so, to provide their rationale.

2: Identification of key associated risks for each (relevant) phase and relative ranking of the risks.

Extensive work was previously carried out to identify the key risks associated with decommissioning ("Remuneration Models Survey Results", Decom North Sea, Accenture, September 2012) [Ref 2]. The list of risks identified in that work was modified where appropriate during the operator workshop and formed the basis for the survey. Starting with the pre-populated list, the contractors were asked to review the risks by undertaking the following steps:

a) Identification: review list of risks identified, remove items, make additions, and clarify or change risk descriptions as required
b) Screen out irrelevant risks: only risks relevant to the contract that is under development should be considered
c) Categorisation: review pre-populated risk categorisations using definitions developed by IMCA (Contractual, Performance, Financial, Political, Technical, Geographical, Operator) [Ref 3] and modify if desired. As the risk type classification was not the primary objective of the work it was requested that this category be checked but not given undue attention
d) Ranking: using the pre-populated drop down list as a basis, the contractor was asked to rank each risk in terms of its potential impact and the ability for the risk to be controlled

3: Allocation of the risk to the operator and/or the contractor

It was proposed that the allocation of risk should be based on the premise of which party is best placed to manage and/or assume contractual responsibility for that risk. For the allocation of risk, 5 main categories were included in the drop down list:

- Fully operator owned
- Mostly operator owned
- Equal risk
- Mostly contractor owned
- Fully contractor owned

Importantly, it was agreed that the allocation of risk to the operator and/or the contractor was to be considered twice:

- First from the perspective of an operator led, reimbursable contract
- Secondly in the context of an Engineering/Preparation/Removal/Demolition lump sum contract

4: Comparison with construction projects

The removals contractors were also asked to compare and contrast the risks with those arising in construction phase of the project, indicating the nature of any differences between them.

Dundas requested that the survey be completed considering the case of a large steel jacket with a subsea tie-back. Additional comments regarding other facility types (e.g. small steel jacket, FPSO, gravity based sub-structure, spar, semi-submersible and TLP) were then invited, in order to identify any unique aspects pertinent for the decommissioning removals process for these structures by exception.

13 SURVEY SUMMARY

The top 6 risks (in terms of "potential impact" x "ability to control") that were identified are listed below along with their proposed contractual allocation. It should be noted that several of these risks appear in multiple Work Breakdown Structure categories. As can be seen, the majority of the biggest contract risks are proposed by the contracting companies to be allocated contractually to the operating and contracting companies in equal share.

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?	
					Operator led reimbursable contract	EPRD
Averaged response of risk 5.04, 6.15, 7.16 & 9.16	Poor weather (WoW)	Performance	3.1	4.2	Fully operator owned	Equal Share
Averaged response of risk 6.02, 7.02 & 9.02	Restricted access to the structure (Assumes contract provides unrestricted access.)	Performance	3.9	3.4	Fully operator owned	Fully operator owned
7.21	Uncertainty of drill cutting pile content and/or volume prior to removal	Technical	3.0	4.2	Fully operator owned	Fully operator owned
7.23	Unknown obstructions - obstructing access to pile cut location	Technical	3.0	4.0	Fully operator owned	Fully operator owned
9.21	Changes to removal requirements beyond original scope of work	Contractual	3.0	4.0	Fully operator owned	Mostly operator owned
Averaged response of risk 6.01, 7.01 & 9.01	Availability of the lifting vessel that has been contracted within the agreed period	Performance	3.7	2.8	Fully service company owned	Fully service company owned

Table 13-1 Highest Ranking Risks

14 FEEDBACK NOTES

In addition to the survey responses the contractors provided feedback, suggestions and considerations as part of the post survey review process. These have also been captured in the following sections.

14.1 Individual Contractor Feedback

Six contractors provided general feedback either in the form of a telephone discussion or via email correspondence. Where conflicting opinions were received all opinions have been captured.

- Preparation & Planning: The contractors expressed the view that the level of preparation and planning undertaken prior to the removals process will have a significant influence on the impact and controllability of risk. The following elements were considered to be important by the contractors to ensure preparation and planning are carried out to both operator and contractor standards:

    1. Early contractor participation – Ensuring participation of the removals contractor commences early in the decommissioning planning phase will reduce the requirement for additional clarifications and further site visits by the removals contractor
    2. Client data – The removals contractors highlighted the importance of receiving accurate and up to date information for the structure from the client. It should not be the original information used for the installation of the structure
    3. Surveys - An “as is” survey will be required by the contractor to validate the current status of the structure and equipment, including weights and integrity

    The contractors surveyed believe that detailed preparation and planning should mitigate or reduce the impact of several risks that have been identified in the study. In addition, if undertaken correctly it will also allow contractors to accurately tender for the project and reduce the risk of delays and cost overrun.

- Cleaning: The contractors recommended that all structures should be hydrocarbon free (or benign) prior to the commencement of removal activities. The standard to which the structure must be cleaned should be agreed between the removals contractor and operator and should be validated by inspection once the work is complete. To avoid unnecessary costs, cleaning inspections should be carried out prior to the commencement of removal activities such as removal vessels deployment.

- Unacceptable Risks: All contractors indicated that risks associated with pollution events should remain with the title holder i.e. the operator. The removals

contractors were asked what they would do if they were asked to remove a potentially polluting structure. The following responses were received:

1. Contractor 1: Would not remove a structure if it was insufficiently cleaned and its condition was likely to cause contamination
2. Contractor 2: Would remove the structure but any resultant pollution would be the responsibility of the operator
3. Contractor 3: Would carry systems to deal with the outcome (e.g. spills) but any pollution would be the responsibility of the operator
4. Contractor 4: Believe that if the correct planning and preparation work are undertaken then this situation could not arise

- Disposal: Several contractors indicated that they are not licenced to dispose of waste. Consequently a specialist disposal contractor would be required for the waste disposal phase. Some removal contractors indicated that they would be willing to dispose of non-polluting materials such as recyclable materials and scrap (covered in Phase 8: Topsides and Substructure Onshore Recycling), however this element would only be carried out as part of a larger project, not as a standalone piece of work.

