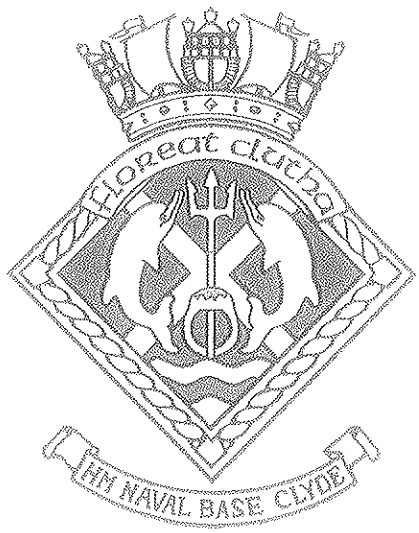
Future Radioactive Waste Management Capability

User Requirements Document

RWMF/URD/001



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REVISION HISTORY

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REVIEW

(For the last issue shown on Revision History)

	Signature	Print Name	Position	Date
Originator			REDF WSL	** Aug
Reviewer			EDC	
Authoriser			CAPD	

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AMENDMENTS RECORD

AMENDMENTS

All amendments to this document will be recorded in the Amendments Record, which will be issued to all copyholders along with the amended pages. Where an amendment results in a new revision of a document, the whole document will by issued and the amendments noted in the Amendments Record. To assist in identifying the amendments, a vertical line is displayed in the right hand margin opposite new or revised text. Vertical lines marking previous amendments are deleted at each revised issue of the document.

Document Format

This document has been produced in accordance with guidance from the MoD Acquisition Operating Framework (Ref 1).

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1 GENERAL DESCRIPTION

1.1 Single Statement of Need (SSON)

The primary need is for a cost effective and Nuclear Safety justified radioactive waste management capability at HMNB Clyde, requiring the provision of a fully commissioned, authorised, operable and maintainable facility(s), that is Fit for Purpose.

A Radioactive Waste Management capability at HMNB Clyde is required to maintain the Base's ability to safely process liquid effluent arising from the operation of nuclear vessels/ decontamination of equipment and to safely dispose of solid waste. The new capability must be commissioned prior to the end of the current facilities' (REDF and APF) end of design life (Feb 2014).

1.2 Background

The existing REDF at HMNB Clyde is undergoing a major refurbishment to extend their design life from Feb 08 to Feb 2014. It was initially intended to replace these two facilities with a new single facility, known as the Radioactive Processing Facility (RPF). However, the RPF contract was cancelled because it was not considered to provide an optimum or cost effective solution to future waste management at Clyde.

The aim is to provide a solution that provides a radioactive waste management capability which is fully integrated into the Estates Rationalisation project at Clyde, which can be demonstrated to be both value for money and aligns with Best Practicable Means (BPM). The development of the optimum radioactive waste capability will need to carefully consider how the Nuclear Repair, Radiochemical Lab, Nucleonic Calibration and NDE facilities will be provided as part of the Estates Rationalisation.

1.3 Operational Context

The refurbished REDF will be employed in the receipt and processing of primary effluent resulting from nuclear submarine operation and maintenance activities at HMNB Clyde, safely and effectively removing or reducing the level of radioactive material present in the effluent. The boundaries of the capability are from the discharge of effluent from a nuclear powered vessel, radiochemical laboratory, nuclear repair workshop and decontamination activities in the APF through to final discharge to the Gareloch in compliance with the conditions detailed in the SEPA Letter of Agreement.

The refurbished APF will be employed in the processing of solid radioactive waste and the decontamination of equipment. The boundaries of the capability are from the generation of solid radioactive waste from a nuclear powered vessel or any other controlled area at HMNB Clyde through to disposal at the Low Level Waste Repository operated by BNG in compliance with the conditions detailed in the SEPA Letter of Agreement.

