

Environmental Management Plan 2020

Submarine Dismantling Project

Initial Dismantling at Rosyth Business Park

Nuclear Licensed Site



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Executive Summary

Consent was granted in October 2014 by the Office for Nuclear Regulation to Rosyth Royal Dockyard Limited to undertake decommissioning (dismantling) of the seven out-of-service defueled submarines at Rosyth Business Park.

The Consent was granted with six Conditions, four of which relate to the required Environmental Management Plan. An annual Environmental Management Plan must be prepared that identifies mitigation measures, reports on their implementation, effectiveness, progress of the decommissioning work and reports on changes to such measures in light of experience. The project shall be carried out in accordance with the Environmental Management Plan.

This document describes the environmental mitigation measures that have been in place for the Stage 1 of the Initial Dismantling of the laid-up submarines Swiftsure and Resolution, and are continuing for the laid-up submarine Revenge.

Authorisation was received from the Scottish Environment Protection Agency on 1st December 2016 for the discharge of radioactive waste from Initial Dismantling at Rosyth Business Park. The Authorisation (now replaced by a Permit under the Environmental Authorisations (Scotland) Regulations 2018) had reduced gaseous and aqueous discharge limits, thus reducing the potential maximum (if not actual) radiological discharges to air and water. Following this, Low Level Waste removal from Laid Up Submarine Swiftsure commenced in December 2016, with the removal of in-scope ship's system equipment through the specialist In-Dock Installation Facility to the dockside.

Active waste is sent to the Active Waste Accumulation Facility to allow processing and dispatch, with metallic waste then going to a specialist contractor for recycling or disposal. Reassurance monitoring of Out of Scope waste is carried out in the Reassurance Monitoring Facility adjacent to No.2 Dock before dispatch for recycling or disposal.

Low Level Waste removal from Laid Up Submarine Swiftsure was completed on time and to budget and the boat was returned to afloat storage. The active metallic waste dispatched to the specialist contractor is undergoing final tests to maximise opportunities for reuse/recycling.

After de-lagging of the Reactor Compartment and subsequent disposal of radiologically contaminated asbestos, initial dismantling of the second Laid Up Submarine Resolution was completed in March 2020. Laid Up Submarine Revenge then entered No.2 Dock for Low Level Waste removal with a possible extension of scope whereby large items of LLW may be removed.

Stage 2 activities are currently in concept design phase and are a joint effort between Babcock and the MOD. A down-selected methodology has been defined early in 2020, however, the MOD requested that further work be carried out on an alternative solution to ensure that the down-selected option remains the appropriate solution for the site. This is currently ongoing. The Office for Nuclear Regulation and the Scottish Environment Protection Agency are regularly consulted on the Stage 2 design process and the supporting organisation.

An examination of environmental performance in this fourth year of operation shows the project is being satisfactorily carried out in compliance with its Authorisation and Consent and with lessons learned that are benefiting the dismantling process and will do so in the future. A number of Key Performance Indicators have been identified and show continued benefits and environmental compliance.

There are no significant changes to the mitigation measures that were submitted in 2014 in the Environmental Statement and in subsequent Environmental Management Plans.

A copy of this document will be sent to the Office for Nuclear Regulation and be made available to the public. Copies will be held at Parkgate Library, Parkgate, Dunfermline KY11 2JW and at Babcock Visitor Centre, Rosyth Business Park, Rosyth, Dunfermline KY11 2YD.

Abbreviations/Definitions

Abbreviation	Definition
ALARP	As Low As Reasonably Practicable
AWAF	Active Waste Accumulation Facility
BPM	Best Practicable Means
EAR	Environmental Aspects Register
EASR18	Environmental Authorisations (Scotland) Regulations 2018 (<i>replaced RSA93 on 1st September 2018</i>)
EIADR	<i>Nuclear Reactors</i> (Environmental Impact Assessment for Decommissioning) Regulations 1999 as amended in 2006 and 2018
EMP	Environmental Management Plan
EMS	Environmental Management System
ES	Environmental Statement
ETC	Effluent Transport Container
GDF	Geological Disposal Facility
H&S	Health and Safety
HECA	Hazard Evaluation & Consequence Assessment
HEPA	High-Efficiency Particulate Air
HGV	Heavy Goods Vehicle
HP	Health Physics
ID	Initial Dismantling
IDI	In-Dock Installation (Facility)
ILW	Intermediate Level (Radioactive) Waste
ISD	In Situ Dismantling

ISO	International Organisation for Standardisation
KPI	Key Performance Indicator
LAM	Large Articles Monitor
LfE	Learning from Experience
LLC	Local Liaison Committee
LLW	Low Level (Radioactive) Waste
LLWR	Low Level Waste Repository
LUSM	Laid Up Submarine
MOD	Ministry of Defence
NERO	Nuclear Emergency Response Organisation
NMP	Nuclear Maintenance Procedure
NTB	Non Tidal Basin
NVQ	National Vocational Qualification
ONR	Office for Nuclear Regulation
Out of Scope	'Out of scope' of regulation. Effectively, 'out of scope' equates to 'not radioactive' for the purposes of the legislation and not subject to any regulatory requirement.
PETP	Portable Effluent Treatment Plant
PST	Primary Shield Tank
RAMS	Radiation Alarm and Monitoring Systems
RC	Reactor Compartment
RCL	Radiochemistry Laboratory
RPV	Reactor Pressure Vessel
RRDL	Rosyth Royal Dockyard Limited

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RSA 93	Radioactive Substances Act 1993 (<i>now replaced by EASR18</i>)
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SADP	Survey and Docking Period
SDP	Submarine Dismantling Project
SEPA	Scottish Environment Protection Agency
SPA	Special Protected Area
SQEP	Suitably Qualified and Experienced Personnel
SRF	Ship Recycling Facility
SSSI	Site of Special Scientific Interest
UNS	Urenco Nuclear Stewardship
VETS	Vessel Equipment Tally System
VOC	Volatile Organic Compounds

1. Introduction

An Environmental Management Plan (EMP) is required following the granting of Consent by the Office for Nuclear Regulation (ONR) to undertake decommissioning (dismantling) of the seven out-of-service defueled submarines at Rosyth Business Park.

Rosyth Royal Dockyard Limited (RRDL) at Rosyth Business Park applied for Consent under the Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations 1999 (as amended) (EIADR) [Reference 1]. An Environmental Statement (ES) [Reference 2] was submitted, as is required by the Regulations.

The Consent was granted in October 2014 [Reference 3] with six Conditions, four of which relate to the required EMP. The ONR Decision Report and the Conditions can be viewed on the ONR website.

The EMP is a stand-alone document that reports on the progress of the decommissioning project over a period of time and which is submitted annually to the ONR. As such, an EMP identifies mitigation measures, reporting on their implementation and effectiveness and any changes to such measures in light of experience.

This, the seventh EMP, reports on the work undertaken on the Submarine Dismantling Project (SDP) at Rosyth Business Park from September 2019 to August 2020.

2. Scope of the Environmental Management Plan

2.1 Initial Dismantling

Initial Dismantling (ID) forms a part of the Ministry of Defence (MOD) wider SDP. This encompasses the provision of facilities, personnel and processes to dismantle twenty-seven defueled nuclear powered submarines of past and current in-service classes. Its stated aim is to ensure that the implementation of any solution is safe, environmentally responsible, secure, cost-effective and inspires public confidence.

MOD/Babcock have developed a staged approach to ID. The two stages are defined as follows:

- Stage 1, involves the docking of the submarine and removal of the majority of the Low Level radioactive Waste (LLW) primarily within the Reactor Compartment (RC). Stage 1 is generally co-incident with the routine docking and maintenance of each laid-up submarine.
- Stage 2, will involve removal of the remaining LLW and the Intermediate Level radioactive Waste (ILW), namely the Reactor Pressure Vessel (RPV) and associated plant.

