Addendum I. Introduction

CONTENTS

List of Tables

List of Figures

I.1 Introduction

The Department of Trade and Industry (DTI) approved the Maureen Decommissioning Programme on 4 December 2000. Subsequent continued offshore work and inspections revealed that two of the Maureen wellhead stalks (the remaining cut-off sections of the wellhead casings) are stuck within the template and that a significant grout (cement) layer is embedded in the template's framing. The new information means that the method selected for retrieval of the drilling template – removing it from the seabed in one piece - involves a much higher degree of difficulty and safety risk than was anticipated during the initial option selection process.

The new information forced a re-examination of the method to be used to retrieve the drilling template to the sea surface. The Maureen Owners thus performed a new comparative assessment of the template removal options. The new assessment employed the same process and criteria as the original, but it also took into account the additional information regarding the condition of the drilling template. The assessment concludes that the preferred removal option for the template is to cut it into pieces on the seabed and then retrieve these pieces to the sea surface, rather than retrieve the template to the surface intact as was the Maureen Owners' original preferred option.

In accordance with the Petroleum Act 1998 and the DTI Decommissioning Guidelines, the Maureen Owners maintained a close dialogue with the DTI as the new information came to light and the assessment of the template removal options was performed. Those consultations culminated in the conclusion that the revised template retrieval methodology would require an amendment to the Maureen Decommissioning Programme.

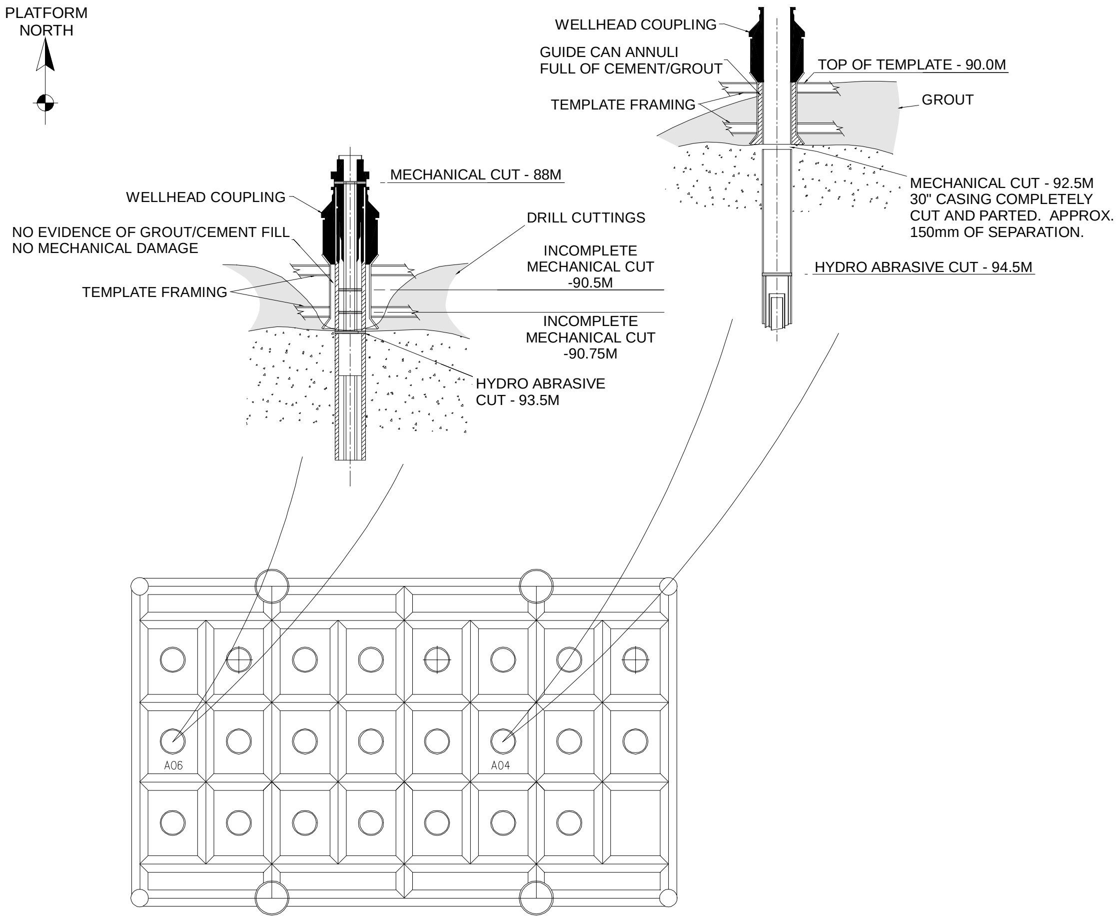
This Addendum to the Maureen Decommissioning Programme summarises the changed circumstances that led to the new comparative assessment and the results of that assessment. It also describes the revised template retrieval methodology, as well as the results of an assessment of the environmental impacts of the revised methodology and the measures the Maureen Owners will take to mitigate possible adverse environmental impacts.

I.2 Background

As part of the process leading to the approved Maureen Decommissioning Programme, the Maureen Owners performed a comparative assessment of potential removal and disposal options for the Maureen drilling template (see Section 6.3.2 and Appendix B of the Decommissioning Programme). That assessment identified the Maureen Owners' preferred removal and disposal option for the drilling template, which was described further in Section 7.7 of the Decommissioning Programme. The DTI approved the Decommissioning Programme, including the removal and disposal methodology proposed for the drilling template, on 4th December 2000.

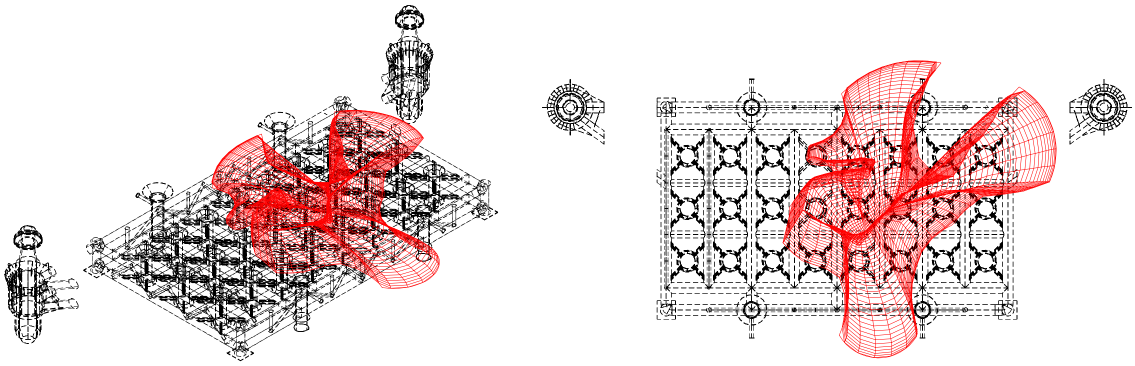
Subsequent to the DTI's approval of the Decommissioning Programme, additional information became available regarding the condition of the drilling template which invalidates the basis upon which the template removal methodology was selected. Specifically, problems encountered during the final stages of the work to plug and abandon the Maureen wells resulted in two wellhead stalks (designated "A04 and "A06") remaining stuck within the template framing (see Figure I-1 below).

