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ISM

SUBMARINE DISMANTLING PROJECT (SDP)

USER REQUIREMENT DOCUMENT

Issue 5.0 – October 2011

de&S SUBMARINES

This document has been released as background information to support the Submarine Dismantling Consultation (28 Oct 2011 – 17 Feb 2012). It has been redacted in order to protect:

- **personal information; and**
- **information that is commercially sensitive.**

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Document Information

Project Name:	Submarine Dismantling Project		
Document Title:	User Requirement Document		
Issue Status:	Issue 5.0	**Reference:**	DISM/SDP/420/1679
Produced By:	ISM Ash 1b Defence Equipment & Support MOD Abbey Wood Bristol BS34 8JH	**Level of Control:**	This Document is controlled to Level 3 iaw SDP PMP Document Quality Management Procedure

Document Authorisation

Owner:	[redacted]	**Peer Reviewer**	
Author:	[redacted]	**Committee Endorsement:**	
Editorial Checker:	[redacted]	**Technical Checker:**	
Document Approver:	[redacted]	**Approver's Signature:**	QR 16 & 17
Document Approver:	[redacted]	**Approver's Signature:**	QR 16 & 17
Document Authoriser:	[redacted]	**Authoriser's signature:**	QR 16 & 17
Document Authoriser:	[redacted]	**Authoriser's signature:**	QR 16 & 17

Amendment History

Issue	Date	Details of Amendment	DCCF
1.0	March 2009	First Issue	000
2.0	13 August 2010	Updated based upon workshop outputs.	000
3.0	October 2010	Updated following level 3 review.	000
4.0A	4 Feb 11	Updated taking account of benefits mapping work, development of MoE and site screening criteria	000
4.0B	10 Feb 11	Updated taking account comments by the Sponsor	000
4.0C	16 Feb 11	Formatting changes	000
4.0	18 Feb 11	Updated including changes by Sponsor and ISM Team	000
5.0	7 Oct 11	Updated following review by SDP Project Manager	000

Distribution

SDP Project Board

SDP Virtual Team

SDP Scrutiny Meeting Members

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1. General Description

1.1. Aim of the Project

1.1.1. The aim of the Submarine Dismantling Project (SDP) is to deliver a safe, secure environmentally responsible, timely and cost-effective solution for the dismantling of 27 of the UK's defuelled nuclear powered submarines.

1.2. Purpose

1.2.1. The purpose of the User Requirement Document (URD), as defined in the MOD Acquisition Operating Framework (AOF), is to:

- Define what outcome or effect is needed, in what quantity, with what effectiveness, and by when.
- Inform the development of a System Requirements Document (SRD) to enable acquisition of a solution to the need.
- Inform Through Life Capability Management (TLCM) that a capability gap has been bounded.
- Allow the conduct of:
  - Balance Of Investment (BOI).
  - Trade-Offs.
  - Option analysis.
  - Combined Operational Effectiveness Investment Appraisal (COEIA).
  - Source selection – for service provision.
- Define the benchmark for levels of availability and sustainability against which DE&S sponsored changes may be justified.
- Underpin the Initial Gate Business Case. The URD Part 1 (General Description) and Part 2 (Key User Requirements) form part of the Initial Gate Business Case (IGBC). The remainder is available for reference.
- Support the Main Gate Business Case (MGBC)..

1.2.2. The URD will remain a live document until Main Gate. Traceability must be maintained between the URD and subsequent analysis, such as BOI or COEIA, to ensure that SDP can deliver its intended role.

1.3. Single Statement of User Need (SSUN)

1.3.1. "To dismantle, cost effectively, 27 defuelled nuclear submarines by 2050, without exceeding the submarine storage capacity, in a safe, secure, and sustainable manner which upholds MOD's reputation as a responsible nuclear operator; stores Intermediate Level Waste (ILW) until a national disposal route is available; disposes

of all other radioactive, hazardous and non-hazardous waste in accordance with legislation and minimises impact upon military capability."

1.4. Background

1.4.1. When a nuclear powered submarine leaves service with the Royal Navy, it undertakes a process known as De-fuel, De-equip and Lay-Up Preparation (DDLP)[1]. This is conducted as soon as practicable, but is dependent on the availability of suitable docks and facilities. The reactor is defuelled and the fuel is removed for long-term storage at the Nuclear Decommissioning Authority (NDA) site at Sellafield. The remaining radioactive material (mainly irradiated steel and some contaminated pipe work) is contained securely in the reactor compartment and remains in the submarine, which is stored safely afloat. Of the 17 nuclear powered submarines which have left naval service to date, 7 are at Rosyth Dockyard and 10 at are at Devonport Dockyard. All submarines leaving service in the future will be stored at Devonport; no further submarines will be stored at Rosyth,

1.5. Context

1.5.1. When the defuelled submarines are dismantled, with the exception of ILW, it is expected that all materials will be reused, recycled or disposed of in accordance with the waste hierarchy and all relevant legislation. UK Government policy for long-term management of ILW is geological disposal[2] and the Department for Energy and Climate Change is leading the programme for development of the UK's Geological Disposal Facility (GDF). On current plans, the GDF will be available for disposal of ILW from SDP sometime after 2040 and storage of ILW is required in the interim period. Any new ILW storage facilities should be designed to last up to 100 years, as recommended in the Committee on Radioactive Waste Management (CoRWM) report [3,4].

1.5.2. Nuclear submarines in afloat storage are exempt from licensing under the Nuclear Installations Act (NIA) 1963 and, instead, regulation resides with the Defence Nuclear Safety Regulator (DNSR) who authorise activities to equivalent conditions, where applicable. Licensing under the NIA and regulation by the Office for Nuclear Regulation (ONR) `will, however, apply to dismantling of nuclear submarines and licensed site(s) will be required for all applicable activities.