- Consortia: Some removal contractors believe a consortium of removals and disposals contractors could potentially be put in place. The opinion on which company should lead a consortium varied and could either be the removals or disposal contractor for the following reasons:

    1. Removals Contractor: Has to undertake the heavy lift activities and other activities will be based around that timing, therefore they may be best placed to lead the consortium
    2. Disposal Contractor: Has to ultimately dispose of the materials therefore their input and potentially their equipment could be required for the removals stage

- Contract Type: In general the removals contractors completed all sections of the survey but indicated that the use of EPRD contracts are considered by some to be highly unlikely for a decommissioning removals project. Many indicated that operator led reimbursable contracts were seen as the more favourable contract format.

- Ownership: The contractors indicated that it would be preferential for ownership of the platform to pass directly from the operator to the disposal contractor and not to the removal contractor.

- Cost: The removal contractor views their role as that of a service provider. Therefore increasing the risk allocated to the removal contractor above the known risks is generally undesirable and if accepted will result in an increased cost and variation orders may be required.

14.2 Suggested Areas for Contract Consideration

The following suggestions were also made by the removals contractors as areas that could be considered for the LOGIC decommissioning contract.

- It would be considered advantageous to have large execution windows in which the removals contractor informs the operator when the work can be undertaken. The decommissioning removal process is not as time constrained as the comparable construction phase, whereby a structure needs to be in place prior to an agreed date (e.g. first oil).
- Ownership of the platform/structure should be retained by the operator until it is handed over to the disposals contractor. There is no advantage in transferring ownership of the structure to the removals contractor for a short period of time if it will transfer again to the disposals contractor. This only adds to increase the required paperwork and consequently the time and cost of the project.
- Accuracy of client (operator) provided information is paramount.
- The health and safety of workers is a joint responsibility and should be split equally between the operator and contractor.

14.3 Suggested Alternative Risking Methodology

One of the contractors indicated that risk and risk allocation could be split more generally into the categories shown in Table 14-1.

#	Category	Description	Example	Recommended Allocation
1	Known	Risk that can be identified from the outset. The result of which are generally predictable.	Weather	Operator or Contractor
2	Known Unknown	Risks that can be identified but the results of which are unclear.	Deviation of weights	Operator and potentially Contractor if priced accordingly
3	Unknown Unknown	Risks that can't be foreseen.	Major accidents	Operator

Table 14-1 Alternative Risking Methodology

14.4 Additional Survey Comments

14.4.1 Construction Comparison

Several contractors indicated the main difference between the removal phase and the comparable construction phase is the lack of a fixed deadline. This was seen as

advantageous as it may lead to a larger time window during which the removal can be undertaken.

14.4.2 Omitted Contractor Survey Responses

Two of the participating contractors omitted survey responses in particular areas, the rationale for these decisions are outline below.

1. Confidential Contractor 1: Would be unwilling to undertake Phase 8 (Topsides and Substructure Onshore Recycling) of the process either lump sum or as a reimbursable subcontract.
2. Confidential Contractor 2: Completed the risk allocation for each phase of the process for either an operator led or EPRD contract, depending on what they believed to be most applicable to the current LOGIC contract draft, as shown below in Table 14-2

	Contract Type	
Details	**Operator Led**	**EPRD**
Phase 5: Topsides Preparation	✓	×
Phase 6: Topsides Removal	✓	×
Phase 7: Substructure Removal	×	✓
Phase 8: Topsides and Substructure Onshore Recycling	×	✓
Phase 9: Subsea Infrastructure (pipelines, umbilicals & mattresses & SSIV)	✓	×
Phase 10: Site Remediation	✓	×

Table 14-2 Survey Sections Completed by Confidential Contractor 2

15 SURVEY OUTPUT

The identified decommissioning removal risks and their categorisations are listed below in

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?	
					Operator led reimbursable contract	Engineer / Prepare/ Remove / Demolition contract
Phase 5: Topsides Preparation						
5.01	Poor or incomplete execution of cleaning and decom phase	Performance	3.0	2.2	Fully operator owned	Fully operator owned
5.02	Unexpected Limitations/ restrictions of operator provided temporary infrastructure including bed space due to NUI/ MMI modes	Performance	3.0	3.2	Fully operator owned	Mostly operator owned
5.03	Live Power/ HC system isolation (failure of)	Performance	3.0	2.4	Fully operator owned	Mostly operator owned
5.04	Poor weather (WoW)	Performance	3.4	4.2	Mostly operator owned	Mostly service company owned
5.05	Loss of or premature decommissioning of platform based equipment e.g. cranes and lifting equipment (operator equipment)	Performance	4.0	2.4	Fully operator owned	Mostly operator owned
5.06	Disposal of unknown hazardous material (HMs)/ hydrocarbons/ waste	Performance	3.4	3.0	Fully operator owned	Fully operator owned
5.08	Transfer of inventory database	Performance	2.0	2.4	Fully operator owned	Equal share
5.09	Accuracy of data/ surveys/ records, specially 'as-built' info, modifications and asset inventory	Technical	3.0	2.6	Fully operator owned	Mostly operator owned
5.1	HSE risks	Performance	3.0	2.0	Equal share	Mostly service company owned
5.12	Underperforming contractor(s)	Contractual	3.0	2.0	Mostly service company owned	Fully service company owned
5.13	Unexpected Limitations/ restrictions of contractor provided temporary infrastructure including bed space due to NUI/ MMI modes		3.0	2.8	Mostly operator owned	Equal share