Figure I-1 Maureen Wellhead Stalks A04 and A06 Following Well Plugging



Subsequent diver inspection revealed that a significant grout layer exists within the template framing (see Figure I-2 below). This layer must have formed during the cementing of the well casings at the start of well drilling operations. The grout layer has been mapped and is estimated to have a volume of 120m^3, or approximately 200 tonnes dry weight (this therefore means that the previously calculated volume of the drill cuttings layer must be reduced by this amount). Attempts at checking the grout strength proved inconclusive, but indications are that the grout layer is extremely well adhered to the framing and potentially the underlying seabed.

Figure I-2 Grout embedded in the Drilling Template Framing



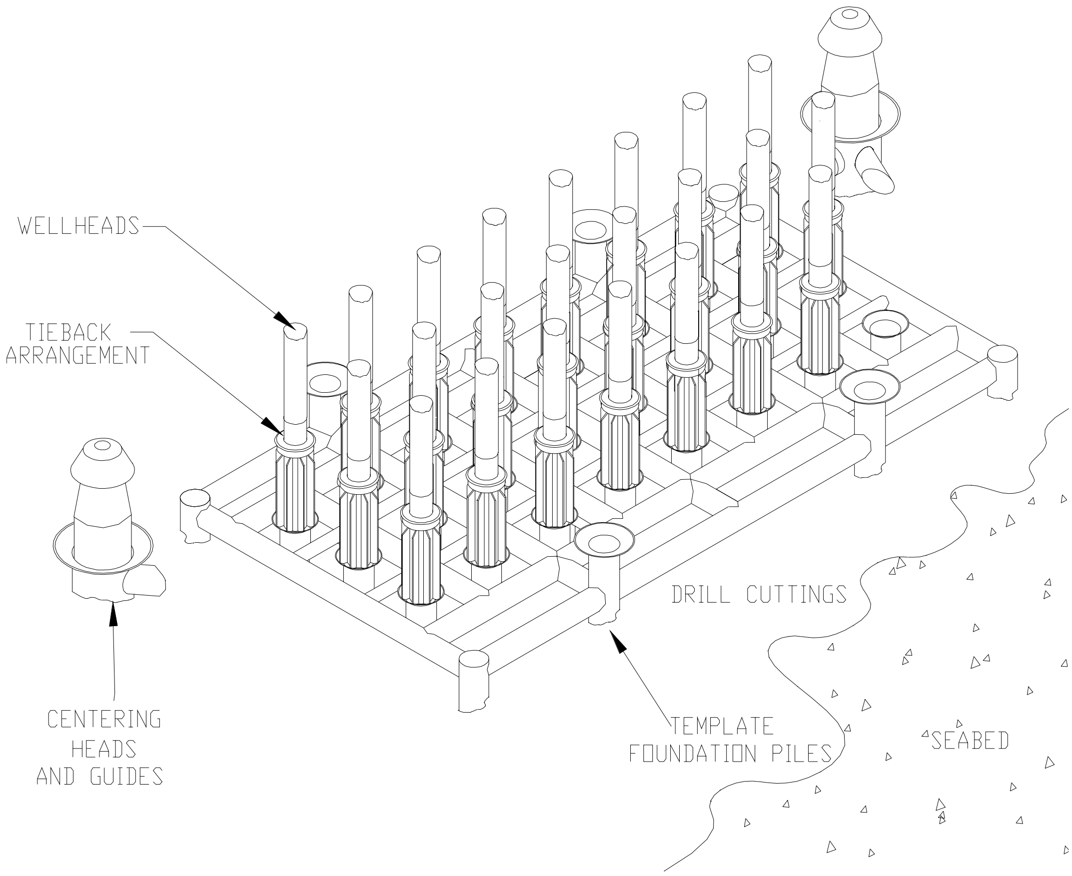
The option selected for removal of the drilling template was to recover it in one piece with a single-lift Heavy Lift Vessel. However, to successfully employ this method it is essential to establish without doubt, that the template is released from the seabed and to possess an accurate estimate of the gross weight of the lift. Without this information it would be unsafe to attempt the lift. In the current circumstances, however, a considerable amount of dive time would be required with the associated safety risk as well as unnecessary disturbance of the seabed before this vital information could be made available.

As a consequence, the Maureen Owners subjected all short-listed template removal options to a new comparative assessment. The new assessment concludes that Option 3 (cut the template on the seabed and recover it in manageable sections) [in this Addendum the option is referred to as "Revised Option 3"] is the best overall technical solution based on safety, environmental and cost criteria. This scheme is in principle similar to that detailed in Option 3 (3.1) of Appendix B of the Decommissioning Programme.

Section I.3 below described the selected removal and disposal option, while Section I.4 describes the comparative assessment that led to the selected option.