The project continually assesses the lessons learned from dismantling each submarine in order to improve the dismantling process and their supporting facilities for the remaining submarines. This demonstration also refines and confirms the rigorous safety and security procedures which are followed in the design and operation of the dismantling facilities and processes, and validate radiation dose and discharge projections.

2.1.1 Stage 1 ID Programme Overview

On 1st December 2016, two necessary 'permissions' were issued by the Scottish Environment Protection Agency (SEPA). These were the Letter of Approval allowing the MOD to dispose of solid and liquid radioactive waste by transfer to RRDL and the Authorisation granted to RRDL under the Radioactive Substances Act 1993 (RSA93) [Reference 4], allowing the disposal of LLW in solid, liquid and gaseous form; with limits being set on the discharge of liquid and gaseous wastes to the environment¹.

Following this, Stage 1 dismantling of the first 'demonstrator' submarine, Laid Up Submarine (LUSM) Swiftsure commenced in December 2016. The waste generated is segregated in two separate waste streams, active and non-active (Out of Scope)². The active wastes are then sub-divided into solid radioactive waste suitable for disposal in normal refuse/hazardous waste or LLW. The former goes to landfill, the latter goes for melting followed by segregation, which is then recycled where possible or disposed of. The first transfer of ship's system LLW was made in June 2017 through the specialist In-Dock Installation (IDI) Facility to the dockside.

Active waste is transported to the Active Waste Accumulation Facility (AWAF) and is anonymised, packaged and transported to a specialist metal re-cycler.

Non active waste is identified at source based on the fact that there is no, or minimal, likelihood that it has come into contact with radioactive material or has been activated. This waste is sent to the Reassurance Monitoring Facility adjacent to No. 2 Dock to verify it can be disposed or recycled as Out of Scope waste. The verification is completed using the Large Articles Monitor (LAM). Disposal of such material is via conventional means. Recycling or disposal methods follow a best practicable means approach when removing waste from site.

LLW dismantling of LUSM Swiftsure has been completed successfully, and completed hull restoration works allowed undocking and her return to her berth in the Non-Tidal Basin (NTB) on 27th August 2018. By March 2019, all Swiftsure solid waste had been consigned off-site for final treatment and disposal and the small volume of liquid waste processed. The Swiftsure contract was delivered on time and to budget.

LUSM Resolution was docked down on 13th December 2018. Completion of removal of Stage 1 LLW has now occurred and she returned to afloat storage on 9th March 2020. LUSM Revenge was subsequently docked on 20th March 2020 and Stage 1 Removals are currently underway. Large LLW removals are planned to occur in mid-2021 subject to contractual agreement with the MOD.

Stage 2 has completed the optioneering phase, however, further work is being undertaken on a customer proposed methodology to determine whether it is more appropriate for the Rosyth site. Further optioneering will take place if initial studies confirm this methodology to be a viable option.

¹ Note that RSA93 legislation has been superseded by the Environmental Authorisations (Scotland) Regulations 2018 (EASR18), [Reference 5] and the Authorisations have been re-issued as Permits with some additions.

² Out of Scope equates to 'not radioactive' for the purposes of the legislation and not subject to any regulatory requirement.

2.1.2 Scope of this Document

The content and format generally follows guidance issued by the ONR and includes a description of management systems and procedures, reporting progress of the dismantling project and the mitigation measures employed. It examines RRDL's environmental performance, detailing the main impacts of the work and lessons learned. The work planned for the next year is also described.

2.1.3 Matters outside the Current Scope of this EMP

The EMP is updated annually and consequently the detail will change as the project moves through implementation and then to closure. Any changes to the project will be reported.

A high level description of the current Initial Concept Design of Stage 2 is given in Section 5.4. It is likely that another submarine will undergo Stage 1 LLW removal prior to any Stage 2 dismantling.

2.2 Matters outside the Scope of the EMP

Activities within the greater SDP beyond ID are the responsibility of the MOD and not of RRDL and will not feature in the EMP, other than as a brief mention. These include:

- Site selection, construction and operation of the interim ILW store to which the removed RPVs will be transported and stored until the Geological Disposal Facility (GDF) is available for final disposal. The MOD signed a contract in 2017 with Urenco Nuclear Stewardship (UNS) for the storage of the RPVs in an existing facility (to be upgraded) at Capenhurst in Cheshire.
- Design and procurement of an RPV transport container and subsequent transportation to the interim store.
- Final dismantling and recycling of the materials of the radiologically cleared submarine hulk in a licensed UK ship recycling facility.
- The dismantling of the 20 submarines at Devonport

2.3 Geographical Scope

The Plan is centred on the areas of operation within Rosyth Business Park and its immediate environs of the Forth Estuary and the adjacent residential areas. ONR is satisfied that SDP ID at Rosyth is unlikely to have significant environmental effects on other European Economic Area States and thus specific mitigation measures are not required.

2.4 Environmental Assessment Topics included within the EMP

These were assessed in the Environmental Statement (ES) and the mitigation measures then put forward are reviewed and updated and are included as Appendix B.

The topics are:

1. Radioactive Discharges.
2. Air Quality and Climate.
3. Flora and Fauna (Ecology).

4. Landscape and Visual Amenity.
5. Material Assets including Cultural Heritage.
6. Population, Socio-Economics and Health and Wellbeing.
7. Soil, Geology, Hydrogeology and Land Contamination.
8. Water Quality and Resources.
9. Noise, Vibration and Nuisance, including Dust Emissions.
10. Traffic and Transport.
11. Waste Management and Sustainability.
12. Land Use and Materials.
13. Interaction of Project Impacts and other Developments.

3. The Site and Surrounding Areas

3.1 Site Description

Rosyth Business Park is situated at Rosyth near Dunfermline in the county of Fife, Scotland. It is on the north bank of the environmentally and commercially important estuary of the River Forth, about 2km west (upstream) of the Forth Rail Bridge and the two Forth road bridges, the new Queensferry Crossing carrying the M90 and the original Forth Road Bridge that is the public transport corridor.



Figure 1: General Location Plan

The defueled laid up submarines are berthed on the southern side of the NTB. Dismantling is undertaken within the nuclear licensed site at Dock No. 2, a massive concrete and granite structure, with the entrance from the NTB fitted with a steel caisson. Dock drainage is normally to the NTB. Surface water from the Business Park areas discharges at authorised discharge points to the NTB and to the Forth Estuary.

The AWAFF is a purpose built facility for the characterisation, treatment and dispatch of solid LLW in preparation for its disposal and for the safe storage of ILW. The AWAFF forms part of the nuclear licensed site but is separate from Dock No. 2 and is within its own secure compound.

Immediately downstream on the eastern side of the Rosyth Business Park is the Port of Rosyth and an area of land zoned for future employment development. Collectively, the area is known as the Rosyth Waterfront.

3.2 Sensitivity of the Receiving Environment

The main settlements nearby are Rosyth and Dunfermline to the north but there is no resident population within 0.5km of the site in any direction. The Heavy Goods Vehicle (HGV) traffic route to and from the Business Park and the M90 follows the lower road through the industrial Rosyth Waterfront and not through residential areas.

Rosyth Business Park is located adjacent to the sensitive environment of the Firth of Forth Special Protected Area (SPA) and Ramsar Wetland of International Importance. The SPA is underpinned by the Firth of Forth Site of Special Scientific Interest (SSSI). Upstream is the Special Area of Conservation (SAC) of the River Teith, a tributary of the River Forth. Radioactive aqueous discharges from RRDL are made to the Forth Estuary, in compliance with the Permit under EASR18.

There is little floral and faunal diversity within the Business Park and all the sites where ID activities take place have hard cover and are in current industrial use. There are no natural streams flowing through the Business Park.