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?	
					Operator led reimbursable contract	Engineer / Prepare/ Remove / Demolition contract
5.14	Operator imposing non anticipated work methodologies e.g. ISSOW		3.2	1.8	Fully operator owned	Fully operator owned
Phase 6: Topsides Removal						
6.01	Availability of the lifting vessel that has been contracted within the agreed period	Performance	3.6	2.8	Fully service company owned	Fully service company owned
6.02	Restricted access to the structure (Assumes contract provides unrestricted access.)	Performance	3.8	3.4	Fully operator owned	Fully operator owned
6.03	Unexpected Limited/ restrictions of operator provided temporary infrastructures including bed space	Performance	3.0	3.4	Fully operator owned	Fully operator owned
6.04	Unexpected carry over work from outside of agreed scope	Performance	3.0	2.4	Fully operator owned	Fully operator owned
6.06	Getting the right permits, licenses and consents in time	Political	3.0	2.4	Fully operator owned	Mostly operator owned
6.07	Uncertainties of weights and centre of gravity at point of lift	Performance	3.0	2.4	Fully operator owned	Mostly operator owned
6.08	Unknown marine growth	Technical	2.0	2.0	Mostly operator owned	Equal share
6.09	Lifting points not fit for purpose (i.e. not as expected)	Technical	3.2	2.6	Mostly operator owned	Equal share
6.1	Cutting preparation (jacket)	Technical	3.0	2.0	Mostly service company owned	Fully service company owned
6.11	Transportation risks - Contractor materials e.g. failure of sea fastening, failure of transportation equipment, collision, grounding, crew error	Performance	3.0	2.0	Fully service company owned	Fully service company owned
6.12	Transportation risks - Structures being transported	Performance	3.0	2.0	Fully service company owned	Fully service company owned
6.13	Seabed clean up subject to survey	Performance	2.0	2.0	Mostly operator owned	Mostly service company owned
6.14	Loss of asset integrity during lift	Technical	4.0	2.4	Equal share	Equal share
6.15	Poor weather (WoW)	Performance	3.0	4.2	Fully operator owned	Equal share

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?	
					Operator led reimbursable contract	Engineer / Prepare/ Remove / Demolition contract
6.16	Dropping load	Technical	4.0	2.2	Mostly service company owned	Mostly service company owned
6.17	HSE risks	Performance	3.0	2.0	Equal share	Equal share
6.18	Spill to sea	Performance	3.0	2.2	Mostly operator owned	Mostly operator owned
6.2	Transfer of data regarding as built and current status	Technical	3.0	2.6	Mostly **operator** owned	Mostly operator owned
6.21	Underperforming contractor(s)	Contractual	3.8	2.0	Equal share	Fully service company owned
Phase 7: Substructure Removal						
7.01	Availability of the lifting vessel that has been contracted within the agreed period	Performance	3.8	2.8	Fully service company owned	Fully service company owned
7.02	Restricted access to the structure (Assumes contract provides unrestricted access.)	Performance	4.0	3.4	Fully operator owned	Mostly operator owned
7.04	Unexpected carry over work from outside of agreed scope	Performance	3.0	2.4	Fully operator owned	Mostly operator owned
7.06	Getting the right permits, licenses and consents in time	Political	3.0	2.6	Fully operator owned	Mostly operator owned
7.07	Uncertainties of weights and centre of gravity at point of lift	Performance	4.0	2.4	Fully operator owned	Mostly operator owned
7.08	Unknown marine growth	Technical	2.0	2.2	Mostly operator owned	Equal share
7.09	Unexpected protected marine species	Technical	2.0	2.2	Mostly operator owned	Fully operator owned
7.1	Lifting points may not exist or be in poor condition	Technical	3.0	2.6	Fully operator owned	Equal share
7.11	Change in jacket cutting plan	Technical	3.0	2.4	Mostly operator owned	Mostly service company owned
7.12	Transportation risks - Contractor materials e.g. failure of sea fastening, failure of transportation equipment, collision, grounding, crew error	Performance	3.0	2.0	Fully service company owned	Fully service company owned
7.13	Transportation risks - Structures being transported	Performance	3.0	2.0	Fully service company owned	Fully service company owned

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?	
					Operator led reimbursable contract	Engineer / Prepare/ Remove / Demolition contract
7.14	Dropped object removal/recovery	Performance	2.2	2.0	Mostly service company owned	Mostly service company owned
7.15	Loss of asset integrity during lifting sequence	Technical	4.0	2.6	Mostly operator owned	Equal share
7.16	Poor weather (WoW)	Performance	3.0	4.2	Fully operator owned	Mostly service company owned
7.17	Dropping load	Technical	4.0	2.2	Mostly service company owned	Mostly service company owned
7.18	HSE risks	Performance	3.0	2.0	Equal share	Equal share
7.2	Underperforming contractor(s)	Contractual	4.0	2.0	Equal share	Fully service company owned
7.21	Uncertainty of drill cutting pile content and/or volume prior to removal	Technical	3.0	4.2	Fully operator owned	Fully operator owned
7.22	Transfer of data regarding as built and current status	Technical	3.0	2.6	Fully operator owned	Fully operator owned
7.23	Unknown obstructions - obstructing access to pile cut location	Technical	3.0	4.0	Fully operator owned	Fully operator owned
Phase 8: Topsides and Substructure Onshore Recycling						
8.01	Poor or incomplete execution of cleaning and decom phase	Performance	3.0	2.0	Fully operator owned	Mostly operator owned
8.03	Multiple cross border disposal legislation	Political	2.0	2.0	Fully operator owned	Mostly operator owned
8.04	Ownership risk of controlled waste materials	Operator	2.0	2.0	Mostly operator owned	Equal share
8.05	Inaccurate platform inventory data	Performance	3.0	2.0	Fully operator owned	Mostly operator owned
8.06	Blockage of harbour during offloading	Performance	3.0	2.0	Mostly operator owned	Fully service company owned
8.07	Disposal of unknown HMs/ hydrocarbons/ waste	Performance	3.0	2.0	Fully operator owned	Fully operator owned
8.08	Lack of availability of equipment for offloading within the agreed period (Assumes removal offloading and disposal is under the same contract)	Performance	3.0	2.0	Fully operator owned	Mostly service company owned