I.3 Description of the Selected Template Recovery Method

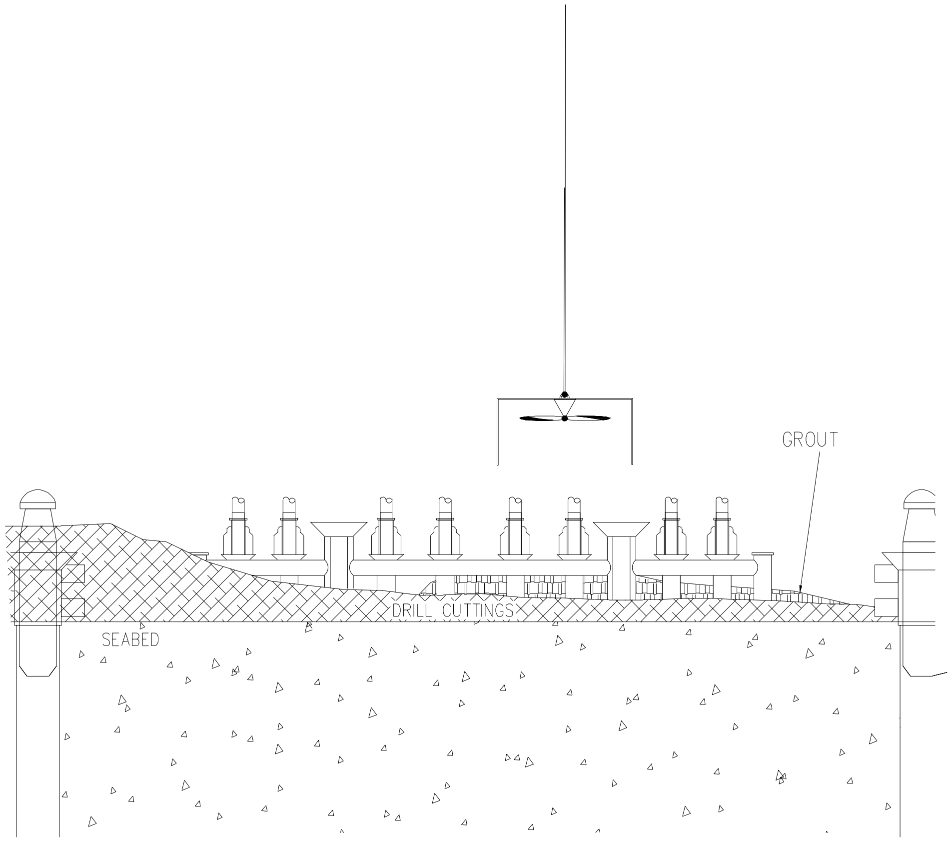
Figure I-3 Maureen Drilling Template



I.3.1 Phase 1 - Template Washing (see Figure I-4 overleaf)

The first phase of the retrieval will be to wash the template. This operation will be completely diver-less, and will be performed from a dynamically positioned (DP) construction vessel using a remotely operated 'Jet Prop' type system and a remotely operated vehicle (ROV). The 'Jet Prop' will be steered over and around the template and will be used to displace drill cuttings and loose grout and wash the template framing. The disturbance will lead to the local re-suspension of drill cuttings; however, modelling predicts that the cuttings will quickly fall back into the existing surrounding seabed cuttings layer and will not be drawn up through the water column or be dispersed over a wider area. The removal of material from the template was modelled by BMT (Ref. Section 17, Table 17.1, Item 20) when considering probable disturbance to drill cuttings as part of the Decommissioning Programme preparation. The modelling presumed use of a similar high velocity jet system that would blow drill cuttings and loose material from the template and corroborated the expectation that the cuttings will return to the seabed within the overall extent of the existing cutting's layer.

Figure I-4 Jet Prop System Used to Wash Template Displacing Drill Cuttings and Loose Grout



I.3.2 Phase 2 – Removal of Wellhead Stalks (see Figure I-5 and Figure I-6 overleaf)

Before the template frame can be retrieved the wellhead stalks must be removed. The well conductor casings have all been released and recovered as part of the well P&A scope, leaving only short wellhead stalks in situ. The stalks have all been subject to hydro-abrasive and mechanical cutting underneath the template, below mean seabed level. The stalks (twenty in number) have been trial-lifted and all but two (A04 and A06) are confirmed as free. Subsequent inspection of the two stuck stalks by divers revealed the causes. A06 has an incomplete casing cut, while A04 is cemented into the frame. Precisely engineered shaped charges will be used to free both. All twenty stalks will then be recovered to the surface using the DSV crane.

Figure I-5 Divers Place Shaped Charges to Free the Two Stuck Wellhead Stalks

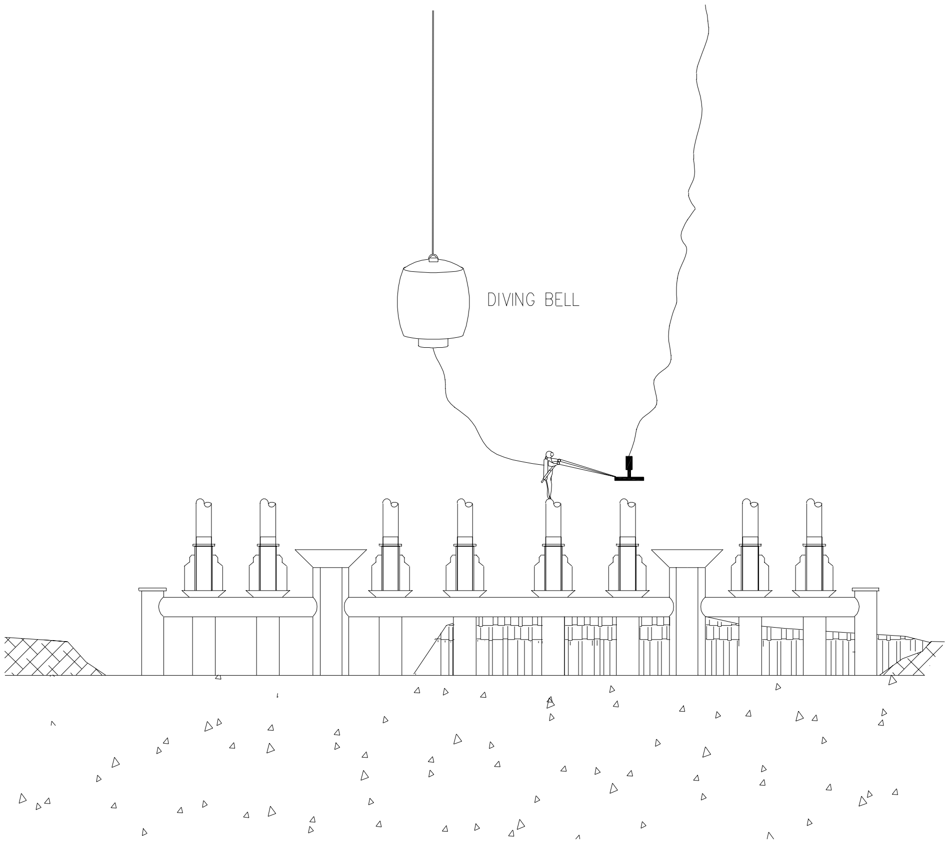
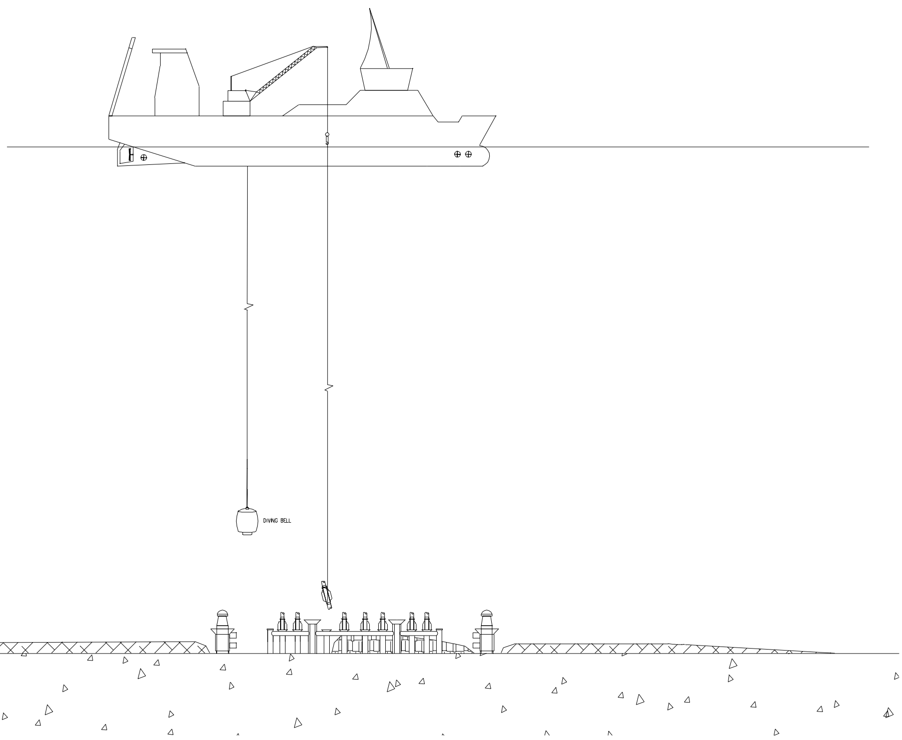