1.5.3. The European Atomic Energy Community (Euratom) Treaty acts in several areas connected with atomic energy, including research, the drawing-up of safety standards, and the peaceful uses of nuclear energy. The Treaty does not, however, apply to the use of nuclear energy for military activities and MOD is therefore, not under any duty to provide the EU Commission with data on SDP plans for

[1] Devonport Dockyard is the only nuclear licensed site in the UK planned to undertake this activity in the future.
[2] Scottish Government policy for ILW differs from the policy in England and Wales and is for long-term management in near-surface, near-site facilities. It is not applicable, however, to waste arising from decommissioning of redundant nuclear submarines.
[3] Managing our Radioactive Waste Safely, CoRWMs recommendations to Government, 31/07/06, available at http://corwm.decc.gov.uk
[4] Response to the Report and Recommendations from the Committee on Radioactive Waste Management (CoRWM), By the UK Government and he devolved administrations, 25 October 2006. http://www.corwm.org.uk/Pages/Lnk_pages/key_issues.aspx

decommissioning under Article 37 of the Treaty[5].

1.5.4. Whilst afloat storage of submarines has proved to be a very safe arrangement, it does not meet the existing policy requirements of dealing with waste as soon as is reasonably practicable and this is a significant policy driver for the implementation of SDP.

1.5.5. The Maritime Change Programme (MCP) is a vehicle for enabling the coordination of a complex portfolio of federated maritime transformational projects. SDP will be an enabler to some of MCP benefits particularly savings on overheads associated with Laid-Up Submarines (LUSMs). SDP is also a significant component in the delivery of MOD's Nuclear Liabilities Management Strategy[6].

1.5.6. The primary reasons for undertaking SDP, which therefore form the basis of the URD, are as follows:

- Although afloat storage has proved to be a very safe arrangement for over 20 years, it does not fulfil Government[7] and MODs[8] nuclear decommissioning policy which requires that nuclear decommissioning activities should be carried out as soon as reasonably practicable.

- The capacity to store further submarines will be reached by 2020 and there are no existing berthing facilities suitable for the Vanguard Class submarines when they leave service. The cost of developing a new berthing facility has been estimated at [redacted].

- The increasing cost of maintaining the redundant submarines and conducting unplanned remedial work is increasing as they age and increase in number.

- The ability to deliver savings by reducing the overall footprint required to support out-of-service submarines, which enables the efficient use of sites to support in-service submarines.

- Concerns have been expressed by the public (in earlier consultations), regularly in the local press and in Parliament about the duration of afloat storage and the need for progress in developing a solution.

- The lack of a proven solution for submarine dismantling is recognised as a risk within the business cases for future submarine classes and to the sustainability of the submarine programme as a whole.

1.5.7. These issues underline the need for a long-term solution for submarine dismantling which includes arrangements for interim land storage of the ILW from the SDP and

[5] Case Law has hitherto upheld this position: See European Court of C-61·03 OJ C132 vol. 48, of 28 May 2005
[6] MOD Nuclear Liabilities Management Strategy, September 2011
[7] The Decommissioning of the UK Nuclear Industry's Facilities – Amendment to Command 2919, DTI Paper, Sep 04.
[8] "MOD policy for decommissioning and the disposal of radioactive waste and residual nuclear material arising from the nuclear programme", issued 9 Oct 07.

achieves the best value for the recyclable materials from the submarines[9].

1.5.8. To understand the wider SDP context, please refer to the context documents listed at section 4.

1.6. Scope

1.6.1. The project scope includes 27 nuclear submarines of past and current classes. While the project scope does not include disposal of Astute class or Successor submarines, the project is required, where possible, to retain flexibility for future classes; namely to preserve options for adapting or life-extending dismantling facilities should such decisions be taken in the future.

1.6.2. The project includes dismantling of all parts of the submarines, including conventional ship breaking. In this regard as much recycling of material as possible will be undertaken.

1.6.3. The project includes the eventual decommissioning of the dismantling and ILW storage facilities themselves.

1.6.4. Decommissioning of the Shore Test Facility (STF) at Vulcan Naval Reactor Test Establishment (NRTE) will be funded separately through Nuclear Propulsion (NP) project and is not included within the scope of the SDP. However, the two projects will share lessons learned, relevant data and expertise.

1.6.5. The SDP is politically sensitive, and is subject to a high degree of public engagement and the involvement of the wide range of stakeholders involved in its execution. Two rounds of formal public consultation have already been conducted, and a Ministerial commitment has been made to further consultation, in the form of the Submarine Dismantling Consultation, before major decisions are made. The project is committed to a policy of openness and transparency, and has its own website, http://www.mod.uk/DefenceInternet/MicroSite/DES/WhatWeDo/SDP.

1.7. Operating Process

1.7.1. The SDP process start point is a defuelled submarine in afloat storage. This applies to the 17 submarines currently stored afloat, and also applies to newly decommissioned submarines which will be subject to DDLP and then be stored afloat on a temporary basis.

1.7.2. The operating process may include, but not be limited to, providing facilities and services for:

- The safe removal of parts of the submarine containing radioactive components and/or the safe removal of radioactive components. This will include the segregation of radioactive waste into ILW and Low Level Waste (LLW) or Very Low Level Waste (VLLW).

[9] The scrap value per submarine has been estimated by the DSA to be between [redacted] and [redacted] (net) per submarine, after transport and dismantling costs have been removed.

- The packaging and transport of ILW arising from the hull to a place of interim storage.

- The packaging and transport of LLW and VLLW. SDP will use a licensed facility in accordance with the UK's LLW Strategy.