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?	
					Operator led reimbursable contract	Engineer / Prepare/ Remove / Demolition contract
8.09	Use of inappropriate services for hazardous work (i.e. in house services to save money)	Contractual	3.0	2.0	Mostly service company owned	Mostly service company owned
8.11	HSE	Performance	3.0	2.0	Equal share	Equal share
8.13	Underperforming contractor(s)	Contractual	3.0	2.0	Mostly operator owned	Mostly service company owned
Phase 9: Subsea Infrastructure (pipelines, umbilicals and mattresses and SSIV)						
9.01	Availability of the lifting vessel that has been contracted within the agreed period	Performance	3.8	2.8	Fully service company owned	Fully service company owned
9.02	Restricted access to the structure (Assumes contract provides unrestricted access.)	Performance	4.0	3.4	Fully operator owned	Fully operator owned
9.04	Unexpected carry over work from outside of agreed scope	Performance	3.0	2.4	Fully operator owned	Mostly operator owned
9.06	Getting the right permits, licenses and consents in time	Political	3.0	2.4	Fully operator owned	Mostly operator owned
9.07	Uncertainties of weights and centre of gravity	Performance	3.2	2.4	Mostly operator owned	Equal share
9.08	Unknown marine growth	Technical	2.0	2.0	Equal share	Equal share
9.09	Unexpected protected marine species	Technical	2.0	2.2	Fully operator owned	Mostly operator owned
9.11	Change in cutting plan (e.g. pipeline manifold)	Contractual	3.0	2.2	Mostly operator owned	Mostly service company owned
9.12	Transportation risks - Contractor materials e.g. failure of sea fastening, failure of transportation equipment, collision, grounding, crew error	Performance	3.0	2.0	Mostly service company owned	Fully service company owned
9.13	Transportation risks - Structures being transported	Performance	3.0	2.0	Fully service company owned	Fully service company owned
9.14	Seabed clean up scope greater than anticipated	Performance	2.0	2.2	Fully operator owned	Mostly operator owned
9.15	Loss of equipment integrity during lifting sequence	Contractual	3.0	2.0	Equal share	Equal share
9.16	Poor weather (WoW)	Performance	3.0	4.0	Mostly operator owned	Equal share

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?	
					Operator led reimbursable contract	Engineer / Prepare/ Remove / Demolition contract
9.17	Dropping load	Contractual	3.0	2.0	Mostly service company owned	Fully service company owned
9.18	HSE risks	Performance	3.0	2.0	Equal share	Equal share
9.2	Underperforming contractor(s)	Contractual	3.0	2.0	Equal share	Fully service company owned
9.21	Changes to removal requirements beyond original scope of work	Contractual	3.0	4.0	Fully operator owned	Mostly operator owned
9.22	leakage from subsea facilities (pipeline or umbilical)	Performance	3.0	2.4	Fully operator owned	Mostly operator owned
9.23	Changing conditions and number of stabilisation features e.g. mattress or grout bags	Technical	3.0	3.0	Fully operator owned	Equal share
Phase 10: Site Remediation						
10.01	Availability of the lifting vessel and access to the structure	Performance	3.8	2.8	Equal share	Mostly service company owned
10.02	Restricted access to the structure (Assumes contract provides unrestricted access.)	Performance	2.4	3.4	Fully operator owned	Mostly operator owned
10.04	Unexpected carry over work from outside of agreed scope	Performance	2.2	2.4	Fully operator owned	Fully operator owned
10.06	Getting the right permits, licenses and consents in time	Political	2.0	2.4	Fully operator owned	Mostly operator owned
10.12	Seabed clean up scope greater than anticipated	Performance	2.0	2.2	Fully operator owned	Mostly operator owned
10.14	Poor weather (WoW)	Performance	2.0	2.6	Mostly operator owned	Equal share
10.16	HSE risks	Performance	2.0	2.0	Equal share	Equal share
10.18	Underperforming contractor(s)	Contractual	2.2	2.0	Equal share	Fully service company owned

Table 15-1, grouped in accordance with the OGUK decommissioning work breakdown structure. Risks included in the DNS/Accenture study report [2] but deemed not relevant to a removal contact are presented in Table 15-2. The risk type is also displayed below but was

not altered by any of the removals contractors. The overall contractor responses below are the averaged survey response from all contractors, in the case of risk ownership, the results have been rounded to the nearest answer.

It should be noted that several of the risks are repeated in multiple WBS categories.

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?	
					Operator led reimbursable contract	Engineer / Prepare/ Remove / Demolition contract
Phase 5: Topsides Preparation						
5.01	Poor or incomplete execution of cleaning and decom phase	Performance	3.0	2.2	Fully operator owned	Fully operator owned
5.02	Unexpected Limitations/ restrictions of operator provided temporary infrastructure including bed space due to NUI/ MMI modes	Performance	3.0	3.2	Fully operator owned	Mostly operator owned
5.03	Live Power/ HC system isolation (failure of)	Performance	3.0	2.4	Fully operator owned	Mostly operator owned
5.04	Poor weather (WoW)	Performance	3.4	4.2	Mostly operator owned	Mostly service company owned
5.05	Loss of or premature decommissioning of platform based equipment e.g. cranes and lifting equipment (operator equipment)	Performance	4.0	2.4	Fully operator owned	Mostly operator owned
5.06	Disposal of unknown hazardous material (HMs)/ hydrocarbons/ waste	Performance	3.4	3.0	Fully operator owned	Fully operator owned
5.08	Transfer of inventory database	Performance	2.0	2.4	Fully operator owned	Equal share
5.09	Accuracy of data/ surveys/ records, specially 'as-built' info, modifications and asset inventory	Technical	3.0	2.6	Fully operator owned	Mostly operator owned
5.1	HSE risks	Performance	3.0	2.0	Equal share	Mostly service company owned
5.12	Underperforming contractor(s)	Contractual	3.0	2.0	Mostly service company owned	Fully service company owned
5.13	Unexpected Limitations/ restrictions of contractor provided temporary infrastructure including bed space due to NUI/ MMI modes		3.0	2.8	Mostly operator owned	Equal share