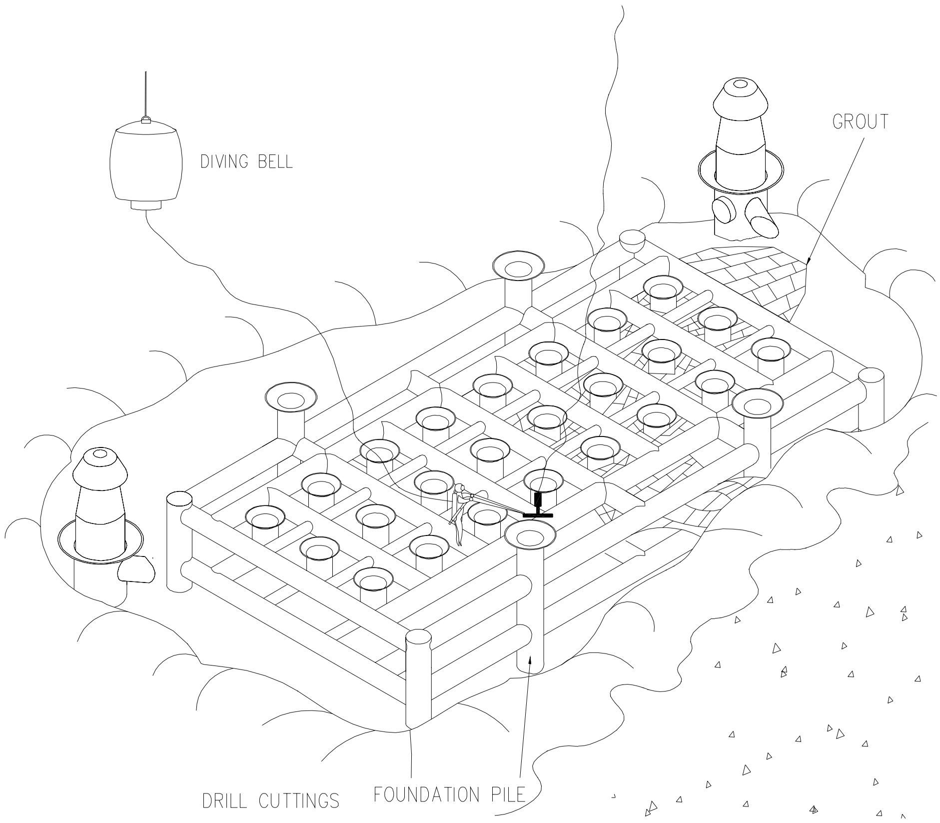
Figure I-6 DSV Crane Recovers Wellhead Stalks to the Surface



I.3.3 Phase 3 – Removal of the Template Foundation Piles

Inspection has revealed that the foundation piles have not back-filled with spoil, and thus excavation and jetting out (as anticipated in the Decommissioning Programme) will not be required. Shaped charges will be lowered down the inside of the piles and these will be used to cut the piles at the appropriate depth, as specified within the Maureen Decommissioning Programme, below seabed level prior to retrieval to the surface.