- Movement of the complete submarine hulls or hull sections (including associated equipment and systems) remaining after radioactive materials have been removed, to a place where conventional ship recycling can take place.

- Safe disposal and/or recycling of the non-radioactive residue material of each submarine hull, systems and structure, which will include hazardous and non-hazardous waste, and the removal of security sensitive material.

- Interim UK land storage facilities, capable of holding the resulting consignments of ILW until the proposed GDF becomes available.

1.7.3. The facilities and services provided are required to comply with all relevant environmental and safety legislation, and applicable security and other standards.

1.7.4. The SDP Operational Analysis Supporting Paper (OASP) sets out the options for conducting the above operations and the analysis that forms the basis for proposals for public consultation.

1.8. Capability Stakeholders & Customer

1.8.1. The Defence Nuclear Executive Board (DNEB) sets nuclear decommissioning policy for the Department and Head of Deterrent & Underwater Capability (DUWC) is the Sponsor and Senior Responsible Owner (SRO).

1.8.2. Owing to the nature of the project, stakeholders are many and varied, and include:

- Internal MOD stakeholders.

- Other Government Departments (OGDs) and Devolved Administrations (the Scottish Government, Welsh Government and Northern Ireland Assembly).

- NDA.

- Regulatory Authorities and Agencies.

- Local Government.

- Non Governmental Organisations (NGOs) and Community Based Organisations (CBOs).

- The general public.

1.8.3. A full list of stakeholders is presented in the Project Management Plan[10] (PMP).

1.9. Capability Users

1.9.1. The "User" of the solution is ISM, the DE&S Team which has responsibility for the submarine at this stage of its life cycle and will manage the throughput of submarines into the dismantling operation.

1.10. Benefits and User Requirements

1.10.1. A benefits mapping workshop was held on 2 November, which resulted in the production of a hierarchical set of SDP benefits and disadvantages. The top level benefits are:

- Public confidence.
- Socio-economic impact.
- Reduction of impact on operations.
- Reduction in impact on Government and MOD.
- Reduction of environmental and safety impact.

1.10.2. These benefits will be used as the basis of benefits realisation, to ensure that SDP delivers what is required.

1.10.3. All of the benefits and disadvantages (except those related to public confidence and indirect socio-economic impact) have been mapped to the User Requirements to ensure traceability and completeness. They have also been used to develop Measures of Effectiveness (MoE), for use either in the Whole Life Cost (WLC) model to support the Investment Appraisal (IA); or the Multi-Criteria Decision Analysis (MCDA) model to support the Operational Effectiveness (OE).

1.11. Project Timescales

1.11.1. The project has been divided into a number of Phases and Gates in accordance with the principles of the CADMID cycle[11] and the project passed Initial Gate in 2002. The current dates corresponding to each stage and milestone of the project are maintained in the PMP[12].

[10] SDP Project Management Plan, ISM, Issue 9.0, dated September 2011.
[11] See Annex B Definitions.
[12] SDP Project Management Plan, ISM, Issue 9.0, dated August 2011.

1.12. Priorities

Priority Level	Definition	Trade-off Guidance and Level
Key	Requirement is essential to deliver Platform Key User Requirement (KUR), or operational effect	Requirement must be implemented for the system to succeed. Trading will require resubmission to the Investment Appraisal Committee (IAC).
Mandatory	Requirement is essential for compliance with legislation	Requirement must be implemented.
1	High Priority Requirement	Trading will require reference back to the Head of Capability or Capability Working Group (CWG).
2	Medium Priority Requirement	Trading will require reference back to the Sponsor.
3	Low Priority Requirement	Trading can be decided by the Equipment Capability Desk Officer.

2. Key User Requirements

2.1.1. The full list of User Requirements (UR's) are shown in Annex B. KUR's for SDP are listed in the table below.

Ref	User Requirement	Justification
1.1.1	The user requires a solution which is as cost-effective as possible, minimising the costs of submarine dismantling and ILW storage without compromising safety, security, sustainability or regulatory compliance.	To minimise the cost of dismantling and ILW storage whilst delivering an effective solution.
2.6.3	The user requires a means to store Intermediate Level Waste (ILW) from 27 defuelled nuclear submarines until a national disposal route is established.	To carry out Government and MOD nuclear decommissioning policy, with the long term aim of disposal of ILW.
3.4.1	The user requires that the capability is in service before the decommissioned submarine storage capacity is reached. To achieve this IOC must be accomplished by [redacted] and FOC by [redacted]	Storage in 3 basin, in Devonport, is limited and storage elsewhere is likely to impact operation of the dockyard or naval base. Therefore SDP should be operational before the current storage capacity is reached.
5.2.1	The user requires that SDP inspires public confidence and thereby upholds the MOD's reputation as a responsible nuclear operator.	To fulfil Ministerial commitments in response to previous public consultations, and commitments to undertaking further public consultation before major decisions are made.[13]

[13] S of S announcement, May 2000, and Min(DP) response to the recommendations of Consultation on ISOLUS Outline Proposals (CIOP), Feb 05.