ONR concluded in its Decision Report [Reference 3] that in its opinion, the ES (including evidence) showed overall, the predicted environmental benefits far outweighed any adverse environmental effects of the project.

There were no impacts judged to be significant.

3.3 Stakeholder Engagement

Stakeholder engagement is largely through the Local Liaison Committee (LLC) meetings that are held at Rosyth Business Park, however, due to the COVID19 pandemic the 2020 LLC has been deferred. The site looked at a remote meeting but the decision was taken to prepare an interim brief to be sent to committee members. This was sent to members including site regulators on 27th May 2020 with invitations to comment. No comments were received from the stakeholders. The meeting will be held when it is appropriate to do so, working within government guidelines.

ONR have stated a requirement to review the site Hazard Evaluation & Consequence Assessment (HECA) under the new legislative conditions of the REPPPIR regulations. This was done on site and supplied to the local authority in October 2019.

The HECA demonstrated that the bounding radiological accident on site does not require an off-site plan. This provides the local authority with the evidence that they do not need to establish an off-site capability for site emergencies.

4. Management Arrangements

4.1 RRDL Management System

RRDL has management systems in place to ensure compliance with all health, safety and environmental protection requirements and to secure a high standard of performance in all its undertakings. Contractors working within Rosyth Business Park are required to conduct their operations in the same manner. The overarching Environmental Policy [Reference 6] is reproduced as Appendix A.

Documentation supporting and implementing the corporate policy statements follows a tiered system from Company Procedures prescribing the controls for specific subject areas through to working level instructions and procedures.

4.1.1 Quality Assurance

The associated business entities of RRDL are certified to BS EN ISO 9001: 2015³, this management system is third party certified by Lloyd's Register Quality Assurance.

4.1.2 Health and Safety Assurance

The associated Health and Safety (H&S) business entities of RRDL were certified to the OHSAS 18001:2007⁴ at the end of August 2020 and were working towards the International Organisation for Standardisation's (ISO) ISO 45001 that has replaced it. This accreditation was achieved on the 22nd September 2020.

There was one RIDDOR reportable accident⁵ in February 2018. 822,534 project hours have been executed and recorded between Feb 2013 and Aug 2020. A number of safety initiatives have been introduced, together with training and workshops for safety culture improvement.

4.1.3 Conventional Environmental Management

The associated business entities of RRDL have been awarded ISO 14001 certification continually since February 2013 and successfully transitioned to the 2015 version in August 2018. Certification confirms its Environmental Management System (EMS) has been approved by Lloyd's Register; the approval certificate identity number is 10125654.

The EMS Manual [Reference 7] details the series of environmental management Policy and Procedures documents and is promulgated by a robust education and awareness programme. Conventional

³ Quality Management Systems. Standard by British Standard / European Standard / International Organization for Standardization, 2015.

⁴ OHSAS 18001, Occupational Health and Safety Assessment Series, is an internationally applied British Standard for occupational health and safety management systems.

⁵ RIDDOR, Reporting of Injuries, Diseases and Dangerous Occurrences Regulations, 2013 regulates the statutory obligation to report deaths, injuries, diseases and "dangerous occurrences", including near misses that take place at work or in connection with work.

environmental issues are managed through the Environmental Aspects Register (EAR) that is the heart of the ISO 14001 certified EMS.

The SDP ID operations have EARs for activities in Survey and Docking Period (SADP), the AWAFF, the Health Physics (HP) Laundry, the Radiochemistry Laboratory (RCL), the Emergency Response Centre, the High Intensity Calibration Centre, and LUSM Maintenance [References 8, 9, 10, 11, 12, 13 and 14]. These are each 'owned' by the manager of the relevant operation and record a description of each environmental aspect (activity or process) and the significance of its impact on the environment. It links each aspect to relevant control mechanisms⁶, highlighting any environmentally critical control equipment.

The content of the EARs was highlighted by Lloyd's auditors during an ISO14001 surveillance visit as it was not deemed to be detailed enough. The auditor considered that the appropriate actions were being performed, however, the recording process was insufficient. After a review, there are now eight EARs. The existing EARs were reviewed by the owners in conjunction with the Safety, Health and Environment department and up-issued. A subsequent Lloyds audit has re-examined the EARs and they are now considered to be satisfactory. As such, the recommendation has been recorded as closed.

Babcock Marine has developed a sustainability strategy to align its Environmental, Social and Governance arrangements with 11 of the United Nations Sustainable Development Goals. The strategy moving forward is;

2020/2021 – Create awareness and begin implementation where appropriate

2021/2022 – Measure and Analyse by continued data collection and analysis with respect to codes and standard

2022/2023 – Implement Change based on analysis of data.

RRDL will align and comply with the corporate strategy.

4.1.4 Nuclear and Radiological Safety

A series of Policy and Procedures documents govern nuclear related activities at Rosyth Business Park. The principal Company Procedure is the Nuclear Safety Management Manual [Reference 15] and specific instructions that implement the arrangements described in the Manual are defined in departmental procedures and instructions.

Arrangements for compliance with Licence Conditions are routinely inspected by the ONR. Inspections seek to judge both the adequacy of the arrangements and their implementation. ONR issues quarterly reports [Reference 16] regarding site inspections made and any resultant actions. In the LLC meeting April 2019, [Reference 17], the ONR statement confirmed that Rosyth is classed as a routine attention category, which recognises the level of radiological hazard on-site is low. ONR is "satisfied" with RRDL's overall safety performance after carrying out interventions on-site throughout the past year, with no enforcement actions having to be taken on-site as a result of RRDL's interaction with them.

⁶ Relevant control measures are local or company policies, procedures, process maps, risk assessments and other engineered control mechanisms and equipment.

SEPA reported that for 2019, RRDL's environmental performance as assessed under SEPA's Compliance Assessment Scheme is 'excellent'. Upgrades to the ventilation High-Efficiency Particulate Air (HEPA) filtration systems testing arrangements were required to ensure full compliance with the conditions in the Permit issued under EASR18 have been completed. An injection point has been installed as well as an upstream (pre-filter) and downstream (post filter) sampling points on all systems which did not meet current Nuclear Industry guidance. This was the case across the five main filter banks in AWAf room 7.2 and the standalone office ventilation system in the filter room above the offices. The work was completed and tested using the steps set out in Nuclear Maintenance Procedure (NMP) 1533 [Reference 18].

Upgrades to the liquid effluent storage tanks at the RCL and HP laundry were also required to ensure compliance with the conditions in the Permit. RRDL has provided SEPA with a programme for addressing these issues and SEPA is monitoring progress. See Section 5.3.

Two emergency response exercises were carried out in between September 2019 and August 2020. The first was held on 11th September 2019 and was an internally assessed training event. The second was held on 25th September and was a major live play exercise based on the 2 dock licensed site. This exercise involved participation from all of the emergency services and was assessed by ONR who observed that it was an 'Adequate' demonstration of RRDL's arrangements. ONR also noted that the scenario was particularly challenging for the response team.

4.1.5 Energy Management

Babcock in its Energy Policy [Reference 19] states its commitment to reducing the site's carbon footprint and in the Environmental Policy [Reference 6] to maximise utilisation of renewable energy sources.

4.2 Radioactive Waste Management

The Company Procedure, Radioactive Waste Management [Reference 20] contains instructions for the management of radioactive waste at Rosyth Business Park.

Radioactive waste is produced in the dismantling of the laid up submarines and from the supporting operations of the Portable Effluent Treatment Plant (PETP), AWAf, RCL and HP Laundry.