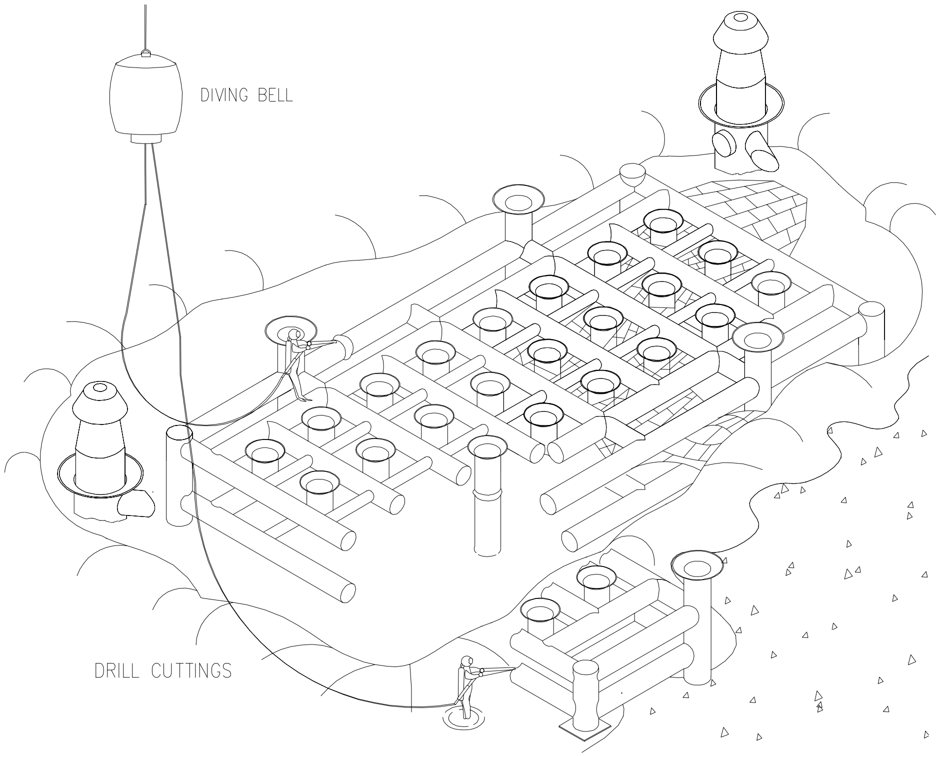
Figure I-7 Divers Use Shaped Severance Charges to Cut the Four Foundation Piles



I.3.4 Phase 4 – Removal of the Template

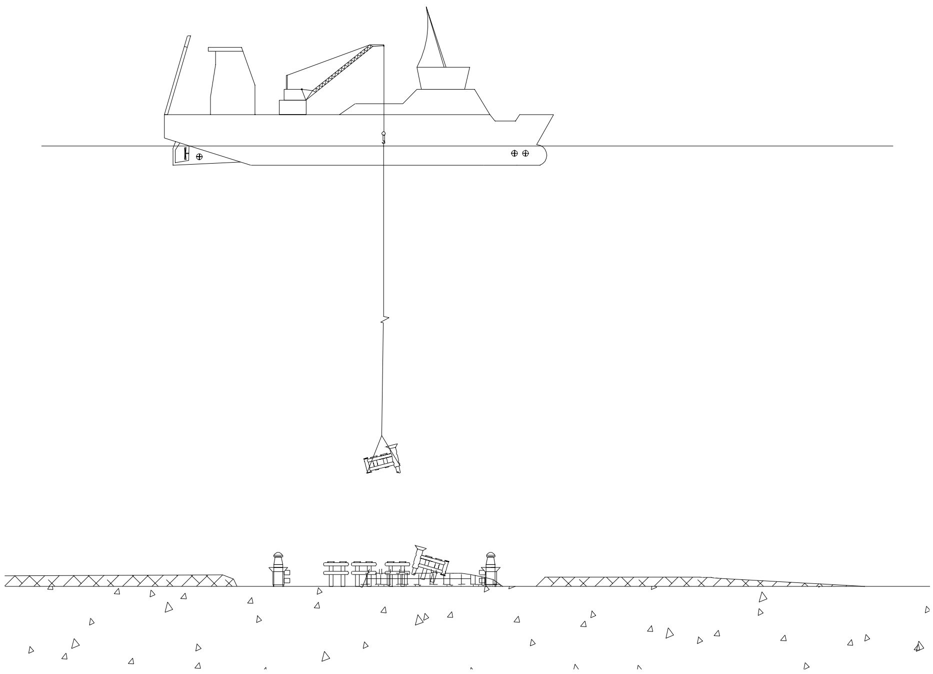
The drilling template has a grout (cement) layer adhering to and within the framing, which adds significantly to the gross weight and creates an anchoring effect, the consequences of which are impossible to predict. This resulted from spillage during well completion activities at an early stage in the well drilling programme. This situation effectively means that a safe single lift of the template intact cannot be executed. Therefore the drilling template will be recovered from the seabed in sections. The template framing will be cut into predetermined sized pieces that can be lifted by the DSV crane. The template will be cut using a combination of linear shaped charges specifically designed for this application, and having a low collateral effect, and oxy-arc manual cutting systems.

Figure I-8 Divers Place Linear Shaped Charges to Cut the Template Into Manageable Sections



After the template is cut into manageable pieces the pieces will be retrieved to the surface using the DSV crane.

Figure I-9 Template Sections are Retrieved Using the DSV



Once the pieces are retrieved to the surface they will be transported to shore and disposed of as originally envisaged in the Decommissioning Programme (see Section 7.8 of the Programme).

I.3.5 Phase 5 – Docking Piles

There is no change to the docking pile recovery method and thus the scheme detailed in Section 7.7.2 of the Decommissioning Programme will be followed.

I.3.6 Environmental Considerations

As part of the evaluation of the potential change in template removal methodology, the Maureen Owners commissioned the Defence Evaluation and Research Agency (DERA) to perform an environmental impact assessment (EIA) of the revised methodology, with particular emphasis on the use of shaped charge explosive cutting devices during the retrieval operation.

The EIA report concluded that the proposed method of removing the drilling template has the potential to cause some adverse environmental effects. In particular, high intensity sound emitted during the removal operations may harm marine life found in the area around the removal site (the most likely species to be encountered are minke whale, white beaked dolphin, harbour porpoise and grey seal).

The EIA identified mitigation measures that could be employed to reduce the risks identified. In consultation with DERA and the DTI (JNCC), the Maureen Owners have developed an Environmental Protection Plan which encompasses the following elements:

- Measures will be implemented prior to recovery operations to minimise entry of other sea users into the work area (i.e. notices to Coast Guard, Notice to Mariners, use of VHF radio to notify any nearby vessels immediately prior to commencement of operations)

- Detonation of charges will be scheduled to ensure a gradual build-up of sound energy (maximise “ramp-up” effect). This is detailed in the Environmental Protection Plan

- A dedicated team will monitor marine life in the area, employing visual and passive acoustic techniques, starting at least 30 minutes prior to commencement of recovery operations and lasting continuously throughout the operations;

    If marine mammals are observed within the calculated danger range, detonations will be delayed until the animals leave the area

    All monitoring activity will be recorded and collated as a permanent record

- A post-activity environmental de-brief will be conducted so that all participants involved can contribute to lessons learned.