3. Individual Capability Requirements and Constraints

3.1.1. The full list of UR's are shown in Annex B. These are structured hierarchically as shown in the table below, with individual requirements numbered X.X.X:

SDP	1. Economic Impact	1.1 Economic Impact on MOD
	2. Management of MOD Liability	2.1 Management of non-hazardous waste liability
		2.2 Management of hazardous waste liability
		2.3 Management of LLW/VLLW Liability
		2.4 Security
		2.5 Management of ILW Liability
		2.6 Compliance with regulation, policy and strategy
	3. Management of impact on operations	3.1 Support to submarine enterprise
		3.2 Management of impact on operations
		3.3 Maintenance of UK capability
		3.4 Management of berthing capacity
	4. Management of environmental impact and safety	4.1 Management of transport
		4.2 Environmental impacts
		4.3 Safety
	5. Delivery of programme	5.1 Timescales
		5.2 Building public confidence

4. Context Documents

Title	Originator	Reference/ Version	Date	Classifi-cation	Key Data
Acquisition Operating Framework (AOF)	MOD	V3.1.13	October 2011	None	MOD acquisition policy
Managing our Radioactive Waste Safely: CoRWMs Recommendations to Government	CoRWM	N/A	31 July 2006	None	Waste Management Policy
MOD Policy for Decommissioning and the Disposal of Radioactive Waste and Residual Nuclear Material Arising from the Nuclear Programme	MOD	N/A	9 October 2007	None	MOD Nuclear Waste Policy
Response to the Report and Recommendations from the Committee on Radioactive Waste Management (CoRWM) by the UK Government and the Devolved Administrations	DEFRA	N/A	25 October 2006	None	Waste Management Policy
SDP Concept of Analysis (CoA)	ISM	Issue 1.1	March 2011	Protect - Policy	SDP options analysis process
SDP CONOP	ISM	Version 1.0	February 2011	Protect-Policy	Background; Operational Context; Capability stakeholders
SDP Master Data and Assumptions List (MDAL)	ISM	Issue 4.5	September 2011	Restricted	Interoperability; constraints; assumptions; dependencies
SDP Operational Analysis Supporting Paper (OASP)	ISM	Issue 1.0	October 2011	Protect-Commercial	Options analysis results & proposals
SDP Project Management Plan (PMP)	ISM	Issue 9.0	October 2011	Protect-Policy	Operating environment; acquisition strategy; ISD; FOC; OSD
SDP Requirements and Acceptance Management Plan (RAMP)	ISM	Issue 1.0	April 2010	None	Acquisition strategy
SDP Site Criteria & Screening Paper	ISM	Issue 2.1	October 2011	None	Screening for options analysis

Title	Originator	Reference/ Version	Date	Classifi-cation	Key Data
Strategic Environmental Assessment: Scoping Report (SEA)	DE&S	Revision 7	March 2011	None	Environmental
The Decommissioning of the UK Nuclear Industry's Facilities - Amendment to Command 2919	DTI	N/A	September 2004	None	UK Nuclear Decommissioning Policy
MOD Nuclear Liabilities Management Strategy	DE&S	N/A	September 2011	None	MOD Nuclear Liabilities Strategy

A Abbreviations

Abbreviation	Meaning
AOF	Acquisition Operating Framework
BOI	Balance of Investment
CADMID	Concept Assessment Demonstration Migration In-Service Disposal
CBO	Community Based Organisation
CoA	Concept of Analysis
COEIA	Combined Operational Effectiveness and Investment Appraisal
CoRWM	Committee on Radioactive Waste Management
CPG	Capability Planning Group
CWG	Capability Working Group
DDLP	De-fuel, De-equip and Lay-Up Preparation
DE&S	Defence Equipment and Support
DNEB	Defence Nuclear Executive Board
DNSR	Defence Nuclear Safety Regulator
DUWC	Deterrent & Underwater Capability
Euratom	European Atomic Energy Community
FOC	Full Operating Capability
GDF	Geological Disposal Facility
IAC	Investment Approvals Committee
IGBC	Initial Gate Business Case
ILW	Intermediate Level Waste
IOC	Initial Operating Capability
ISD	In Service Date
ISM	In Service Submarines
JSP	Joint Service Publication
KUR	Key User Requirement
LLW	Low Level Waste
LUSM	Laid Up Submarine
MCP	Maritime Change Programme
MDAL	Master Data and Assumptions List
MGBC	Main Gate Business Case
MOD	Ministry of Defence
MoE	Measure of Effectiveness
NDA	Nuclear Decommissioning Authority
NGO	Non-Governmental Organisation

Abbreviation	Meaning
NIA	Nuclear Installations Act
NRTE	Naval Reactor Test Establishment
OASP	Operational Analysis Supporting Paper
OGD	Other Government Department
OSD	Out of Service Date
PMP	Project Management Plan
RAMP	Requirements and Acceptance Management Plan
RC	Reactor Compartment
RPV	Reactor Pressure Vessel
SDP	Submarine Dismantling Project
SEA	Strategic Environmental Assessment
SRD	Systems Requirement Document
SRO	Senior Responsible Owner
SSUN	Single Statement of User Need
STF	Shore Test Facility
TLCM	Through Life Capability Management
UR	User Requirement
URD	User Requirements Document
VLLW	Very Low Level Waste
WLC	Whole Life Cost

B User Requirements

B.1 Measures of Effectiveness

The table below lists threshold MoE, which represent the minimum required level of performance for a UR to be achieved. Where threshold MoEs have been set for site screening or options analysis, a code has been used which identifies the criteria used. In the case of site screening these are references 1A to 1J and 2A to 2K (see the Site Criteria and Screening Paper v2.1 dated May 2011 for details). In the case of options analysis these are references 1-POL to 5-POL; 1-OP to 4-OP; 1-H&S to 5-H&S and 1-ENV to 6-ENV (see the OE Report v1.0 dated October 2011 for details.

The table also lists objective MoEs, which represent the ideal level of performance for meeting a UR. Where objective MoEs have been set for options analysis a code has been used which identifies the criteria used. These are references 1-POL to 5-POL; 1-OP to 4-OP; 1-H&S to 5-H&S and 1-ENV to 6-ENV (see the OE Report for details).