The policy of RRDL for the management of radioactive waste is as follows:

- a. To ensure that work is planned so as to minimise the production of radioactive waste.
- b. To remove radioactive waste from the workplace as soon as practicable.
- c. To ensure that exposures to ionising radiation during the handling and processing of radioactive waste are As Low As Reasonably Practicable (ALARP).
- d. To ensure that the risks to workers and to members of the public from the management of radioactive waste are ALARP.
- e. To make optimum use of authorised disposal routes and to reduce the volume of waste by the Best Practicable Means (BPM).

Document No: 1411017**4.2.1 Waste Hierarchy**

It is an underpinning part of RRDL policy for the management of all wastes at Rosyth Business Park (including radioactive waste), that the principles of the Waste Management Hierarchy are applied (see Figure 2 below).

This policy is applied throughout all work from the planning stages onwards.

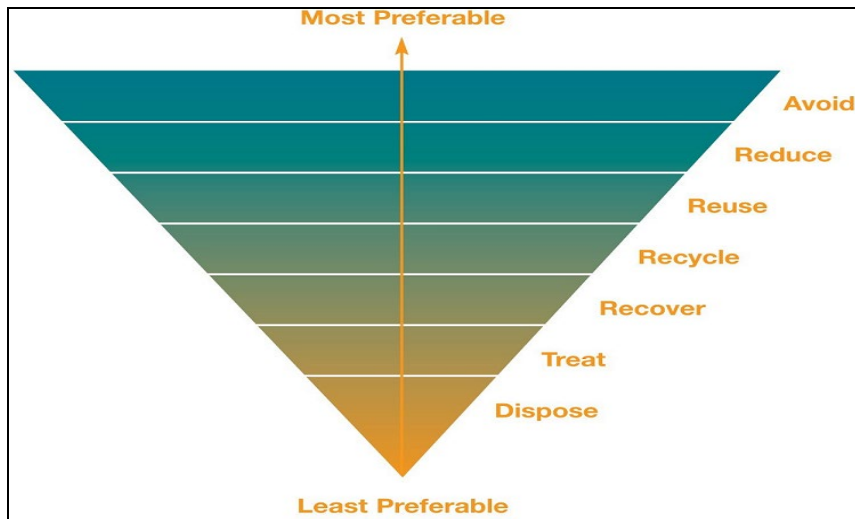


Figure 2: Waste Management Hierarchy (reproduced from Reference 20)

Where characterisation indicates that materials are contaminated rather than activated, treatment and recycling routes are used.

4.2.2 Management Strategy for Wastes from SDP ID

Management of all types of waste envisaged to be produced during Stage 1 ID within the SDP are communicated in the SDP Waste Management Policy Document [Reference 21] and supporting documents.

The activities and processes of the dismantling and removal of waste from the RC is managed by use of Logic Linked Nuclear Procedures. These manage waste segregation in the IDI Facility as LLW or 'Out of Scope' by a combination of provenance and radiological monitoring, transport to the AWAFF or Reassurance Monitoring Facility, subsequent further monitoring, treatment and dispatch – this all under HP control. Every item removed from the RC bears a unique identification using a Vessel Equipment Tally System (VETS) that is followed and updated through the entire process, recording detailed information about the item. This generates an auditable trail through the waste management streams and subsequent disposal.

Monitoring and mitigation strategies are described in some detail in Sections 7.2 Environmental Management for Phase 2, LLW Removal in the EMP for 2017 and mitigation measures are summarised here in Appendix B, Mitigation Measures Minimising Environmental Impacts.

4.3 Learning from Experience

The Project has adopted a Learning from Experience (LfE) system whereby experiences or issues that may be beneficial or problematic to the project are identified – these are captured, assigned an owner and entered in the Register. Each experience or issue is impact assessed and actions taken forward. These matters are discussed regularly and the lessons learned are promulgated and incorporated into the project methodology.

Also current are the Continuous Improvement Register, Babcock’s Accident and Incident Reporting System (Synergi Life) reporting accidents, faults and near misses and the ‘That’s Not Right’ boxes for suggestions. These systems all add to the ‘No Blame’ culture of encouraging reporting and improvements.

5. The Project Activities, September 2019 to August 2020

5.1 LUSM Resolution Stage 1 Dismantling

Stage 1 dismantling of LUSM Resolution was completed on 9th March 2020 when she was returned to the NTB for a period of storage afloat. LLW removal has proceeded to plan.

5.1.1 Waste Disposal

In the period September 2019 to March 2020, 41.66 tonnes of active metallic (M1) waste and 0.258 tonnes of soft waste were removed from Resolution to the AWAF. No liquid effluent (residual water within the primary circuit systems) was removed in this period from Resolution to the AWAF. Figure 3 displays the total waste removed from Resolution over the course of her entire time in the dock.

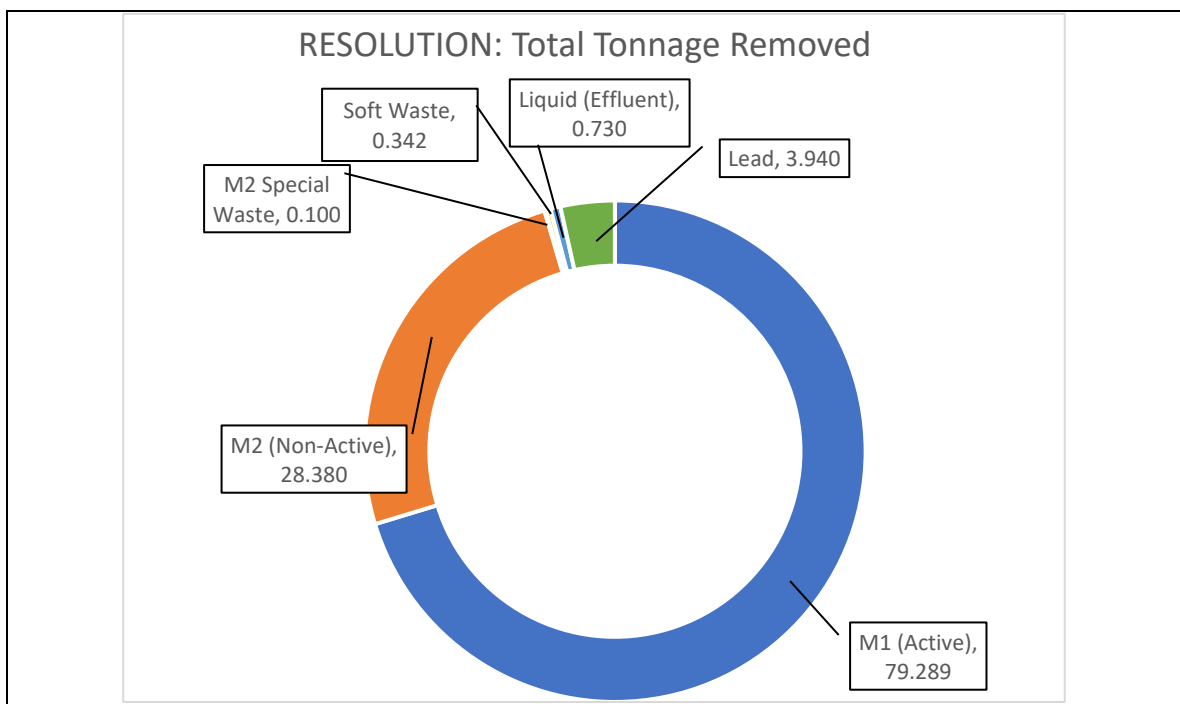


Figure 3: Total Waste Removed from Resolution in Stage 1 ID (tonnes).

5.2 LUSM Revenge

The Inventory of Hazardous Materials has been compiled for Revenge. Due to the similarity between the Resolution and Revenge RCs it was decided that a laser scan of the Revenge RC would not be performed and that 360° photos satisfied the engineering requirements.