1.4 Operating Environment

The future capability will be Nuclear Safety Implicated (NSI) on an Authorised Site within HM Naval Base Clyde Faslane. All submarine operations will be in the Northern Area. All classes of submarine are to be supported, including remaining TRAFALGAR Class submarines. The Estates Rationalisation programme seeks to reduce the nuclear footprint and the new Submarine maintenance Hub will be co-located in this area. The future radioactive waste capability is to be provided to ensure integration and alignment with the Estate Rationalisation programme.

1.5 Operating Process

The future capability will be used to perform the following activities:

Liquid Waste

- Movement of liquid effluent from HM submarines to the processing facility. (3.03)
- If required, the discharge of SuperTET/PET/PEB to the processing facility. (3.10)
- Storage of the PET/PEB/SuperTET. (3.12)
- Temporary storage of effluent in receipt and hold tanks. (3.6)
- Processing of the effluent to remove radioactivity (3.11)
- Sampling of effluent. (3.7)
- Discharge of treated liquid effluent under SEPA agreement. (3.8)
- Maintenance of plant. (3.37)
- Maintenance/preparation of a SuperTET / PET / PEB.
- Treatment and disposal of liquid effluent from cleaning processes. (3.11)
- Ion exchange "resin change" and "cementation" process. (3.01,3.02)

Solid Waste

- Movement of solid waste/equipment into a solid waste processing facility. (3.21)
- Monitoring of solid waste/equipment within the facility. (3.22)
- Minimisation of radioactive waste by effective segregation
- Decontamination of equipment. (3.15)
- Compaction and temporary storage of solid waste. (3.20)
- Despatch of equipment for re-use. (3.15)
- Packaging, lifting and preparing ISO container for transfer to LLWR
- Consignment of solid low level waste to LLWR. (3.14, 3.16)

1.6 The Applicable Acquisition Strategy

The intention is to develop an appropriate procurement strategy for implementation of the future radioactive waste management capability in conjunction with the entirety of the Estates Rationalisation

programme. The requirement is that the procurement strategy be reviewed by NSQEP to ensure it will provide an adequate solution to the NSI aspects of the project.

1.7 Required ISD and FOC Dates

The required In-Service-Date for the new facility is to provide Full Operational Capability (FOC) no later than 1 December 2013. The end of design life for REDF/APF is currently Feb 2014.

1.8 Planned OSD

The facility should be designed for a 30 year commission, i.e. planning for an Out of Service Date (OSD) of 2043.

1.9 Interoperability

Subject to the integrated solution, the new facility may be required to accept Primary Effluent Barge (PEB) Primary Effluent Tank (PET) deliveries and / or Super Transporter Effluent Tank (Super TET).

The facility must be able to accept and process solid waste at Clyde.

The facility capabilities must be maintainable without impinging on the ability to support submarine operations throughout its life.

1.10 Constraints

The following are considered to be the most significant constraints:

- Regulatory constraints (SEPA/NII) on discharge, sampling and barrier controls.
- All safety documentation must successfully undergo Clyde "due process".
- The management of radioactive waste, in its entirety, must be demonstrably 'Best Practicable Means'.
- The proposed solution must be assessed by a SQEP panel at key stages of the programme to ensure that the solution is adequate in meeting regulatory requirements but also that it remains VFM.
- The key stages for SQEP review will be detailed in support of the Business Case.

1.11 Priorities

The delivery of the whole project is of high priority in its entirety. Prioritising of individual requirements was not considered appropriate in this case, since the fulfilment of any individual requirement of the project is not of value in isolation.

1.12 Capability Users

The effluent processing capability users are the Commanding Officers of nuclear vessels, the Nuclear Repair teams and the solid waste facility via the Facility Operator and Radio chemists.

The solid waste capability users are the Commanding Officers of nuclear vessels, the Nuclear Repair teams, Health Physics Group, Radio chemists, Rolls Royce and Associates (RRA) and other contractors.