UR No.	User Requirement	Measure of effectiveness (threshold)	Measure of effectiveness (objective)	Justification	Validation Criteria	Priority	Remarks	Related benefits and disadvantages (D)
1.1.1	The user requires a solution which is as cost-effective as possible, minimising the costs of submarine dismantling and ILW storage without compromising safety, security, sustainability or regulatory compliance.	Meets safety, security, sustainability and regulatory requirements	Minimise WLC	To minimise the cost of dismantling and ILW storage whilst delivering an effective solution.	Demonstration of compliance with safety, security, sustainability and regulation; and accurate WLC data.	Key	This requirement captures the economic impact of SDP on the MOD, excluding financial gains achieved from recycling (1.1.2). The wider financial impact of SDP (on, for example, communities) do not form a project requirement.	Economic benefit up front assessment; Economic benefit removal of LUSMs; Cost of dismantling (D); Cost of land storage (D)

UR No.	User Requirement	Measure of effectiveness (threshold)	Measure of effectiveness (objective)	Justification	Validation Criteria	Priority	Remarks	Related benefits and disadvantages (D)
1.1.2	The user requires a solution which maximises the financial value of material recycled from submarines.	N/A	Minimise WLC	To maximise the financial return from dismantling to help offset the costs of dismantling and ILW storage.	Demonstration of financial value of material extracted from submarines.	3	This requirement does not have a threshold MoE as there is no defined minimum financial return.	Value of recycled material
2.1.1	The user requires a means to remove, transport, re-use, recycle and/or dispose of non-hazardous waste in accordance with legislation and MOD policy.	Meets legislative and MOD policy requirements	Minimise WLC	To carry out Government and MOD policy and comply with statutory requirements for waste management.	Demonstration of management of Controlled waste in accordance with legislative requirements.	Mandatory	Reference SDP regulatory strategy and SDP sustainable development strategy. The WLC will include the cost of using landfill to dispose of non-hazardous waste	Means to remove non-hazardous waste; Means to dispose of non-hazardous waste
2.2.1	The user requires a means to remove, transport, recycle and/or dispose of hazardous waste in accordance with legislation and MOD policy.	Meets legislative and MOD policy requirements	Minimise WLC	To carry out Government and MOD policy and comply with statutory requirements for hazardous waste management.	Demonstration of management of hazardous waste in accordance with legislative requirements.	Mandatory	Reference SDP regulatory strategy and SDP sustainable development strategy.	Means to remove hazardous waste; Means to dispose of hazardous waste
2.3.1	The user requires a means to remove all other radioactive waste (other than ILW) in accordance with legislation and Government and MOD policy.	Meets legislative and Government and MOD policy requirements	Minimise WLC	To carry out Government and MOD nuclear decommissioning policy and comply with statutory requirements.	Demonstration of management of all other radioactive waste (other than ILW).	Mandatory	The removal and disposal of radioactive sealed sources are controlled under alternative management routes.	Means to remove LLW/VLLW

UR No.	User Requirement	Measure of effectiveness (threshold)	Measure of effectiveness (objective)	Justification	Validation Criteria	Priority	Remarks	Related benefits and disadvantages (D)
2.3.2	The user requires a means to dispose of all other radioactive waste (other than ILW) in accordance with legislation and Government and MOD policy.	Meets legislative and Government and MOD policy requirements	Minimise WLC	To carry out Government and MOD nuclear decommissioning policy and comply with statutory requirements.	Demonstration of management of all other radioactive waste (other than ILW).	Mandatory	The removal and disposal of radioactive sealed sources are controlled under alternative management routes.	Means to dispose of LLW/VLLW
2.4.1	The user requires that classified information, equipment, materials and waste associated with dismantling, transportation and storage are appropriately controlled	Unacceptable potential for unauthorised access (4-POL)	1. Unauthorised Access to Classified Material (4-POL) 2. Minimise WLC	To comply with MOD security regulations and the 1958 US/UK Mutual Defence Agreement.	Demonstration that all activities comply with relevant security requirements, such as JSP 440.	1	Dismantling includes the management of all waste streams: ILW, LLW/VLLW, hazardous and non-hazardous waste.	Secure dismantling; Secure transportation; Secure dismantling

UR No.	User Requirement	Measure of effectiveness (threshold)	Measure of effectiveness (objective)	Justification	Validation Criteria	Priority	Remarks	Related benefits and disadvantages (D)
2.5.1	The user requires a means to remove Intermediate Level Waste (ILW) from 27 defuelled nuclear submarines, taking account of the opportunity to characterise and segregate as optimally and cost-effectively as possible.	1. Unacceptable potential for negative impact on opportunities and risk (1-POL) 2. Coastal site location (1A) 3. Physical capacity (1B) 4. Legal or commercial commitments (1D) 5. UK organisational control (1E) 6. Security of tenure for 30 years (1F) 7. Topography (1G)	1. Flexibility and robustness to opportunity and risk (1-POL) 2. Minimise WLC	To carry out Government and MOD nuclear decommissioning policy, with the long term aim of disposal of ILW, in accordance with regulations.	Demonstration of removal of ILW. Demonstration that stakeholder consultation has been undertaken.	1	The removal of ILW will be part of a wider segmentation and characterisation of waste which will offer potential WLC savings if optimised.	Means to remove ILW; Characteris-ation and Segmentation

UR No.	User Requirement	Measure of effectiveness (threshold)	Measure of effectiveness (objective)	Justification	Validation Criteria	Priority	Remarks	Related benefits and disadvantages (D)
2.5.2	The user requires a means to package Intermediate Level Waste (ILW) from 27 defuelled nuclear submarines in a suitable form for storage until a national disposal route is established.	Unacceptable potential for negative impact on opportunities and risk (1-POL)	1. Flexibility and robustness to opportunity and risk (1-POL) 2. Minimise WLC	To carry out Government and MOD nuclear decommissioning policy, with the long term aim of disposal of ILW, in accordance with regulations.	Demonstration of packaging of ILW. Demonstration that the packaging regime is suitable for 100 years life.	1	A range of different technical approaches are available for ILW packaging but the regime must be suitable for 100 years of interim storage.	Means to package ILW; Package suitable for proposed GDF