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?	
					Operator led reimbursable contract	Engineer / Prepare/ Remove / Demolition contract
5.14	Operator imposing non anticipated work methodologies e.g. ISSOW		3.2	1.8	Fully operator owned	Fully operator owned
Phase 6: Topsides Removal						
6.01	Availability of the lifting vessel that has been contracted within the agreed period	Performance	3.6	2.8	Fully service company owned	Fully service company owned
6.02	Restricted access to the structure (Assumes contract provides unrestricted access.)	Performance	3.8	3.4	Fully operator owned	Fully operator owned
6.03	Unexpected Limited/ restrictions of operator provided temporary infrastructures including bed space	Performance	3.0	3.4	Fully operator owned	Fully operator owned
6.04	Unexpected carry over work from outside of agreed scope	Performance	3.0	2.4	Fully operator owned	Fully operator owned
6.06	Getting the right permits, licenses and consents in time	Political	3.0	2.4	Fully operator owned	Mostly operator owned
6.07	Uncertainties of weights and centre of gravity at point of lift	Performance	3.0	2.4	Fully operator owned	Mostly operator owned
6.08	Unknown marine growth	Technical	2.0	2.0	Mostly operator owned	Equal share
6.09	Lifting points not fit for purpose (i.e. not as expected)	Technical	3.2	2.6	Mostly operator owned	Equal share
6.1	Cutting preparation (jacket)	Technical	3.0	2.0	Mostly service company owned	Fully service company owned
6.11	Transportation risks - Contractor materials e.g. failure of sea fastening, failure of transportation equipment, collision, grounding, crew error	Performance	3.0	2.0	Fully service company owned	Fully service company owned
6.12	Transportation risks - Structures being transported	Performance	3.0	2.0	Fully service company owned	Fully service company owned
6.13	Seabed clean up subject to survey	Performance	2.0	2.0	Mostly operator owned	Mostly service company owned
6.14	Loss of asset integrity during lift	Technical	4.0	2.4	Equal share	Equal share
6.15	Poor weather (WoW)	Performance	3.0	4.2	Fully operator owned	Equal share

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?	
					Operator led reimbursable contract	Engineer / Prepare/ Remove / Demolition contract
6.16	Dropping load	Technical	4.0	2.2	Mostly service company owned	Mostly service company owned
6.17	HSE risks	Performance	3.0	2.0	Equal share	Equal share
6.18	Spill to sea	Performance	3.0	2.2	Mostly operator owned	Mostly operator owned
6.2	Transfer of data regarding as built and current status	Technical	3.0	2.6	Mostly **operator** owned	Mostly operator owned
6.21	Underperforming contractor(s)	Contractual	3.8	2.0	Equal share	Fully service company owned
Phase 7: Substructure Removal						
7.01	Availability of the lifting vessel that has been contracted within the agreed period	Performance	3.8	2.8	Fully service company owned	Fully service company owned
7.02	Restricted access to the structure (Assumes contract provides unrestricted access.)	Performance	4.0	3.4	Fully operator owned	Mostly operator owned
7.04	Unexpected carry over work from outside of agreed scope	Performance	3.0	2.4	Fully operator owned	Mostly operator owned
7.06	Getting the right permits, licenses and consents in time	Political	3.0	2.6	Fully operator owned	Mostly operator owned
7.07	Uncertainties of weights and centre of gravity at point of lift	Performance	4.0	2.4	Fully operator owned	Mostly operator owned
7.08	Unknown marine growth	Technical	2.0	2.2	Mostly operator owned	Equal share
7.09	Unexpected protected marine species	Technical	2.0	2.2	Mostly operator owned	Fully operator owned
7.1	Lifting points may not exist or be in poor condition	Technical	3.0	2.6	Fully operator owned	Equal share
7.11	Change in jacket cutting plan	Technical	3.0	2.4	Mostly operator owned	Mostly service company owned
7.12	Transportation risks - Contractor materials e.g. failure of sea fastening, failure of transportation equipment, collision, grounding, crew error	Performance	3.0	2.0	Fully service company owned	Fully service company owned
7.13	Transportation risks - Structures being transported	Performance	3.0	2.0	Fully service company owned	Fully service company owned

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?	
					Operator led reimbursable contract	Engineer / Prepare/ Remove / Demolition contract
7.14	Dropped object removal/recovery	Performance	2.2	2.0	Mostly service company owned	Mostly service company owned
7.15	Loss of asset integrity during lifting sequence	Technical	4.0	2.6	Mostly operator owned	Equal share
7.16	Poor weather (WoW)	Performance	3.0	4.2	Fully operator owned	Mostly service company owned
7.17	Dropping load	Technical	4.0	2.2	Mostly service company owned	Mostly service company owned
7.18	HSE risks	Performance	3.0	2.0	Equal share	Equal share
7.2	Underperforming contractor(s)	Contractual	4.0	2.0	Equal share	Fully service company owned
7.21	Uncertainty of drill cutting pile content and/or volume prior to removal	Technical	3.0	4.2	Fully operator owned	Fully operator owned
7.22	Transfer of data regarding as built and current status	Technical	3.0	2.6	Fully operator owned	Fully operator owned
7.23	Unknown obstructions - obstructing access to pile cut location	Technical	3.0	4.0	Fully operator owned	Fully operator owned
Phase 8: Topsides and Substructure Onshore Recycling						
8.01	Poor or incomplete execution of cleaning and decom phase	Performance	3.0	2.0	Fully operator owned	Mostly operator owned
8.03	Multiple cross border disposal legislation	Political	2.0	2.0	Fully operator owned	Mostly operator owned
8.04	Ownership risk of controlled waste materials	Operator	2.0	2.0	Mostly operator owned	Equal share
8.05	Inaccurate platform inventory data	Performance	3.0	2.0	Fully operator owned	Mostly operator owned
8.06	Blockage of harbour during offloading	Performance	3.0	2.0	Mostly operator owned	Fully service company owned
8.07	Disposal of unknown HMs/ hydrocarbons/ waste	Performance	3.0	2.0	Fully operator owned	Fully operator owned
8.08	Lack of availability of equipment for offloading within the agreed period (Assumes removal offloading and disposal is under the same contract)	Performance	3.0	2.0	Fully operator owned	Mostly service company owned