Detailed procedures for implementation of the action plan have been developed in close consultation with the DTI and their advisors, particularly JNCC. Implementation of the plan will minimise the potential adverse environmental impacts of the removal operations identified in the EIA.

I.4 Comparative Assessment of Decommissioning Options

I.4.1 Comparative Assessment Summary

As a result of the new information concerning the condition of the drilling template, the Maureen Owners conducted a new comparative assessment of the relevant template removal and disposal options (these options are described in Appendix B to the Decommissioning Programme). The assessment was performed using the same process and criteria as the original assessment (see Sections 6.2, 6.3 and Appendix B of the Decommissioning Programme).

In light of prevailing conditions and on the basis of the new comparative assessment, Revised Option 3 was selected as the preferred Option.

The following section discusses the individual elements of the assessment. The table at the end of this Section summarises the overall results.

I.4.2 Complexity and Associated Technical Risk - Comments

I.4.2.1 Option 1

As per the original assessment, but further complicated technically by the grout spill layer and the two stuck wellhead stalks transforming this into a diver intensive option. It is estimated that an additional ten days of diving operations focused primarily on grout removal with charges will likely be necessary to prepare the template for lifting. HLV availability and increased risk during lift also gives rise for concern because separation from the seabed cannot be guaranteed owing to the indeterminate nature of the excess grout.

I.4.2.2 Option 2

As per the original assessment, but further complicated technically by the grout spill layer and the two stuck wellhead stalks transforming this into a diver intensive option. It is estimated that an additional ten days of diving operations focused primarily on grout removal with shaped charges will likely be necessary to prepare the template for lifting. HLV availability and increased risk during lift also gives rise for concern because separation from the seabed cannot be guaranteed owing to the indeterminate nature of the excess grout.

I.4.2.3 Revised Option 3

The most complex activity connected with this option is the cutting of the template into sections on the seabed. This is a very diver intensive option and necessitates the use of shaped charges and oxy-arc cutting systems. This option poses a number of diver related hazards but none that are unique. Washing the template subsea with a ‘Jet Prop’ system or similar is environmentally a better solution than that originally proposed in the Maureen Decommissioning Programme, in respect of cuttings disturbance, requiring no diver intervention. The handling and recovery of ‘clean’ material mitigates contamination potential and allows for wider choice when selecting an onshore disposal site. This option also allows for a wider choice of vessels (DSVs) to be considered as the crane lift capacity is greatly reduced.

I.4.3 Risks to Personnel – Comments

I.4.3.1 Option 1

As per the original assessment, but with more diving activity required and the use of some potentially hazardous devices and equipment. Less of a diver intensive operation than Option 3. Increased risk to topside personnel during lift due to template condition uncertainties.

I.4.3.2 Option 2

As per the original assessment, but with more diving activity required and the use of some potentially hazardous devices and equipment. Less of a diver intensive operation than Option 3. Increased risk to topside personnel during lift due to template condition uncertainties.

I.4.3.3 Revised Option 3

The risk of contaminating the divers hyperbaric environment is reduced by use of the 'Jet Prop' system washing drill cuttings from and around the template before starting diving operations. The potential for topside contamination is also reduced. This is a very diver intensive option, which will require the use of some potentially hazardous devices and equipment. It will also require divers to repetitively manually handle DSV crane rigging. This option increases diver exposure to risk and as such will need strict procedural control.

I.4.4 Environmental Impacts - Comments

I.4.4.1 Option 1

As per existing (original) Decommissioning Programme assessment. See page 3 Appendix B.

I.4.4.2 Option 2

As per existing (original) Decommissioning Programme assessment. See page 6 Appendix B.

I.4.4.3 Revised Option 3

Washing the template with the 'Jet Prop' system, blowing the drill cuttings clear of the template framing and the immediate diver working area will avoid continuous drill cuttings disturbance (which is a concern in the Decommissioning Programme) during the execution of the Option. It also mitigates the potential for drill cuttings to be drawn up through the water column during the recovery of the sections as any disturbance will remain localised.

Figures for emissions to air from the DSV during the execution of the Option are, by qualitative assessment, likely to be highest given the number of days the DSV will be on site. This is despite combined emission levels from other vessels used during the recovery and transport to shore being lower as the number of attendant vessel needed, in support of this Option is less.

The 'clean material' recovered from the seabed will also present less of an environmental impact at the onshore disposal site.

I.4.5 Effect on Safety of Navigation and Other Sea Users - Comments

I.4.5.1 Option 1

As per existing (original) Decommissioning Programme assessment. See pages 7 – 15, Appendix B.

I.4.5.2 Option 2

As per existing (original) Decommissioning Programme assessment. See pages 7 – 15, Appendix B.

I.4.5.3 Revised Option 3

As per existing (original) Decommissioning Programme assessment. See pages 7 – 15, Appendix B for Option 3.

I.4.6 Costs

I.4.6.1 Option 1

The cost of pursuing this Option(s) has risen significantly owing to the estimated increase in the number of DSV days. Higher HLV spread costs in 2001 may further increase this figure.

I.4.6.2 Option 2

The cost of pursuing this Option has risen significantly owing to the estimated increase in the number of DSV days. Higher HLV spread costs in 2001 may further increase this figure.

I.4.6.3 Revised Option 3

Current contractors offer indicates that this is still in the same relative cost position as in the Maureen Decommissioning Programme Options.