UR No.	User Requirement	Measure of effectiveness (threshold)	Measure of effectiveness (objective)	Justification	Validation Criteria	Priority	Remarks	Related benefits and disadvantages (D)
2.5.3	The user requires a means to store Intermediate Level Waste (ILW) from 27 defuelled nuclear submarines until a national disposal route is established.	1. Unacceptable potential for negative impact on opportunities and risk (1-POL) 2. New store construction (2A) 3. Existing store capability (2B) 4. Physical capacity (2C) 5. Legal or commercial commitments (2D) 6. UK organisational control (2E) 7. Security of tenure for 100 years (2F) 8. Topography (2G)	1. Flexibility and robustness to opportunity and risk (1-POL) 2. Minimise WLC	To carry out Government and MOD nuclear decommissioning policy, with the long term aim of disposal of ILW, in accordance with regulations.	Demonstration of storage of ILW. Demonstration that stakeholder consultation has been undertaken.	Key	Waste will be required to be stored until a disposal solution has been established, which is currently planned to be the proposed GDF. A period of 100 years has been specified.	Means to store ILW

UR No.	User Requirement	Measure of effectiveness (threshold)	Measure of effectiveness (objective)	Justification	Validation Criteria	Priority	Remarks	Related benefits and disadvantages (D)
2.6.1	The user requires that the solution complies with all relevant international, national and local regulatory and legislative requirements.	1. Unacceptably high potential for non compliance with UK decommissioning policy (5-POL) 2. Unacceptable potential for non compliance with UK policy and strategy (2-POL)	1. Compliance with UK decommissioning policy (5-POL) 2. Compliance with UK policy on radioactive waste management (2-POL)	To meet legislative and regulatory requirements and carry out Government and MOD nuclear decommissioning policy.	All activities comply with current and planned international/national/local legislative, health, safety, security and environmental requirements.	Mandatory	Refer to SDP Regulatory Strategy. The aim of this requirement is to ensure conformance with all relevant regulation and avoid the risk of future censure or the removal of MOD self-regulation.	Conformance with regulation; avoidance of regulatory censure; Continuance of self regulation
2.6.2	The user requires that the solution is in accordance with Government and MOD policy, including Command 2919	1. Unacceptably high potential for non compliance with UK decommissioning policy (5-POL) 2. Unacceptable potential for non compliance with UK policy and strategy (2-POL)	1. Compliance with UK decommissioning policy (5-POL) 2. Compliance with UK policy on radioactive waste management (2-POL)	To fulfil MOD policy requirements for sustainable development and other areas.	Demonstration of effectively meeting MOD policy.	1	Refer to SDP Regulatory Strategy	Conformance with MOD policy; Conformance with NDA waste strategy; Meets Command 2919

UR No.	User Requirement	Measure of effectiveness (threshold)	Measure of effectiveness (objective)	Justification	Validation Criteria	Priority	Remarks	Related benefits and disadvantages (D)
3.1.1	The user requires sufficient design flexibility to accommodate the future dismantling/recycling/disposal of Astute Class and SSBN(F).	None	Flexibility of dismantling approach to managing future classes (2-OP)	To be capable of accommodating future submarine classes in accordance with Government policy. To include early identification of any potential increase in costs associated with additional hulls.	The solution must demonstrate sufficient design flexibility to expand the facilities, before contract award.	2	For SSBN(F) the facility should be capable of accommodating PWR3 components (current SSBN(F) planning assumption). No minimum, threshold MoE is set as this requirement is tradeable.	Dismantling flexibility
3.1.2	The user requires that the solution supports the wider submarine enterprise by improving perceptions of Successor and MUFC.	Unacceptable negative impact on operations (1-OP)	1. Impact on the maritime enterprise and wider MOD operations (1-OP) 2. Transferable dismantling knowledge (4-OP)	The current situation of indefinite afloat storage is likely to increasingly damage perceptions of future classes.	An improved perception amongst interested parties as to the design and build of future SSN/SSBN classes.	3	No minimum, threshold MoE is set as this requirement is tradeable.	Positive effect Successor and MUFC; Maintains UK capability

UR No.	User Requirement	Measure of effectiveness (threshold)	Measure of effectiveness (objective)	Justification	Validation Criteria	Priority	Remarks	Related benefits and disadvantages (D)
3.2.1	The user requires that the impact of SDP on current operational commitments is minimised.	Unacceptable negative impact on operations (1-OP)	Impact on the maritime enterprise and wider MOD operations (1-OP)	Submarine dismantling has the potential to interfere with operational commitments through requiring, for example, escort vessels for submarines moving between sites.	No, or minimal, interference with operational commitments.	3	This will include security and the use of trained manpower or equipment to support submarine dismantling.	Direct impact on operations
3.2.2	The user requires that impact of dismantling and ILW storage upon the military capability is minimised	1. Unacceptable negative impact on operations (1-OP) 2. Compatibility with site operations (1H/2H)	Impact on the maritime enterprise and wider MOD operations (1-OP)	To ensure the commissioning and operation of submarine decommissioning facilities does not impact upon current or future military capability. The planned dismantling activities must be compatible with the operations, both current and planned, on the site.	Demonstration and analysis of impact upon military capability.	1	Examples of incompatibility would include activities competing for physical space and facilities; it could also include the dismantling being incompatible with the main purpose and mission of the site. Where potential conflicts exist it will be the decision of the MOD or other Government department or commercial owner to prioritise activities and decide whether dismantling is a compatible activity.	Reduction of impact to operations