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?	
					Operator led reimbursable contract	Engineer / Prepare/ Remove / Demolition contract
8.09	Use of inappropriate services for hazardous work (i.e. in house services to save money)	Contractual	3.0	2.0	Mostly service company owned	Mostly service company owned
8.11	HSE	Performance	3.0	2.0	Equal share	Equal share
8.13	Underperforming contractor(s)	Contractual	3.0	2.0	Mostly operator owned	Mostly service company owned
Phase 9: Subsea Infrastructure (pipelines, umbilicals and mattresses and SSIV)						
9.01	Availability of the lifting vessel that has been contracted within the agreed period	Performance	3.8	2.8	Fully service company owned	Fully service company owned
9.02	Restricted access to the structure (Assumes contract provides unrestricted access.)	Performance	4.0	3.4	Fully operator owned	Fully operator owned
9.04	Unexpected carry over work from outside of agreed scope	Performance	3.0	2.4	Fully operator owned	Mostly operator owned
9.06	Getting the right permits, licenses and consents in time	Political	3.0	2.4	Fully operator owned	Mostly operator owned
9.07	Uncertainties of weights and centre of gravity	Performance	3.2	2.4	Mostly operator owned	Equal share
9.08	Unknown marine growth	Technical	2.0	2.0	Equal share	Equal share
9.09	Unexpected protected marine species	Technical	2.0	2.2	Fully operator owned	Mostly operator owned
9.11	Change in cutting plan (e.g. pipeline manifold)	Contractual	3.0	2.2	Mostly operator owned	Mostly service company owned
9.12	Transportation risks - Contractor materials e.g. failure of sea fastening, failure of transportation equipment, collision, grounding, crew error	Performance	3.0	2.0	Mostly service company owned	Fully service company owned
9.13	Transportation risks - Structures being transported	Performance	3.0	2.0	Fully service company owned	Fully service company owned
9.14	Seabed clean up scope greater than anticipated	Performance	2.0	2.2	Fully operator owned	Mostly operator owned
9.15	Loss of equipment integrity during lifting sequence	Contractual	3.0	2.0	Equal share	Equal share
9.16	Poor weather (WoW)	Performance	3.0	4.0	Mostly operator owned	Equal share

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?	
					Operator led reimbursable contract	Engineer / Prepare/ Remove / Demolition contract
9.17	Dropping load	Contractual	3.0	2.0	Mostly service company owned	Fully service company owned
9.18	HSE risks	Performance	3.0	2.0	Equal share	Equal share
9.2	Underperforming contractor(s)	Contractual	3.0	2.0	Equal share	Fully service company owned
9.21	Changes to removal requirements beyond original scope of work	Contractual	3.0	4.0	Fully operator owned	Mostly operator owned
9.22	leakage from subsea facilities (pipeline or umbilical)	Performance	3.0	2.4	Fully operator owned	Mostly operator owned
9.23	Changing conditions and number of stabilisation features e.g. mattress or grout bags	Technical	3.0	3.0	Fully operator owned	Equal share
Phase 10: Site Remediation						
10.01	Availability of the lifting vessel and access to the structure	Performance	3.8	2.8	Equal share	Mostly service company owned
10.02	Restricted access to the structure (Assumes contract provides unrestricted access.)	Performance	2.4	3.4	Fully operator owned	Mostly operator owned
10.04	Unexpected carry over work from outside of agreed scope	Performance	2.2	2.4	Fully operator owned	Fully operator owned
10.06	Getting the right permits, licenses and consents in time	Political	2.0	2.4	Fully operator owned	Mostly operator owned
10.12	Seabed clean up scope greater than anticipated	Performance	2.0	2.2	Fully operator owned	Mostly operator owned
10.14	Poor weather (WoW)	Performance	2.0	2.6	Mostly operator owned	Equal share
10.16	HSE risks	Performance	2.0	2.0	Equal share	Equal share
10.18	Underperforming contractor(s)	Contractual	2.2	2.0	Equal share	Fully service company owned

Table 15-1 Risk Allocations

The following table (Table 15-2) presents risks that were included in the pre-populated list, but which were not considered to be relevant to the removals contract (either in general or for that particular part of the WBS). Although considered not relevant to this contract, several contractors allocated risk for these, the results of which are captured in the table below.

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?	
					Operator led reimbursable contract	Engineer / Prepare / Remove / Demolition contract
Phase 5: Topsides Preparation						
5.07	Overoptimistic decommissioning plans agreed with regulator	Political	2.8	2.6	Fully operator owned	Mostly operator owned
5.11	Poor retention of knowledge & skills in the operating co	Performance	3	3.4	Fully operator owned	Fully operator owned
Phase 6: Topsides Removal						
6.05	Unproven lifting technologies	Technical	4	2.2	Mostly service company owned	Mostly service company owned
6.08	Unknown marine growth	Technical	2	2	Mostly operator owned	Equal share
6.1	Cutting preparation (jacket)	Technical	3	2	Mostly service company owned	Fully service company owned
6.13	Seabed clean up subject to survey	Performance	2	2	Mostly operator owned	Mostly service company owned
6.19	Poor retention of knowledge & skills in the operating company	Performance	3	2.6	Fully operator owned	Fully operator owned
Phase 7: Substructure Removal						
7.03	Limited/ restrictions of temporary infrastructures including bed space	Performance	3.2	2.6	Fully operator owned	Equal share
7.05	Unproven lifting technologies	Technical	4	2.2	Mostly service company owned	Mostly service company owned
7.1	Lifting points may not exist or be in poor condition	Technical	3	2.6	Fully operator owned	Equal share