1.13 Capability Stakeholders

Stakeholders whose needs contribute to the Requirements and/or Constraints recorded in this document are as follows:

- Operator: Facility Operator
- Intelligent Customer iaw AC1: SFM
- Funding: DE&S Investment Board
- Regulators: DNSR, NII, SEPA
- Providers of Safety Justification: NCG
- Radiation Protection and Radioactive Waste advice and guidance: BRPA and BRSO
- Base Approvers: CNSC, NSSSC, NSAG, SDCC.
- Base Design Department: NBDD
- External bodies: e.g. Argyll & Bute Council for Planning & Building Warrants
- Scottish Minister for Environment
- FLEET
- DSA as decider for assurance

1.14 Dependencies

HMNB Clyde has a fundamental dependency on the availability of a radioactive waste management capability. Without these capabilities, no nuclear vessels can be supported at HMNB Clyde.

The management of interfaces between stakeholders is the key non-operational dependency.

1.15 Assumptions

a. Provision of current Effluent Processing capability will remain available until February 2014. (3.12)
b. The new capability will align with the requirements of the Clyde Estates Rationalisation Programme.
c. Capital and Through Life Costs of the project will be optimised and demonstrated in the Business Case.

d. HMNB Clyde will be the centre of specialisation for submarine fleet time engineering (FTE). Deep maintenance facility will be based at Devonport in accordance with Maritime Change Principles (MCP).

e. All classes of Submarine will be base ported at HMNB Clyde: V Class; A Class; and final phase T Class.

f. Three T Class submarines will arrive following their RAMPs late 2012 and the remaining 4 T Class submarines will remain in Devonport until their decommissioning by 2015. A periodic review of these assumptions will capture any changes to the proposed naval base transformation/maritime principles.

g. Partnering arrangements will continue beyond 2013.

h. All nuclear related work will be transferred to the northern area, thus allowing the nuclear footprint to be reduced.

I. The radioactive waste management capability will be located to the northern area and will be planned for as part of estates rationalisation but delivered as a separate project.

J. Proposals will include provision of facilities in the northern area for workshops, offices and appropriate specialist functions to meet waterfront support with co-location where appropriate.

k. The costs associated with decommissioning at the end of life (2043) will be accounted for and based on current dismantling and disposal costs.

l. A comprehensive review of previous development work in support of the RPF projects will identify Lessons learned to avoid repeat mistakes.

m. The Swiftsure and Nuclear Reactor Plant (NRP) (a Type 1 Pressurised Water Reactor) will no longer be in service but Trafalgar Class will be required to discharge at Clyde during plant warm ups. Astute and Vanguard Class submarines do not need an external primary coolant discharge capability during the plant warm-up cycle. It is therefore envisaged that the volume of effluent discharged from submarines will reduce significantly.

n. It is assumed that the political stance regarding the presence of nuclear submarines in Scotland does not have an effect on the project.

o. As a value management approach, the option of using the same team to decommission REDF and APF on completion of the build project will be investigated to minimise project overheads.

p. Cementation plant: A detailed assessment of procurement options will identify the optimum solution to minimise through life costs. Based on previous operating history, the cementation plant is likely to be operated every 5 years. This assumption forms the basis of the estimated costs should the plant be brought in as required rather than a permanent facility. (3.04)

q. Although a study had been commissioned to assess the feasibility of a discharge point in the Northern area, the presence of the new SSN Berthing Facility is expected to disrupt the tidal dispersion and necessitate further studies.

r. Batch discharges from submarines will be larger than current PET capability ($2m^3$) e.g. double loop drain ($10m^3$).

s. The decommissioning of the building is not part of the scope of this project but it is assumed that the funds allocated for decommissioning will be reviewed based on lessons learned during this implementation phase and other similar decommissioning projects.

t. Any vessel used to accept and transfer radioactive effluent will meet the requirements of the MCA

u. Any solution should align to future strategy for conducting nuclear work at Coulport.

v. Discharge will be at an agreed discharge point (SEPA)

w. The option of re-using equipment supplied in 08/09 as part of the REDF Refurbishment Project will be thoroughly investigated, noting that a temporary processing facility may need to be established during transfer and commissioning of equipment.

x. Adequate NSQEP resource is engaged throughout the life of the project to ensure that the design solution is adequate and cost effective to align with the lessons learned within Reference B. (3.33)

y. The Hazard Categorization for the new facility will be no higher than that of the RPF, which was determined as a Cat 3/C, using bounding inventory calculations.