UR No.	User Requirement	Measure of effectiveness (threshold)	Measure of effectiveness (objective)	Justification	Validation Criteria	Priority	Remarks	Related benefits and disadvantages (D)
3.3.1	The user requires that submarine dismantling does not adversely affect the skills base required to support the wider submarine enterprise	Unacceptable risk that a lack of skills and experience will adversely impact SDP or the submarine enterprise	Threat to skill and experience set (3-OP)	The conduct of a new activity requiring scarce nuclear skills could affect the existing, limited pool of skilled staff.	No, or minimal, interference with existing working patterns.	3	The impact on skills is likely to be limited but cannot be wholly discounted	Threat to skills (D)
3.3.2	The user requires that sufficient trained resource is available to meet the SDP planned throughput.	Unacceptable risk that a lack of skills and experience will adversely impact SDP or the submarine enterprise	Threat to skill and experience set (3-OP)	To enable the dismantling process to be undertaken as required.	Ensure that contractor experience in dismantling is maintained and specialist skills either maintained or increased.	1	The sites where processes relating to SDP will be conducted shall have the skills capacity to manage them, and to manage increases in capacity.	Development of skills; contractor experience in dismantling; preservation of specialist skills base
3.3.3.	The user requires that submarine dismantling is coherent with the Maritime Change programme (MCP)	Unacceptable negative impact on operations (1-OP)	Impact on the maritime enterprise and wider MOD operations (1-OP).	MCP effects sites and facilities across the UK and SDP must be cognisant of the implications of different options to MCP.	Minimal negative, or even positive, impact on MCP.	1	Ensures coherence with Fleet plans	Maintains contract partnership

UR No.	User Requirement	Measure of effectiveness (threshold)	Measure of effectiveness (objective)	Justification	Validation Criteria	Priority	Remarks	Related benefits and disadvantages (D)
3.4.1	The user requires that the capability is in service before the decommissioned submarine storage capacity is reached. To achieve this IOC must be accomplished by [redacted] and FOC by [redacted]	Afloat storage capacity is not exceeded	Minimise WLC	Storage in 3 basin, in Devonport, is limited and storage elsewhere is likely to impact operation of the dockyard or naval base. Therefore SDP should be operational before the current storage capacity is reached.	Demonstration of the end to end process for the dismantling of the submarine and the management of all waste streams, within the IOC and FOC dates specified.	Key	Dismantling must not exceed storage capacity. If storage can be managed efficiently there could be WLC savings.	Prevention of impact when capacity full; do not exceed berthing capacity
3.4.2	The User requires that the solution accommodates dismantling immediately after DDLP.	Delays between DDLP and dismantling minimised	Minimise WLC	It is anticipated that the storage of V class submarines will impose operational penalties on the dockyard therefore the ability to dismantle on completion of DDLP will be advantageous.	Evidence that design accommodates immediate dismantling after DDLP.	2	The longer the delay between DDLP and dismantling, the greater the WLC implications.	Submarines dismantled straight after DDLP
4.1.1	The user requires a means of transporting packaged ILW from the dismantling location to the interim storage location.	Receipt of ILW (2K)	Scope/extent of transportation of submarines and radioactive waste (3-POL)	To enable ILW to be stored in a location other than the dismantling location.	Demonstration of transportation between dismantling location and interim storage location.	2	The transportation requirements will be based upon the removal strategy. This will primarily give rise to WLC implications but there are also regulatory considerations.	Moving waste

UR No.	User Requirement	Measure of effectiveness (threshold)	Measure of effectiveness (objective)	Justification	Validation Criteria	Priority	Remarks	Related benefits and disadvantages (D)
4.1.2	The user requires a means of transporting redundant defuelled submarines from their current berthing locations to the initial dismantling location.	Port access (1C)	Scope/extent of transportation of submarines and radioactive waste (3-POL)	To enable decommissioning to occur at a location other than the submarines current berthing location.	Demonstration of transportation between current berthing location to initial dismantling location.	1	Transport of redundant defuelled submarines prior to initial dismantling may not be required in dual site options where initial dismantling (for all submarines) is undertaken at the same site that they are kept in afloat storage..	Submarine moving post ILW (D)
4.1.3	Subsequent to initial dismantling, the user requires a means of transporting the submarines' non-radiological sections to a final ship breaking location.	Port access (1C)	Scope/extent of transportation of submarines and radioactive waste (3-POL)	To enable non-radiological sections to be decommissioned at a location other than the initial dismantling location.	Demonstration of transportation between initial dismantling location and final ship breaking location.	1	The transportation requirements will be based upon the removal strategy. This will primarily give rise to WLC implications but there are also regulatory considerations.	Submarine moving between sites (D)

UR No.	User Requirement	Measure of effectiveness (threshold)	Measure of effectiveness (objective)	Justification	Validation Criteria	Priority	Remarks	Related benefits and disadvantages (D)
4.2.1	The user requires that the environmental impact of SDP on the natural environment should be minimised.	1. Worker dose exceeds basic Safety Limit (1-H&S) 2. Unacceptably high potential for non-radiological impact on workers (2-H&S) 3. Unacceptably high potential for unplanned radioactive release – dismantling (3-H&S), transportation (4-H&S), storage (5-H&S) 4. Non-compliant radiological discharges (1-ENV & 2-ENV) 5. Non-compliant non-rad. discharges (3-ENV & 4-ENV)	1. Worker dose (1-H&S) 2. Non-radiological impact on workers (2-H&S) 3. Potential for unplanned release during dismantling (3-H&S), transportation(4-H&S), storage (5-H&S) 4. Radiological discharges to the public (1-ENV) and environment (2-ENV) 5. Non-radiological impact on the public (3-ENV) and environment (4-ENV)	To fulfil statutory and MOD sustainable development requirements to minimise adverse environmental impacts and enhance positive ones.	This is derived from the key environmental factors in the SEA. Validation will be conducted using the SEA framework.	1	Legislative requirements are detailed in the Regulatory Strategy. MOD policy requirements are detailed in the SDP Sustainable Development strategy.	Accident (D); Public dose (D); Worker dose (D); Impact on the natural environment (D); Non-radiological impact on workers (D); Non-radiological impact on public (D); Avoidance of future incident; future does reduction