Revenge docked down in No. 2 Dock on 20th March 2020 for commencement of LLW removal. There was no hard metal LLW transferred to the AWF from Revenge dismantling between March 2020 and 31 August 2020. A contract to remove large items of LLW (the Pressuriser and two Steam Generators) is currently being produced, the work for which will be completed in 2021.

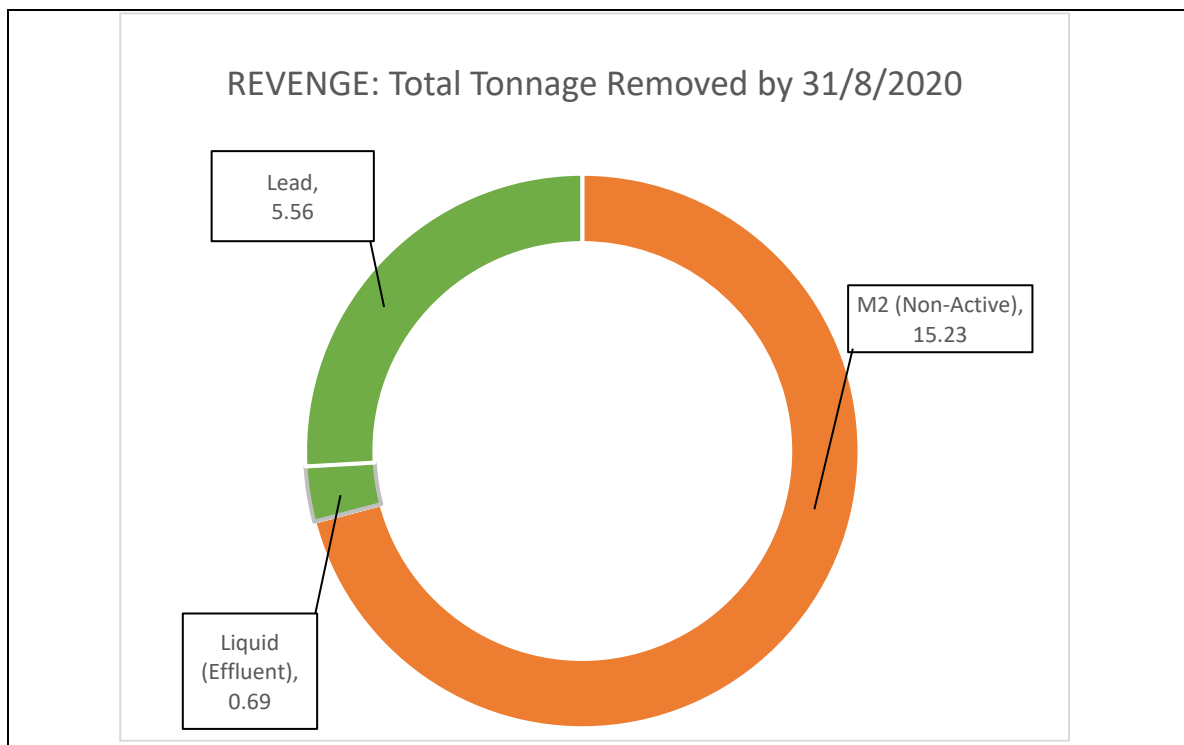


Figure 4: Waste Removed from Revenge in Stage 1 ID (tonnes) to 31/8/20

5.2.1 Asbestos-Contaminated Lagging Disposal

Assessment of the data resulting from a detailed sampling and analysis plan for Revenge asbestos contaminated lagging demonstrated that the lagging needed to be classified as radioactive waste. However the low radioactivity content of the lagging waste made it suitable for disposal in normal refuse under the standard condition G.3 to RRDL's Environmental Permit under EASR18.

Revenge was delagged whilst afloat in the NTB and the waste stored onboard until it was brought into No.2 Dock as agreed with SEPA and MOD. The bags of hazardous asbestos contaminated lagging waste were removed from Revenge and assayed using the Large Articles Monitor in the AWF. The bags filled four asbestos skip containers, which were disposed of to the Avondale Authorised Asbestos Disposal Site at Polmont near Falkirk in June 2020. There, it was disposed of in a capped asbestos cell which provides an additional and robust layer to protect the environment. The total weight for the four consignments was 11.29 tonnes.

5.3 Other Supporting Works

The RCL received UKAS re-accreditation in 2018 and is able to conduct all routine radiochemical analytical work required to support SDP. A surveillance visit took place in September 2019 and was successful.

The present underground storage tank that holds the RCL aqueous waste before treatment and disposal is to be replaced in order to best comply with conditions within the Environmental Permit from SEPA issued under EASR18. Initially it was thought that above ground storage was achievable, however, it was not possible to identify a suitable location for the tank without incurring substantial additional costs remediating ground which, although the site is owned by RRDL, is not currently allocated to the project. Instead, a minimum 2000l fully bunded tank with leak detection and filtration will be installed in the present tank location. Control of this system will now be remote, meaning sampling, mixing and pumping can be completed without undue risk to the operators.

The HP Laundry aqueous waste will now be stored within a 2000l fully bunded tank with leak detection and filtration inside the laundry as opposed to the confined space where the current tank is located. The effluent generated from the washing machines will be mixed, sampled and, once proven to contain no radionuclides, will be discharged straight to the grey water sewer as agreed with SEPA. Discharge rates from this system will be recorded using an inline effluent counter.

Progress on the upgrades to both the waste storage tanks has been impacted by COVID19 protocols (see Section 7.1) and discussions with the main contractor who has been contracted to design, manufacture and install the systems.

The new Effluent Transport Container (ETC) for discharges from the HP Laundry has been commissioned and accepted into service.

Further ventilation system improvements were completed as described in Section 4.1.4.

Various repairs and upgrades have been made or are planned to the dock infrastructure and penstocks.

5.4 Stage 2 Activities

Planning for Stage 2 was developed from 2017 Optioneering Studies. The selected solution has been developed to an 'Initial Concept Design' stage, where all fundamental risks have been assessed and understood indicative costs and programme have been developed.

A high-level methodology has been devised whereby:

- The RPV is removed from submarine.
- The RPV is loaded into its bespoke transport container.
- The container is lifted onto transport trailer and consigned to UNS Capenhurst for long-term interim storage, pending GDF and any further treatment required at that time.
- The submarine hulk is remediated and surface towed to a conventional shipbreaker in the UK.

The customer has requested that the site revisit a previously discarded option as a means of developing the feasibility of the methodology which is the preferred option for the site at this stage. As a result of this, a technical and tactical assessment is now ongoing to select the most appropriate means of removing the RPV from the boat.

Stage 2 activities are currently in pre-concept design phase and are a joint effort between RRDL and the MOD. A down-selected methodology was defined early in 2020, however, the MOD requested that further work be carried out on an alternative solution to ensure the down selected option remains the appropriate solution for the site. This is currently ongoing. ONR and SEPA are being regularly consulted on the Stage 2 design process and the supporting organisation.

5.5 Planned Project Activities, September 2020 to August 2021

Activities as described above will continue throughout the remainder of 2020 and in 2021. In addition, the following activities are also planned in this period:

- Transfers of ILW and LLW ion exchange Resins to new containers due to begin early 2021. The final disposals of Resins are currently being planned.
- Design of a new Rosyth Dockyard Radiochemistry Lab will begin in December 2020 with construction expected to begin in late 2021.
- Replacement of the discharge outlet for aqueous liquid LLW to the River Forth is due to be approved and performed in 2021

6. Environmental Performance, 1st September 2019 to 31st August 2020

All activities are conducted within the governance of RRDL environmental management policies and procedures.