z. The Design Authority, Construction Authority and Commissioning Authority will be transferred to the Prime Contractor.

aa. Planning approval for building works will need to be granted by Argyll and Bute Council.

bb. SEPA agreement will need to be obtained by the Authorisee, with regard to RSA93 and COPA74 in respect of effluent discharge and solid waste disposal.

cc. The requirement to perform a Weapon Ordinance Munitions or Explosive Risk Assessment will be examined early.

dd. The demonstration of withstand to external hazards against DGD505 (e.g. seismic withstand) will be agreed with the Regulator prior to any significant design work to optimise costs and reduce project risk.

ee. All Nuclear Safety Implicated commissioning (active and inactive) will be conducted by the Facility Operator iaw site process.

ff. All safety case documentation in support of this project will be subject to an enhanced level of scrutiny and is likely to be called in by DNSR.

gg. DNSR, NII and SEPA will be consulted at an early stage to reduce regulatory risk. #

hh. All base internal support will be adequate.

2 KEY USER REQUIREMENTS (KURS)

The Key User Requirements of the capability are as follows:

- Submission and successful determination by SEPA of new application for agreement to dispose of radioactive waste.
- First Nuclear use (FNU) of new facility is required by 14 February 2014.
- Detailed design and safety case to undergo Clyde Due process.
- SFM should carry out the 'Intelligent Customer' Role to ensure that the proposed solution meets the requirements of all stakeholders.

3 CAPABILITY REQUIREMENTS AND CONSTRAINTS

Liquid Waste Capability					
Ref	Owner	Area	Requirement/ Constraint	Acceptance Criteria	Remarks
3.1	EDC	Operational	Ability to process 130m^3 of effluent per year.	Adequate design substantiation to meet capacity.	Estimates are based on RPF studies and will be amended to take account of.TRAFALGAR Class being base ported at
3.2	EDC	Operational	Ability to process 2m^3 of effluent per hour.	Adequate design substantiation to meet capacity.	

					Clyde.
3.3	EDC	Operational	Enables transfer of effluent from submarine to facility.	Demonstration during design and commissioning.	
3.4	EDC	Operational	On Site cementation capability.	Adequate design substantiation and plant proving.	This is based on the assumption 1.15 l – that resin contained within the IX column will need to undergo cementation prior to consignment to Drigg.
3.5	EDC	Operational	Receive, assess and store liquids in carboys pending disposal.	NA	
3.6	EDC	Operational.	Temporary storage of effluent in receipt and hold tanks.	Design substantiation.	
3.7	EDC	Operational.	Sampling of effluent	Design substantiation.	
3.8	EDC	Operational.	Discharge of treated effluent.	Design substantiation and SEPA approval of discharge point(s).	Dispersion studies may have to be carried out in support of this new application.
3.9	EDC	Operational.	Adequate mooring, service and discharge connections to a PEB, if a PEB is required as part of the solution.	Demonstrated using Design Change Request and commissioning.	
3.10	EDC	Operational.	Discharge of SuperTET/PET/PEB to the processing facility	Demonstrated using Design Change Request and commissioning.	
3.11	EDC	Operational	Treatment and disposal of liquid effluent from cleaning processes	Design substantiation and commissioning.	
3.12	EDC	Operational	The waste management capability can store PET / PEB / SuperTET and ancillary equipment.	Design substantiation and acceptance of operability by Facility Operator.	