I.4.7 Assessment Summary

Table I-1 Option Selection Summary Table – Technical Considerations

Option/Method	Technical		
	Lifting	Technical cutting	Disposal
Option 1 Method 1.1 Recover the template using HLV, clean & cut into manageable pieces, load onto a supply vessel and transport to shore for disposal.	HLV required for the template lift. Weight is estimated at 700 te (in air) total. This figure includes 200 te for grout spill layer. Template is not confirmed as being released from the seabed. Breakout load maybe much higher due to grout anchoring effect therefore greater capacity HLV required. Offshore lifts: Heavy lift (700 te+) and 22 x smaller lifts (5 to 20 te).	Onboard cutting into manageable pieces (~50 te pieces).	Recover steel. More options for disposal site. Offshore wash waste to be recovered and disposed.
Ranking	**3**	**2**	**2**
Option 1 Method 1.2 Recover the template using HLV, cut into manageable pieces, load onto a supply vessel and transport to shore for cleaning & disposal.	HLV required for the template lift. Weight is estimated at 700 te (in air) total. This figure includes 200 te for grout spill layer. Template is not confirmed as being released from the seabed. Breakout load maybe much higher due to grout anchoring effect therefore greater capacity HLV required. Offshore lifts: Heavy lift (700 te+) and 22 x smaller lifts (5 to 20 te).	Onboard cutting into manageable pieces (~50 te pieces).	Recover steel. Disposal of wash effluent containing mud, oil and drill cuttings. Onshore cleaning limits sites.
Ranking	**3**	**2**	**2**
Option 2 Method 2.1 Recover the template using HLV, clean offshore in bunded area and load the whole template onto a supply vessel for transport to shore for reuse or recycling.	HLV required for the template lift. Weight is estimated at 700 te (in air) total. This figure includes 200 te for grout spill layer. Template is not confirmed as being released from the seabed. Breakout load maybe much higher due to grout anchoring effect therefore greater capacity HLV required. Offshore lifts: Heavy lift (700 te+) and 22 x smaller lifts (5 to 20 te). Onshore heavy lift (700 te+) also required.	Onshore cutting if the template cannot be reused and has to be disposed. Onshore cuts into manageable lengths.	Template deconstruction if it cannot be reused. (large laydown area required). Recovery and disposal of wash effluent containing mud, oil and drill cuttings.
Ranking	**3**	**1**	**3**

Table I-1 Option Selection Summary Table – Technical Considerations (Continued)

Option/Method	Technical		
	Lifting	Technical cutting	Disposal
Option 2 Method 2.2 Recover the template using HLV, and load the whole template onto a supply vessel for transport to shore for onshore cleaning and reuse or recycling.	HLV required for the template lift. Weight is estimated at 700 te (in air) total. This figure includes 200 te for grout spill layer. Template is not confirmed as being released from the seabed. Breakout load maybe much higher due to grout anchoring effect therefore greater capacity HLV required. Offshore lifts: Heavy lift (700 te+) and 22 x smaller lifts (5 to 20 te). Onshore heavy lift (700 te+) also required.	Onshore cutting if the template cannot be reused and has to be disposed. Onshore cuts into manageable sections.	Template deconstruction if it cannot be reused. (large laydown area required). Recovery and disposal of wash effluent containing mud, oil and drill cuttings.
Ranking	**3**	**1**	**3**
Option 3 Method 3.1 Wash template in situ using Jet Prop system. Displace all drill cuttings and loose grout. Cut template into eight sections on seabed and recover using DSV crane. Load clean material to a supply vessel for transportation to onshore disposal site.	DSV required for recovery of the template sections. Offshore lifts: 8 x Heavy lifts (75 te+) and 22 x smaller lifts (5 to 20 te).	Subsea cutting into eight sections using explosive devices and oxy-arc cutting systems.	Recover clean pre-cut steel. No wash effluent to dispose of.
Ranking	**2**	**2**	**1**

Table I-2 Option Selection Summary Table – Safety Considerations

Options/Method	Safety			
	Divers	**Surface Work**	**Marine**	**Onshore**
Option 1 Method 1.1 Recover the template using HLV, clean & cut into manageable pieces, load onto a supply vessel and transport to shore for disposal.	12 @ 16 days Release stuck wellhead stalks. Break up grout spill layer. Recover all wellhead stalks to surface. Cut template foundation piles. Cut and recover docking piles. Attach HLV lift rigging. High risk of diver contamination from drill cuttings.	Recovery of template, transferring onto barge/supply vessel, cleaning in bunded area and collecting the effluent for onshore disposal, cutting template into manageable pieces. High risk of deck crew contamination from drill cuttings.	DSV - 1 @ 16 days HLV - 1 @ x 2 days Barge/supply vessels – 1 of each @ 7 days = 32 vessels days.	Handling of clean template pieces. Handling and disposal of offshore wash waste containing mud, oil and drill cuttings.
Ranking	**3**	**3**	**2**	**2**
Option 1 Method 1.2 Recover the template using HLV, cut into manageable pieces, load onto a supply vessel and transport to shore for cleaning & disposal.	12 @ 16 days Release stuck wellhead stalks. Break up grout spill layer. Recover all wellhead stalks to surface. Cut template foundation piles. Cut and recover docking piles. Attach HLV lift rigging. High risk of diver contamination from drill cuttings.	Recovery of template, transferring onto barge/supply vessel, cutting template into manageable pieces and transferring onto supply vessel. High risk of deck crew contamination from drill cuttings.	DSV - 1 @ 16 days HLV - 1 @ x 2 days Barge/supply vessels – 1 of each @ 7 days = 32 vessels days.	Handling of dirty template pieces. Onshore cleaning of template pieces and disposal of effluent containing mud, oil and drill cuttings.
Ranking	**3**	**2**	**2**	**2**
Option 2 Method 2.1 Recover the template using HLV, clean offshore in bunded area and load the whole template onto a supply vessel for transport to shore for reuse or recycling.	12 @ 16 days Release stuck wellhead stalks. Break up grout spill layer. Recover all wellhead stalks to surface. Cut template foundation piles. Cut and recover docking piles. Attach HLV lift rigging. High risk of diver contamination from drill cuttings.	Recovery of template, Transferring whole onto Barge/supply vessel, cleaning in bunded area and collecting the effluent for onshore disposal. High risk of deck crew contamination from drill cuttings.	DSV - 1 @ 16 days HLV - 1 @ x 2 days Barge/supply vessels – 1 of each @ 7 days = 32 vessels days.	Handling whole clean template. Heavy lift and/or winching facilities required onshore. Onshore disposal of wash effluent containing mud, oil and drill cuttings.
Ranking	**3**	**2**	**2**	**2**
Option 2 Method 2.2 Recover the template using HLV, and load the whole template onto a supply vessel for transport to shore for onshore cleaning and reuse or recycling.	12 @ 16 days Release stuck wellhead stalks. Break up grout spill layer. Recover all wellhead stalks to surface. Cut template foundation piles. Cut and recover docking piles. Attach HLV lift rigging. High risk of diver contamination from drill cuttings.	Recovery of template, transferring whole onto barge/supply vessel for transport to shore. High risk of deck crew and onshore crew contamination from drill cuttings.	DSV - 1 @ 16 days HLV - 1 @ x 2 days Barge/supply vessels – 1 of each @ 7 days = 32 vessels days.	Handling of template. Deconstruction if it cannot be reused (large laydown area required). Recovery and disposal of wash effluent containing mud, oil and drill cuttings.
Ranking	**3**	**2**	**2**	**2**