6.1 Environmental Performance of Activities

6.1.1 Activities and Impacts of ID Stage 1 of LUSMs Swiftsure and Resolution

The primary and potentially impacting Activities are (see Sections 5.1 and 5.2):

1. Progressive removal of metallic waste materials in the pre-determined order from the RC.
2. Monitoring procedures effecting sentencing of metal wastes to radioactive and 'Out of Scope' waste streams.
3. Disposal of metallic materials for recycling to a Waste Permitted Person (a company permitted under environmental regulations to accept such materials).
4. SADP activities and maintenance/cutting/welding of hull.
5. De-lagging of the RC and disposal of the radiologically contaminated asbestos waste.
6. Disposal of special waste
7. Docking and undocking of submarines.
8. Recruitment and training of additional staff.
9. Lessons Learned

The main Impacts of these activities have been on the following environmental topics:

Radioactive Discharges and Disposals. (See Appendix C, Key Performance Indicators (KPI))

- No LLW metallic waste from Resolution ID has so far been disposed of from site for further treatment and recycling of metals. Approximately 79 tonnes of LLW metallic waste from

Resolution ID continues to be safely stored in the AWAFF, pending the analysis of samples of the waste for characterisation purposes.

- Aqueous wastes were generated from work in the Radiochemistry Laboratory and Health Physics Laundry. The majority of the aqueous waste discharged is from the Health Physics Laundry, associated with the laundering of protective clothing such as coveralls worn by workers engaged on ID work. The radioactive content of these discharges is well within the authorised limits for disposal.
- RRDL successfully disposed of 0.57 tonnes of soft LLW in June 2020 using a specialist UK contractor. This included some legacy waste as well as that generated from ID LLW removal.
- RRDL transferred 14 solid radioactive metal waste samples (ex-LUSM Resolution) to another MOD Naval Site in July 2020 for metallurgical analysis.
- 11.2 tonnes of radiologically contaminated asbestos from Revenge has been disposed of to a UK Authorised Asbestos Disposal Site

Population, Socio-Economic, Health and Wellbeing Characteristics

- The recruitment and training of personnel has been of economic benefit nationally and locally. The project team now totals 141 with four vacancies.
- The training of six additional HP monitors is progressing well. Over this reporting year, approximately 420 hours of training has been undertaken to ensure the team maintains Suitably Qualified and Experienced Personnel (SQEP) for SDP.
- No complaints were received from residents or stakeholders pertaining to SDP operations.

Waste Management and Sustainability.

- 28.38 tonnes of non-active material has been removed from Resolution and discharged for appropriate disposal through the normal Business Park waste management disposal routes and made available for recycling.
- Wastes are disposed of according to the principles of the waste hierarchy.

6.1.2 Other Supporting Works Related Activities and Impacts

The primary Activities were (see Section 5.3):

1. Upgrade of ventilation filtration systems
2. Provision of new liquid effluent storage tanks for the HP Laundry and the RCL. These will best ensure compliance with conditions within the new Permit from SEPA under EASR18. This work is currently ongoing.
3. Maintenance of accreditation of RCL for analytical/characterisation support to SDP activities.
4. Commission of new effluent transport container.
5. Repairs to dock and infrastructure.

The main Impacts of these activities have been on the following environmental topics:

Radioactive Discharges.

Improvements to the ventilation systems and to liquid effluent storage tanks improves RRDL's compliance with SEPA's requirements and minimises risks of unauthorised disposal of radioactive aqueous liquid waste to the environment.

Waste arisings from improvement works were confirmed to be non-radioactive and were disposed of through the normal Business Park disposal routes, with no radiological consequences.

Population, Socio-Economic, Health and Wellbeing Characteristics

Local and regional contractors have been used for upgrade/repair work. The purchase of goods and services has been of economic benefit locally and nationally. The RCL can now give routine and timely support to the project.

No complaints were received from residents or stakeholders.

Waste Management and Sustainability.

Wastes were disposed of according to the principles of the waste hierarchy.

6.1.3 Stage 2 Related Activities and Impacts

The primary Activities were (see Section 5.4):

1. Multi stakeholder involvement in planning for Initial Concept Design, with certain tasks assigned to specialist sub-contractors.
2. Design work taking place in various offices (and homes) around the country

The main Impacts of these activities have been on the following environmental topics:

Population, Socio-Economic, Health and Wellbeing Characteristics

This has provided local work to the project team and to the UK based specialist sub-contractors. The purchase of goods and services has been of economic benefit nationally and locally.

The effects of COVID-19 are addressed in Section 7.1.

6.2 Summary of Employment and Training

Over the past year, the Project team has increased in number from 130 to 141 persons, with 4 vacancies to be filled. A prime concern that has been addressed is the skills transfer from an ageing workforce who have had years of experience of refitting and maintaining the submarines and are retiring, to the younger generation that are continuing the work of submarine dismantling.

Apprentices are now employed on rotation in the operations department. The six trainee HP monitors have obtained a National Vocational Qualification (NVQ) in Radiation Protection in the June 2020. Approximately 420 hours of training has been undertaken to ensure the team maintains SQEP for SDP over the last year, as availability of specialist people is crucial to adherence to the critical path schedule.

6.3 Lessons Learned

LUSM Swiftsure is known as the 'Demonstrator' submarine, being dismantled using the processes intended for the remaining submarines. The project continually assesses the lessons learned from each submarine in order to:

- Improve the dismantling process and the supporting facilities for the remaining submarines.

- Refine and confirm the rigorous safety and security procedures which will be followed in the design and operation of the dismantling facilities and processes.
- Validate radiological dose and discharge projections.

The LfE Register is actively maintained and regular meetings of the team and the MOD ensure lessons are learned. This continues as learning from Resolution continued and dismantling of LUSM Revenge is underway.

A Lessons Learned/Swiftsure Project Closeout Report will summarise the many lessons learned from the LLW removal from Demonstrator Swiftsure. The final information awaited is regarding the nature and effectiveness of treatment of the radioactive metallic waste now with the specialist contractor so that quantities of metal made available for re-use and of residual LLW (to be consigned to the LLWR) are known.

6.4 Summary

The stated aim of the Submarine Dismantling Project is to ensure that the implementation of any solution is safe, environmentally responsible, secure, cost-effective and inspires public confidence. After years of planning, LLW removal from the second submarine, LUSM Resolution has now been completed on time and to budget. There has been continual assessment of the lessons learned in order to improve the dismantling process and the supporting facilities for the remaining submarines with the report on the outcome of LLW metallic waste treatment and disposal still awaited to conclude the Swiftsure Project Closeout Report.

ID of the second submarine LUSM Resolution has been completed and her return to the NTB was achieved on 9th March 2020. LUSM Revenge then entered No.2 Dock on 20th March 2020 for LLW removal with a possible extension of scope whereby larger items of LLW may be removed.

Stage 2 activities are currently in pre-concept design phase and are a joint effort between Babcock and the MOD. A down-selected methodology was defined early in 2020, however, the MOD requested that further work be carried out on an alternative solution to ensure the down selected option remains the appropriate solution for the site. This is currently ongoing. ONR and SEPA are regularly consulted on the Stage 2 design process and the supporting organisation.

The ONR Inspector confirmed no enforcement notices had been issued, signifying that safety arrangements were effective [Reference 16]. SEPA has rated RRDL as Excellent under its Compliance Assessment Scheme, with the two issues of improvements to testing of HEPA filters on active ventilation systems, which are now complete, and the ongoing installation of new liquid aqueous waste tanks for the RCL and HP Laundry being undertaken.

The H&S record is very good – there have been no lost time accidents since that in February 2018 and a total of 822,534 hours have been worked since April 2015.

The prime concern of skills transfer from an experienced workforce to the younger generation able to continue the work of submarine dismantling has taken place. There has been further recruitment (mostly local) and training of personnel during this year, with the shortage of HP monitors being addressed. The Nuclear Operations team now employs apprentices on rotation.

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The project has benefitted the local and national economy with local firms being contracted to undertake infrastructure renovations and asbestos removal. Subcontracting work for Stage 2 is being undertaken by UK firms.