Solid Waste Capability					
3.13	EDC	Operational	Enable solid waste to be assessed for specific activity and disposed of with domestic waste using the SOLA exemption order and/or shredded and compacted for disposal, placed into drums and transferred to an ISO container for disposal off-site.	Supporting HAZOP identifies hazards and operability associated with this process is acceptable to Facility Operator.	
3.14	EDC	Operational	Enable loading of non-compactable waste into an ISO container under cover.	Design substantiation.	
3.15	EDC	Operational	Enable components and tools to be assessed for activity and contamination.	NA	
3.16	EDC	Operational	Safe loading of the ISO container onto a truck.	Supporting HAZOP identifies hazards and operability associated with this process is acceptable to Facility Operator.	
3.17	EDC	Operational	Enable components to be decontaminated if required and returned for further use.	NA	
3.18	EDC	Operational	There is adequate space to process solid waste.	Acceptable to Facility Operator based on preliminary design.	
3.19	EDC	Operational	Higher activity items (e.g. neutron detectors) to be stored in a shielded storage area between uses or pending disposal.	Design substantiation.	
3.20	EDC	Operational.	Compacting and storage of solid waste.	Design substantiation and supporting HAZOP identifies hazards and operability associated with this process is acceptable to Facility Operator.	
3.21	EDC	Operational	Provides adequate vehicle space for the delivery of solid waste and active components and allows for the movement of solid waste/equipment into a solid waste processing facility	Supporting HAZOP identifies hazards and operability associated with this process is acceptable to Facility Operator.	
3.22	EDC	Operational	Monitoring of solid waste/equipment within the facility		

General Capability Requirements					
3.23	EDC	Detailed Design	Acceptable Detailed design to be provided to the Programme Director for submission through Clyde Due process.	As detailed.	KEY RQT – documentation through "due process"
3.24	EDC	Detailed Design	Reliability data for proposed design components to be provided to support the Safety Justification.	Detailed in design substantiation and acceptable to SDCC.	
3.25	EDC	Detailed Design / Commissio ning	Testing and Commissioning requirements to be provided.	Accepted by SDCC and NSAG.	
3.26	EDC	Detailed Design	Proposed outline installation/construction method statements to be provided to meet NSAG requirements.	As detailed.	
3.27	EDC	Detailed Design	Operating and maintenance Manuals to meet FO requirements.	As detailed.	
3.28	EDC	Technical & Safety Case	Demonstration that the specification for the works are in accordance with recognised industry, MoD and British Standards.	SDCC acceptance of design substantiation.	
3.29	EDC	Technical & Safety Case	All materials proposed to be utilised in the works must be of adequate quality for their intended purpose and shall be from suppliers operating a Quality Assurance system in accordance with BS EN ISO 9002 or equivalent.	Clyde intelligent customer acceptance within quality management plan / supporting documentation.	
3.30	EDC	Technical & Safety Case	Provide all detailed Design Substantiation Reports (DSRs), Technical Reports (TRs), Design Reports (DRs) and Safety Commissioning Schedule (SCS) required to fully demonstrate compliance with the MoD ACs and SPSCs.	Acceptance via Clyde due process.	
3.31	EDC	Technical & Safety Case	The Facility will be covered by an approved safety case, which will evolve from the approved and endorsed Safety Justification Plan and PCSR as the design progresses.	Acceptance via Clyde due process.	

3.32	EDC	Defects Liability	Compliance Period Services will not be required for this Project. However, a Defects Liability Period of 1 year will be required from the date of Contract Completion to account for any defects arising as a result of design or construction defects. This applies only to systems / equipment / components provided by the contractor.	As detailed.	
3.33	EDC	Technical and Safety Case.	Movement and monitoring of solid and liquid waste will reduce exposure and radiological risks to levels ALARP and takes cognisance of the principles of BPM.	Safety Case demonstration accepted vie Clyde due process.	
3.34	EDC	Technical and Safety Case.	Review of Technical Reports: To be submitted through Clyde due process and, where the classification/categorisation dictates whether they should be submitted for ITA.	As detailed.	
3.35	EDC	Technical and Safety Case	The principles of JSP518 will be followed for the construction of an NSI facility, with the production of a SJP, PSR, PCSR, PCmSR and POSR.	Documents meet principles of JSP 518 and are accepted by Clyde Intelligent Customer, based on advice from Clyde due process.	
3.36	EDC	Technical and Safety Case	The management of radioactive waste, in its entirety, must be demonstrably 'Best Practicable Means'.	Demonstration, via safety case documents (primarily POSR) are accepted by Clyde Intelligent Customer, based on advice from the BRPA.	EDC will need to ensure that the BPM study for the new capability is carried out at the start of the process.
3.37	EDC	Maintenance.	Maintenance of process plant is considered in design.	Acceptance by SDCC.	
3.38	EDC	Project Management	Construction operations will incorporate measures to avoid environmental contamination on or off site.	Demonstrated in accordance with CDM regulations and accepted by EDC.	
3.39	EDC	Project Management	An early submission of the design would enable an 'Agreement in Principle' from SEPA and	SEPA acceptance of design.	KEY REQ'T. Recommend that the 'multimedia'