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?	
					Operator led reimbursable contract	Engineer / Prepare / Remove / Demolition contract
7.19	Poor retention of knowledge & skills in the operating company	Performance	3	2	Fully operator owned	Fully operator owned
Phase 8: Topsides and Substructure Onshore Recycling						
8.02	Reverse construction' (as opposed to disposal and/ or recycling)	Performance	3	2	Equal share	Mostly service company owned
8.1	Reputation	Operator	4	2	Mostly operator owned	Equal share
8.12	Retaining knowledge & skills	Performance	3	2	Mostly operator owned	Mostly operator owned
Phase 9: Subsea Infrastructure (pipelines, umbilicals and mattresses and SSIV)						
9.03	Limited/ restrictions of temporary infrastructures including bed space	Performance	3	2.6	Fully operator owned	Equal share
9.05	Unproven lifting technologies	Performance	4	2.2	Mostly service company owned	Mostly service company owned
9.1	Lifting points may not exist or be in poor condition	Contractual	3	2.6	Mostly operator owned	Equal share
9.19	Poor retention of knowledge & skills	Performance	3	2.6	Mostly operator owned	Mostly operator owned
Phase 10: Site Remediation						
10.03	Limited/ restrictions of temporary infrastructures including bed space	Performance	2	2.6	Fully operator owned	Equal share
10.05	Unproven lifting technologies	Performance	4	2.2	Mostly service company owned	Mostly service company owned
10.07	Uncertainties of weights and centre of gravity	Performance	4	2.4	Fully operator owned	Mostly operator owned
10.08	Unknown marine growth	Performance	2	2	Mostly operator owned	Mostly operator owned
10.09	Lifting points may not exist or be in poor condition	Contractual	3	2.6	Mostly operator owned	Mostly operator owned
10.1	Cutting preparation (jacket)	Contractual	3	2	Mostly service company owned	Equal share
10.11	Transportation risks	Performance	3	2	Mostly service company owned	Fully service company owned
10.13	Asset integrity risks	Contractual	3.2	2.4	Fully operator owned	Mostly operator owned

Phase & No.	RISK	Risk Type	What's the potential impact to the project?	How controllable is the risk?	Who should own the risk?	
					Operator led reimbursable contract	Engineer / Prepare / Remove / Demolition contract
10.15	Dropping load	Contractual	3.8	2	Equal share	Equal share
10.17	Poor retention of knowledge & skills	Performance	3	2.6	Mostly operator owned	Mostly operator owned

Table 15-2 Risks Not Considered Relevant to Removals Contract

16 WORK BREAKDOWN STRUCTURE (WBS)

The following work breakdown structure (Figure 16-1) was used as a means of grouping the risks according to category of activity during the operator workshop and to develop the contractor survey. The items marked with a red cross were excluded from consideration in the workshop and consequently the contractor survey as these activities were deemed to be non-relevant for the removals contract that is under development. The figure below shows the previous version of the WBS (upper section) and how it relates to the most recent model (lower section).