Radiological discharges to the environment are well below the radionuclide limits within the SEPA Permit.

The radiologically contaminated asbestos lagging from LUSM Resolution and LUSM Revenge was disposed of to a local Authorised Asbestos Disposal Site.

Disposal routes for out of scope metallic waste to be made available for recycling/reuse, soft trash (LLW and solid radioactive waste suitable for disposal in normal refuse) and special wastes have been successfully established. Swiftsure's metallic LLW has been treated by the specialist contractor and the "melt report" has been received from Siempelkamp (who were contracted through Tradebe). Following receipt of the report a decision was made on the sentencing of the Swiftsure metallic LLW. A proportion of the ingots were identified as appropriate for decay storage, after which they will be suitable for limited release for use in the nuclear industry in Germany. The rest of the ingots are in the process of being returned to the UK for disposal to an appropriately permitted landfill. Secondary waste generated during the melting process is also being disposed of by the most suitable routes.

A spreadsheet recording project Key Performance Indicators (KPI) is attached as Appendix C, KPI Record and is updated each year. For the 12 month period, September 2019 to August 2020, KPIs identified are:

- Radiological Discharges including LLW metallic waste dispatched for recycling.
- Non-radiological materials dispatched for recycling or for landfill.
- Recruitment of Personnel and Training Hours.
- Complaints from General Public and Stakeholders.
- Manhours Worked and Accidents.

7. Changes to the Project and Environmental Management Plan

Excluding those detailed in Section 7.1, there have been no changes to the Project and to the EMP other than the improvements and refinements brought about by the Demonstration process.

There are no significant changes to the mitigation measures that were submitted in the ES [Reference 2] and in the previous EMPs.

The table describing the Environmental Impacts, Mitigation Measures and Actions is given in Appendix B.

7.1 COVID19 Impacts

Due to the COVID19 pandemic, the site began making preparations for possible shut down in early March 2020. The following arrangements were put in place;

- Preparations to facilitate office workers taking IT equipment home to enable home working.
- Decisions were made regarding essential site maintenance to enable reduced maintenance schedules to be prepared.

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- The HP department was set up for essential working including site watch keeping as part of the Nuclear Emergency Response Organisation (NERO).

On 24th March 2020 all work with radioactive substances ceased and all staff were sent home to comply with government guidance.

The NERO capability has been monitored and maintained throughout the pandemic. The essential maintenance schedule was enacted with the facilities department remaining on site. All office workers were set up to work from home.

Site prepared for limited recommencement of operation in the Nuclear Business Unit on 23rd April 2020 with the return of operations Managers and Supervisors. Processes were put in place to achieve social distancing and an enhanced cleaning regime had been instigated in buildings. Site wide COVID19 risk assessments were established.

Industrial staff started to return on 27th April 2020 in a limited fashion to allow controlled start-up of operations. This was phased to address social distancing measures in an industrial environment. Staff numbers continued to increase until 95% of operational staff had returned by the 1st June 2020. The remaining staff were vulnerable and still shielding under government/NHS guidance. Shift working was employed to facilitate social distancing.

Throughout this period constant communication has taken place with the site external regulators, ONR and SEPA.

7.1.1 ONR

On 17th March 2020 ONR requested that a daily report be submitted containing the following information;

- COVID19 case numbers including those who were self-isolating as a precaution
- Capability of site with respect to normal business
- Capability of site with respect to NERO capability.

The daily reporting requirement was changed to weekly from 27th April 2020 and ceased on the 3rd August 2020.

7.1.2 SEPA

On 24th March 2020 SEPA were informed that all operations with radioactive substances had ceased on site. SEPA requested all Scottish sites to submit a contingency plan to cover any normal reporting figures that could not be achieved due to national lockdown. The first contingency plan was supplied on 9th April 2020 and stated the following;

- RRDL were up to date with solid waste disposal reporting and no further disposals would take place in the foreseeable future.
- RRDL planned no liquid discharges until operations resumed when sampling would also resume.
- Gaseous discharge sampling would continue to take place throughout lockdown as part of site reduced manning


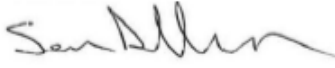

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The contingency plan was agreed with SEPA and weekly meetings took place to keep the regulator informed of site operations.

On 27th April 2020 site operations resumed therefore liquid sampling also recommenced prior to discharges.

Environmental sampling at various sites around the Forth Estuary was the only work to be delayed. This required samples to be collected of environmental media including seaweed, sediment, shellfish etc. All samples were taken on-time but had to be stored safely on site until the external analysis provider re-opened for business. The analysis has now taken place and no issues were raised as a result.

Appendix A - Environmental Policy Statement (Rosyth Business Park)

	<h2 style="margin: 0;">ENVIRONMENTAL POLICY STATEMENT</h2> <h3 style="margin: 0;">ENV/POL/001</h3>	
<p>This policy is applicable to all Babcock Business Units and contractors operating at Rosyth Business Park; to meet as a minimum, all applicable environmental compliance obligations and all Babcock documented environmental policies and procedures etc.</p>		
<p>Core operations at Rosyth Business Park include; project management of engineering, procurement, construction, refit, repair, maintenance, commissioning and decommissioning applicable to naval and commercial vessels; manufacture of pressure containing equipment and fabricated structures for marine, oil and gas, nuclear markets and Port Babcock Rosyth acting as a Statutory Harbour Authority.</p>		
<p>Babcock seeks to achieve the highest standards in the management of environmental matters at Rosyth. Top Management (Site Leadership Team) are committed to supporting/leading an Environmental Management System (EMS) that meets the requirements of ISO 14001:2015 and all relevant compliance obligations, ensuring its integration into the organisation's business processes.</p>		
<p>The Organisation shall;</p>		
<ul style="list-style-type: none"> ● Develop and maintain an EMS which will minimise the environmental impact of, and consider life cycle perspective in relation to, our business activities, products and services. ● Continually monitor and review the EMS to ensure that it remains suitable and sufficient for our business, considering the needs and expectations of our Interested Parties. ● Identify improvements in the management of energy, resources, emissions and discharges in all activities where economically viable, controlling/influencing contractors, suppliers and tenants. ● Set environmental objectives which are aligned to strategic direction and are consistent with this policy, monitoring through agreed performance indicators. ● Ensure that the appropriate resources needed for the EMS are available. ● Commit to the protection of the environment through initiatives such as:- <ul style="list-style-type: none"> ○ The reduction of our carbon footprint in line with the Carbon Trust Standard; ○ Maximised utilisation of renewable energy sources; ○ Prevention of pollution; ○ Effective application of Waste Hierarchy principles; ○ Conservation of biodiversity. ● Engage as necessary with Interested Parties ensuring appropriate levels of communication. 		
<p>Sean Donaldson Managing Director - Energy and Marine</p>		
<p>Alan Nicoll Site Operations Director</p>		
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ENVIRONMENTAL POLICY STATEMENT

ENV/POL/001

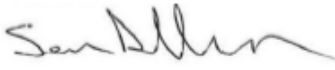

This policy is applicable to all Babcock Business Units and contractors operating at Rosyth Business Park; to meet as a minimum, all applicable environmental compliance obligations and all Babcock documented environmental policies and procedures etc.

Core operations at Rosyth Business Park include; project management of engineering, procurement, construction, refit, repair, maintenance, commissioning and decommissioning applicable to naval and commercial vessels; manufacture of pressure containing equipment and fabricated structures for marine, oil and gas, nuclear markets and Port Babcock Rosyth acting as a Statutory Harbour Authority.

Babcock seeks to achieve the highest standards in the management of environmental matters at Rosyth. Top Management (Site Leadership Team) are committed to supporting/leading an Environmental Management System (EMS) that meets the requirements of ISO 14001:2015 and all relevant compliance obligations, ensuring its integration into the organisation's business processes.