			DNSR before starting construction activities. The preparation of this submission will need to be included as part of the project and again will require a significant level of RSA93 understanding and knowledge.		submission for agreement to dispose of radioactive waste is completed as soon as practical after we have agreed the design of the new facility.
3.40	SFM	SQEP	SFM to provide the 'Intelligent Customer' role, including review and oversight of the project.	Nominated individual to represent SFM, with adequate understanding of effluent processing and experience in similar projects.	KEY RQT
3.41		Operational	First Nuclear use (FNU) of new facility by 14 Feb 2014.	As detailed.	KEY REQT

4 CONTEXT DOCUMENTS AND REFERENCES

A. Acquisition Operating Framework
http://www.aof.mod.uk/aofcontent/tactical/randa/content/urdstructure.htm.

B. HMNB Clyde Radioactive Effluent Disposal Facility – Write Off of Expenditure. D/FINO/100/1/26/1 dated 19 Mar 08.

C. Active Processing Facility and Radioactive Effluent Disposal Facility Periodic Safety Review Conditional Safety Justification for Life Extension, Issue 1 Nov 2007.

D. STA780056 Rev 401, Radioactive Processing Facility Strategic Project Brief.

E. Demonstration of Best Practicable Means (BPM) for the Handling, Movement, Processing, Storage and Disposal of Radioactive Waste at HMNB Clyde Faslane.

F SNIFFER UKRSR05: BPM for the Management of Radioactive Waste March 2005.

5 GLOSSARY

AC	Authorisation Condition
ALARP	As Low As Reasonably Practicable
AOF	Acquisition Operating Framework
APF	Active Processing Facility
BNS	Babcock Naval Services
CDM	Construction (Design and Management)
CNSC	Clyde Nuclear Safety Committee
CSPD	Clyde Strategic Programme Directorate
DAP	Duly Authorised Person
DNSR	Defence Nuclear Safety Regulator
DR	Design Report
DSR	Design Safety Report
EDC	Estates Directorate Clyde
FO	Facility Operator
HMNB	Her Majesty's Naval Base
HSA	Head of Safety Assurance
IPR	Independent Peer Review
ITA	Independent Technical Assessment
KUR	Key User Requirement
MCA	Maritime Coastguard Agency
MoD	Ministry of Defence
NBDD	Naval Base Design Department
NCG	Nuclear Compliance Group
NII	Nuclear Installations Inspectorate
NSAG	Nuclear Services Authorisation Group
NSI	Nuclear Safety Implicated
NSSSC	Nuclear Site Safety Sub-Committee
NUB	Northern Utilities Building
PCmSR	Pre-Commissioning Safety Report
PCSR	Pre-Construction Safety Report
PEB	Primary Effluent barge
PET	Primary Effluent Tank
PM	Project Manager
PMP	Project Management Plan
POSR	Pre Operational Safety Report
PSR	Preliminary Safety Report
REDF	Radioactive Effluent Disposal Facility
RPF	Radioactive Processing Facility
RQT	Requirement
RRA	Rolls Royce and Associates
SCS	Safety Commissioning Schedule
SDCC	Safety Design Control Committee

SEPA	Scottish Environmental Protection Agency
SFM	Superintendent Fleet Maintenance
SJP	Safety Justification Plan
SPSCs	Safety Principles and Safety Criteria
SSON	Single Statement of Need
TR	Technical Report
WSMI	Warship Support Management Initiative

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