UR No.	User Requirement	Measure of effectiveness (threshold)	Measure of effectiveness (objective)	Justification	Validation Criteria	Priority	Remarks	Related benefits and disadvantages (D)
4.2.2	The user requires that the impact of SDP on cultural heritage, landscape and townscape character should be minimised.	1. Non-compliant with mandated standards for impact on the built environment (5-ENV) 2. Unacceptable mitigated risk from natural environment (6-ENV)	1. Impact on the built environment (5-ENV) 2. Impact from the natural environment (6-ENV)	To fulfil statutory and MOD sustainable development requirements to minimise adverse impacts on cultural heritage, landscape and townscape and enhance positive ones.	This is derived from the key environmental factors in the SEA. Validation will be conducted using the SEA framework.	2	Legislative requirements are detailed in the Regulatory Strategy. MOD policy requirements are detailed in the SDP Sustainable Development strategy.	Impact on the built environment (D); Nuisance value (D); Impact from the natural environment (D)

UR No.	User Requirement	Measure of effectiveness (threshold)	Measure of effectiveness (objective)	Justification	Validation Criteria	Priority	Remarks	Related benefits and disadvantages (D)
4.3.1	The user requires the all operations are undertaken in a safe manner.	Operational safety issues (1I/2I)	Minimise WLC	To comply with local, national, international and MOD safety regulations. There must be no unacceptable operational safety issues arising from existing activities on or off site. In common with any activity, there will be safety issues arising in the dismantling or ILW storage processes.	Demonstration that all activities comply with relevant safety requirements. Operations must not affect and must not be affected by military or civil flying regulations or associated flying safeguarding. Sites should not be on a bombing range, firing range, or ammunition storage site. For sites managing ammunition there are strict area restrictions inside which nothing can be built which is not ammunition related. Any other activity which requires safeguarding will need to be considered.	Mandatory	If the threshold MoE is achieved there may be WLC advantages depending on the approach adopted to dismantling and storage, whilst not compromising safety.	Operations conducted safely

UR No.	User Requirement	Measure of effectiveness (threshold)	Measure of effectiveness (objective)	Justification	Validation Criteria	Priority	Remarks	Related benefits and disadvantages (D)
5.1.1	The User requires all 27 defuelled nuclear submarines to be dismantled before the project completion date.	Dismantling of 27 submarines by 2050.	Dismantling of 27 submarines by 2040.	Project funding is expected to complete between 2040 and 2050.	The design should demonstrate the ability to dismantle all 27 submarines by the specified date.	1	There needs to be flexibility in drumbeat so that the work can fit into the Dockyard schedule in the most effective way. There also needs to be flexibility in the time that the submarines are left to cool off.	N/A
5.1.2	The user requires that the all site licenses are current throughout the life of the facility.	Licensing conditions - sites must be capable of licensing for radiological dismantling and ILW storage (1J/2J).	Minimise WLC	To ensure that the decommissioning facilities may be sustained throughout the SDP lifecycle.	Site licensees effectively maintained through lifecycle.	Mandatory	This is a mandatory requirement and has no objective MoE.	N/A
5.1.3	The user requires that provision is made for the decommissioning and disposal of facilities when they become redundant.	Minimal liability for future generations.	Minimise WLC	To fulfil Government nuclear decommissioning policy and legislative requirements.	Facilities effectively decommissioned Facilities lifetime extended outside that of the SDP scope. Plans for facility decommissioning are in place in accordance with License/Authorisation condition 35.	1	Minimal liability means in accordance with regulation. Achieving this for different options will require different costs.	N/A

UR No.	User Requirement	Measure of effectiveness (threshold)	Measure of effectiveness (objective)	Justification	Validation Criteria	Priority	Remarks	Related benefits and disadvantages (D)
5.2.1	The user requires that SDP inspires public confidence and thereby upholds the MOD's reputation as a responsible nuclear operator.	Meets legislative and MOD policy requirements for FOI and public participation in environmental decision making	None	To fulfil Ministerial commitments in response to previous public consultations, and commitments to undertaking further public consultation before major decisions are made.[14]	Evidence provided that recommendations from previous rounds of public consultation have been taken into account in developing the solution and design proposals. The proposed solution is subject to formal public-consultation before final decisions are made, and there is a successful outcome. Public consultation is successfully conducted in accordance with government code of practice. d. Compliance with FOI.	Key	Refer to SDP Regulatory Strategy. It will not be possible to measure this except in WLC terms.	N/A

[14] S of S announcement, May 2000, and Min(DP) response to the recommendations of Consultation on ISOLUS Outline Proposals (CIOP), Feb 05.

UR No.	User Requirement	Measure of effectiveness (threshold)	Measure of effectiveness (objective)	Justification	Validation Criteria	Priority	Remarks	Related benefits and disadvantages (D)
5.2.2	The user requires that an environmental assessment is conducted in a manner which fulfils the requirements of the Assessment of Plans and Programmes ('SEA') Regulations 2004.	SEA conducted as required.	None	To comply with Statutory requirements for environmental assessment and public consultation.	Demonstration that the SEA requirement has been met effectively, on time and without viable legal challenge.	Mandatory	This is a mandatory requirement and has no objective MoE.	N/A