Table I-2 Option Selection Summary Table – Safety Considerations (Continued)

Options/Method	Safety			
	Divers	Surface Work	Marine	Onshore
Option 3 Method 3.1 Wash template in situ using Jet Prop system. Displace all drill cuttings and loose grout. Cut template into eight sections on seabed and recover using DSV crane. Load clean material to a supply vessel for transportation to onshore disposal site.	12 @ 20 days Release stuck wellhead stalks. Recover all wellhead stalks to surface. Cut template foundation piles. Cut and recover docking piles. Cut template into eight sections and break grout spill layer. Rig for DSV crane lifts	Recovery of template, sections using DSV, transferring onto supply vessel for transport to shore for disposal. Clean material.	DSV - 1 @ 20 days Supply vessel – 1 @ 14 days = 34 vessels days	Handling of clean template pieces. .
Ranking	**3**	**1**	**2**	**1**

Table I-3 Option Selection Summary Table – Environmental Considerations

Option/Method	Environmental		
	Marine	Atmospheric	Onshore
Option 1 Method 1.1 Recover the template using HLV, clean & cut into manageable pieces, load onto a supply vessel and transport to shore for disposal.	Disturbance to ~50 m x 26 m area of seabed (~780 m^3 assuming 0.6 m thickness of drill cuttings). Vessel effluent x 25 vessel days. Drill cuttings carried up through water column. Potential for greater dispersal of cuttings.	Exhaust emissions x 25 vessel days. Exhaust emissions onshore - crane, transport of materials.	Disposal of template & pile sections. Offshore washed drill cuttings to be disposed onshore.
Ranking	**2**	**1**	**2**
Option 1 Method 1.2 Recover the template using HLV, cut into manageable pieces, load onto a supply vessel and transport to shore for cleaning & disposal.	Disturbance to ~50 m x 26 m area of seabed (~780 m3 assuming 0.6 m thickness of drill cuttings). Vessel effluent x 25 vessel days. Drill cuttings carried up through water column. Potential for greater dispersal of cuttings.	Exhaust emissions x 25 vessel days. Exhaust emissions onshore - crane, transport of materials.	Disposal of template & pile sections. Onshore cleaning and disposal of drill cuttings effluent.
Ranking	**2**	**1**	**2**
Option 2 Method 2.1 Recover the template using HLV, clean offshore in bunded area and load the whole template onto a supply vessel for transport to shore for reuse or recycling.	Disturbance to ~50 m x 26 m area of seabed (~780 m3 assuming 0.6 m thickness of drill cuttings). Vessel effluent x 25 vessel days. Drill cuttings carried up through water column. Potential for greater dispersal of cuttings.	Exhaust emissions x 25 vessel days. Exhaust emissions onshore - crane, transport of materials.	Reuse or recycling of whole template. Disposal of pile sections. Onshore cleaning and disposal of drill cuttings effluent.
Ranking	**2**	**1**	**2**
Option 2 Method 2.2 Recover the template using HLV, and load the whole template onto a supply vessel for transport to shore for onshore cleaning and reuse or recycling.	Disturbance to ~50 m x 26 m area of seabed (~780 m^3 assuming 0.6 m thickness of drill cuttings). Vessel effluent x 25 vessel days. Drill cuttings carried up through water column. Potential for greater dispersal of cuttings.	Exhaust emissions x 25 vessel days. Exhaust emissions onshore - crane, transport of materials.	Reuse or recycling of whole template. Disposal of pile sections. Onshore cleaning and disposal of drill cuttings effluent.
Ranking	**2**	**1**	**2**
Option 3 Method 3.1 Wash template in situ using Jet Prop system. Displace all drill cuttings and loose grout. Cut template into eight sections on seabed and recover using DSV crane. Load clean material to a supply vessel for transportation to onshore disposal site.	Disturbance to ~60 m x 30 m area of seabed (~1080 m3 assuming 0.6 m thickness of drill cuttings). No drill cuttings carried up through water column. Vessel effluent x 34 vessel days.	Exhaust emissions x 34 vessel days. Exhaust emissions onshore - crane, transport of materials.	Disposal of template & pile sections.
Ranking	**2**	**2**	**1**

Table I-4 Option Selection Summary Table – Cost Considerations

Option/Method	Cost (£)
Option 1 Method 1.1 Recover the template using HLV, clean & cut into manageable pieces, load onto a supply vessel and transport to shore for disposal.	**£3.75 million** Estimate
Ranking	**3**
Option 1 Method 1.2 Recover the template using HLV, cut into manageable pieces, load onto a supply vessel and transport to shore for cleaning & disposal.	**£3.75 million** Estimate
Ranking	**3**
Option 2 Method 2.1 Recover the template using HLV, clean offshore in bunded area and load the whole template onto a supply vessel for transport to shore for reuse or recycling.	**£3.85 million** Estimate
Ranking	**2**
Option 2 Method 2.2 Recover the template using HLV, and load the whole template onto a supply vessel for transport to shore for onshore cleaning and reuse or recycling.	**£3.85 million** Estimate
Ranking	**2**
Option 3 Method 3.1 Wash template in situ using Jet Prop system. Displace all drill cuttings and loose grout. Cut template into eight sections on seabed and recover using DSV crane. Load clean material onto a supply vessel for transportation to onshore disposal site.	**£3.22 million** Current Offer
Ranking	**1**

Table I-5 Option Ranking Table

Option/Method	Safety				Environmental			Technical			Overall		
	Divers	Surface work	Marine	Onshore	Marine	Atmospheric	Onshore	Lifting	Cutting	Disposal		Score	Ranking
Option 1 – Method 1.1	3	2	2	2	2	1	2	3	2	2		22	3
Option 1 – Method 1.2	3	2	2	2	2	1	2	3	2	2		21	
Option 2 – Method 2.1	3	2	2	2	2	1	2	3	1	3		21	2
Option 2 – Method 2.2	3	2	2	2	2	1	2	3	1	3		21	
Option 3 – Method 3.1	3	1	2	1	2	2	1	2	2	1		17	1

I.5 References

1. Maureen Decommissioning Programme – Environmental Impact Assessment (EIA) in Support of Maureen Drilling Template Recovery Using Explosive Cutting Devices – 2001. Phillips Petroleum Company UK Report No 0572/33/0617. DERA Report Number DERA/S&E/USO/CRO11150/1.0. Defence Evaluation and Research Agency, UK, July 2001.