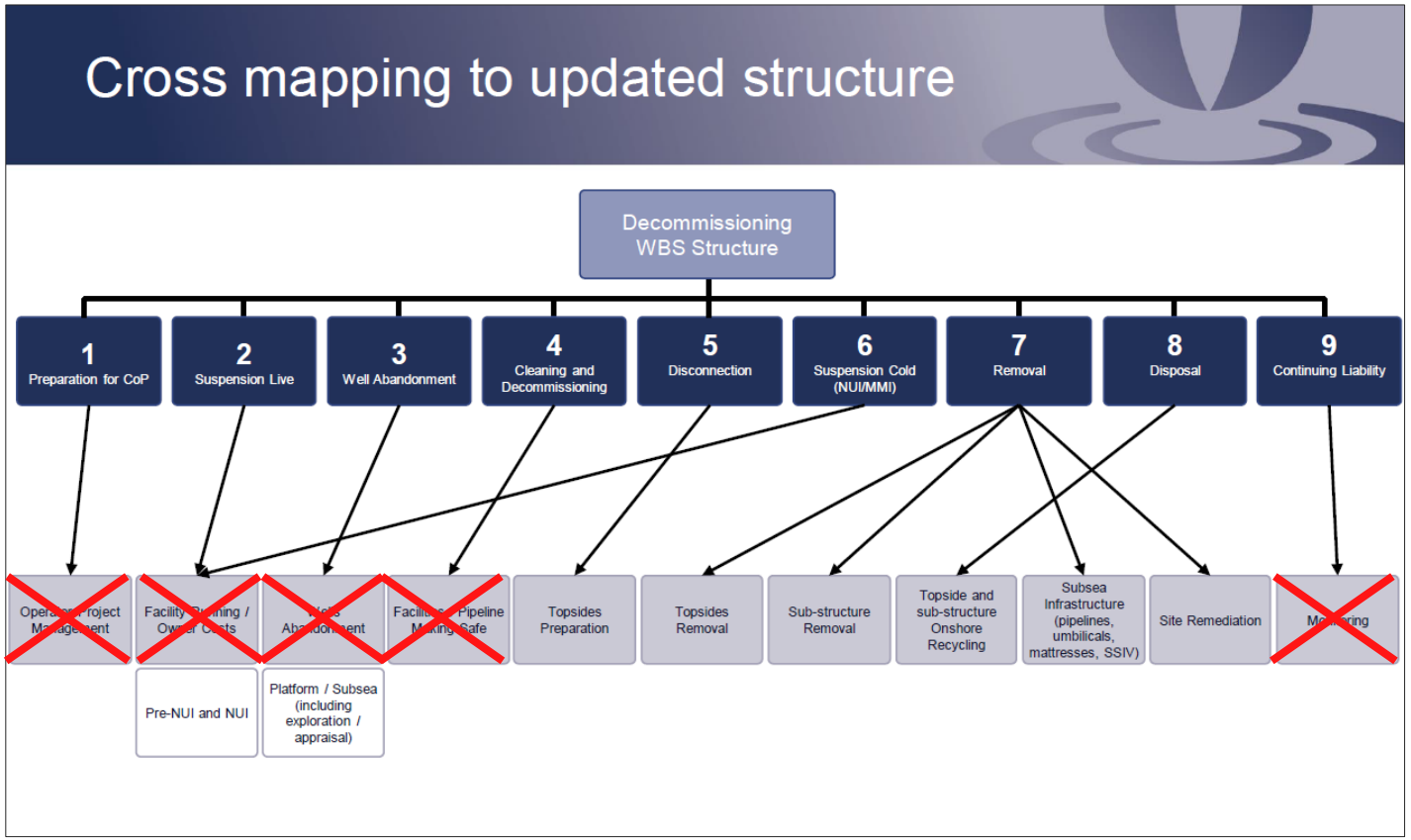

Figure 16-1 Work Breakdown Structure

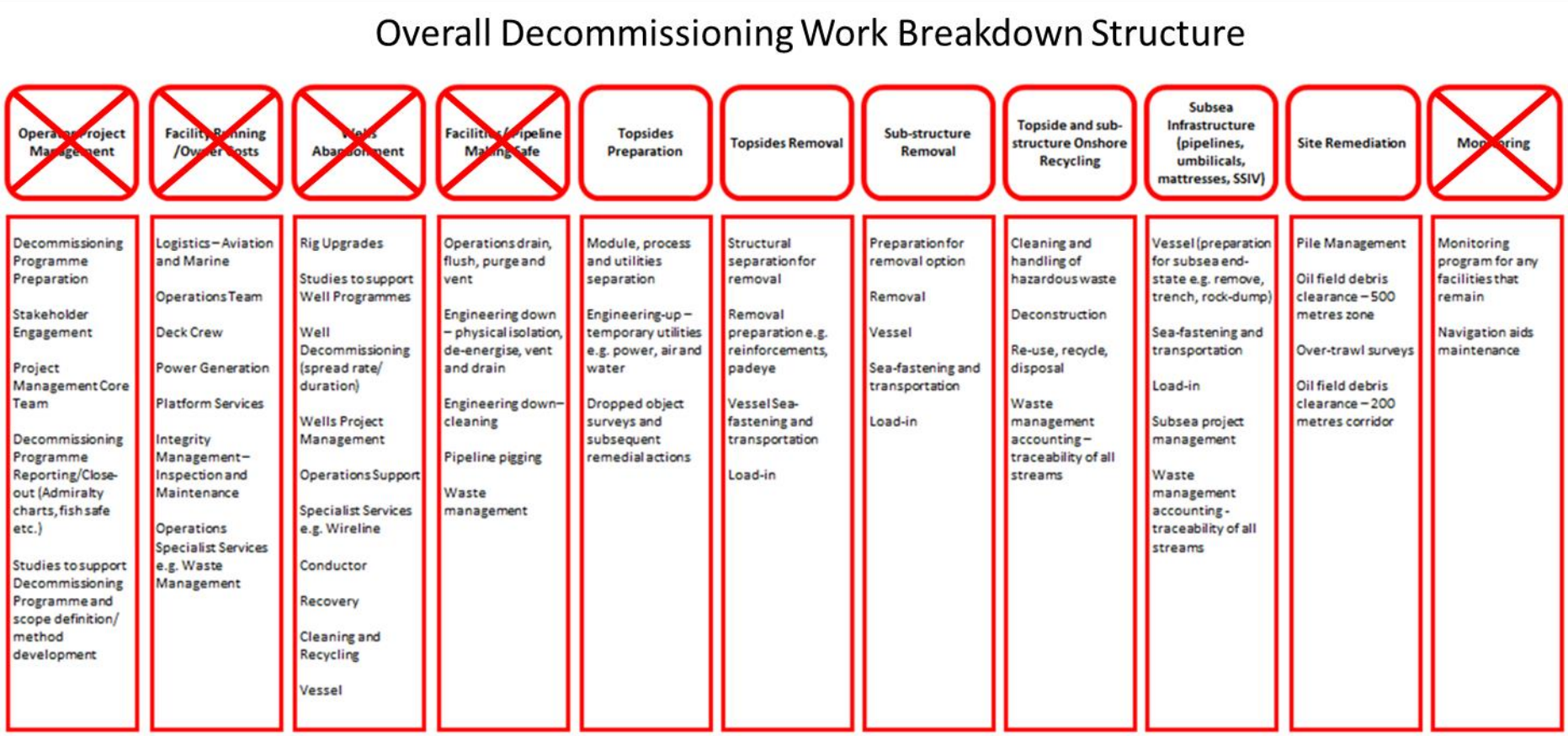

Figure 16-2 Work Breakdown Structure - Detailed

17 REFERENCES

4. “Guidelines on decommissioning cost estimation”, OGUK, Issue 3, September 2013.
5. “Remuneration Models Survey Results”, Decom North Sea, Accenture, September 2012.
6. “Identifying and assessing risk in construction contracts”, International Marine Contactors Association, July 2006

18 SURVEY PARTICIPANTS

The following companies were invited to participate in the survey:

1. Allseas
2. AF Decom
3. Boskalis
4. Heerema Marine Contractors
5. McDermott
6. Saipem
7. Scaldis
8. Seaway Heavy Lift
9. Subsea 7
10. Technip

Of these ten companies, five completed the questionnaire and one additional company provided general feedback.

APPENDIX 1 – RISK CLASSIFICATION

The following risk classifications were used:

Applicable to LOGIC Removals Process Contract?	Yes	Y
	No	N

Risk Type	Contractual	Con
	Performance	Perf
	Financial	Fin
	Political	Pol
	Technical	Tech
	Geographical	Geo
	Operator	Op

What's the potential impact to the project?	Minimum / no impact	1
	Minor impact, manageable	2
	Serious impact, considerable effort to remediate	3
	Major impact, very difficult to address, serious threat to the project	4
	Very significant impact, project stopper	5

How controllable is the risk?	Fully controllable	1
	Mostly controllable	2
	Partly controllable	3
	Mostly uncontrollable	4
	Fully uncontrollable	5

Who should own the risk?	Fully operator owned
	Mostly operator owned
	Equal share
	Mostly service company owned
	Fully service company owned

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ISBN 1 903 004 41 1