The Organisation shall;

- Develop and maintain an EMS which will minimise the environmental impact of, and consider life cycle perspective in relation to, our business activities, products and services.
- Continually monitor and review the EMS to ensure that it remains suitable and sufficient for our business, considering the needs and expectations of our Interested Parties.
- Identify improvements in the management of energy, resources, emissions and discharges in all activities where economically viable, controlling/influencing contractors, suppliers and tenants.
- Set environmental objectives which are aligned to strategic direction and are consistent with this policy, monitoring through agreed performance indicators.
- Ensure that the appropriate resources needed for the EMS are available.
- Commit to the protection of the environment through initiatives such as:-
 - The reduction of our carbon footprint in line with the Carbon Trust Standard;
 - Maximised utilisation of renewable energy sources;
 - Prevention of pollution;
 - Effective application of Waste Hierarchy principles;
 - Conservation of biodiversity.
- Engage as necessary with Interested Parties ensuring appropriate levels of communication.

Sean Donaldson Managing Director - Energy and Marine	
Alan Nicoll Site Operations Director	

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Appendix B - Mitigation Measures Minimising Environmental Impacts

Environmental Topic/Sub- Topic	Nature of Impact	Mitigation Measure	Action
<p>1. Radioactive Discharges</p>	<p>Aqueous, gaseous and solid radioactive discharges are generated that could cause concern to human health and the environment.</p>	<p>The mitigation of Best Practicable Means (BPM) measures being employed for management of solid, liquid and gaseous radioactive wastes and discharges throughout the design and operation of the Project.</p> <p>Stage 1 ID is being accomplished within lower limits than the previous RRDL discharge limits under EASR18.</p>	<p>RRDL is required to demonstrate compliance with Site License Conditions 32 and 33 regarding Radioactive Waste Management. See Reference 20.</p> <p>The Head of Nuclear Assurance has overall responsibility for the provision of a radioactive waste management service.</p>
<p>1a. Radioactive (Aqueous) Liquid Effluent discharges</p>	<p>Discharge is to the internationally designated and environmentally important Forth Estuary.</p>	<p>The cutting processes within the RC and the AWWAF are dry and do not generate liquid arisings.</p> <p>The Portable Effluent Treatment Plant (PETP) is used to process effluent (from residual water within the ship's systems and tool decontamination) prior to discharge where appropriate.</p> <p>Stage 1 ID is undertaken within reduced aqueous discharge limits and in accordance with Conditions of the EASR18 Permit.</p>	<p>Engineered measures and administrative controls are employed to minimise volumes and activities of discharges.</p> <p>All discharges are sampled prior to release and records maintained</p>
<p>1b. Radioactive Potassium Chromate Solution</p>	<p>This is a lightly radioactive oxidising agent with persistent toxic qualities.</p>	<p>The potassium chromate system will remain undisturbed in containment in the RC during Stage 1 until it is removed and disposed of by a specialist contractor in Stage 2. Where residual potassium chromate is found outside the containment of PST, appropriate mitigation actions must be determined to ensure a safe place of work & that no harm can result to the environment.</p>	<p>These procedures have been followed in managing residual contamination in the RC. No contaminated non-active items were disposed of as Special Waste in the reporting period.</p>

Environmental Topic/Sub- Topic	Nature of Impact	Mitigation Measure	Action
			For Stage 2, BPM will be demonstrated for handling of potassium chromate solution. Under no circumstances will this be discharged to the aqueous environment
1c. Radioactive Gaseous Discharges	Gaseous discharges are primarily associated with cutting and size reduction of radiologically contaminated materials.	All work is undertaken in High-Efficiency Particulate Air (HEPA) filtered containments within the RC and the AWAf. Stage 1 ID is undertaken within reduced gaseous discharge limits and in accordance with the EASR18 Permit.	Application of As Low as Reasonably Practicable (ALARP) and BPM.
1d. Solid Radioactive Waste	Solid LLW material will be cut from the submarine RC, characterised, packaged and disposed of appropriately.	All work is undertaken in containment. All solid waste items are uniquely identified to ensure BPM management and disposal/treatment for maximising of recycling and minimising disposal to limited facilities. Waste is accumulated and disposed of in accordance with Conditions stipulated by the EASR18 Permit.	Management of the radioactive waste is the responsibility of the HP Department. Application of ALARP and BPM and in compliance with the Waste Management Hierarchy.

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Environmental Topic/Sub- Topic	Nature of Impact	Mitigation Measure	Action
2. Air Quality and Climate			
<p>2a. Non-Radioactive Discharges to Air</p>	<p>Use of fuels and release of other, greenhouse or ozone depleting gases can influence air quality and climate change.</p> <p>There will be local, small impact of plant and vehicle exhausts throughout.</p> <p>Specialist paint of high VOC content can influence local air quality and may cause short or long term health problems.</p> <p>Residual amounts of greenhouse and ozone depleting gases or asbestos may be found within the submarines' systems.</p>	<p>Plant and vehicle exhaust gases are minimised by good practice and maintenance but are a necessary part of the project.</p> <p>Electrification of plant and vehicles would reduce emissions locally.</p> <p>Such specialised paints are currently required for submarine hull maintenance but H&S and environmental risk assessments highlight risks to workers, other people or wildlife, and the environment and specify mitigation measures.</p> <p>Any residual gases and liquids within redundant pipework is contained for appropriate disposal. Removal, treatment/disposal measures for asbestos and asbestos lagging is addressed. Removal will be undertaken by qualified, experienced personnel in containment.</p>	<p>Energy is used efficiently in compliance with the Energy Policy [Reference 19]. Opportunities are being sought for energy savings.</p> <p>The EAR [Reference 8] has been updated to take account of additional identified risks of high VOC paint.</p> <p>Special (hazardous) wastes will be identified and removal and disposal will be in compliance with Disposal of Special Waste Policy [Reference 22] and/or radioactive waste requirements.</p> <p>SEPA approved a sampling and analysis plan for asbestos lagging and approval for removal and disposal for such on Revenge was granted and waste has been disposed of to Avondale landfill asbestos cell.</p>

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Environmental Topic/Sub- Topic	Nature of Impact	Mitigation Measure	Action
2b. Climate Change and Energy Use	<p>Climate changes are influenced by use of fossil fuels and release of greenhouse gases.</p> <p>Extreme weather events will necessitate local restrictions on activities.</p>	<p>See above for Energy Use management. Use is relatively small and cannot measurably influence climate change.</p> <p>Administrative controls and management arrangements ensure that in expectation of extreme weather conditions, certain operations will cease and additional controls are established i.e. crane operations cease and storm anchors will be fitted.</p>	<p>The safety case will define limits for safe working.</p>
2c. Coastal Change and Flood Risk	<p>There is no new impact on coastal processes. The project will not increase the risk of flooding elsewhere but flooding of the site could occur.</p>	<p>Certain operations will not be carried out when extreme weather conditions are anticipated. See above.</p> <p>A forecast storm surge would result in work being made safe thus minimising risk.</p>	<p>As the project progresses, there may be a need to consider flood risk and provision of flood protection.</p>

Environmental Topic/Sub- Topic	Nature of Impact	Mitigation Measure	Action
3. Flora and Fauna (Ecology)			
<p>3a. The important habitat of the Forth Estuary</p>	<p>The Forth Estuary is the principal receptor with regard to ecological matters. Pathways for harm to occur are primarily:</p> <ul style="list-style-type: none"> • By radioactive effluent discharged to the estuary, • By discharge to the licensed dock drainage system and discharge to the NTB. • From leaks and spills 	<p>See comment on Radioactive Liquid Effluent Discharges in Section 1a above.</p> <p>The risks of spillage into the dock's drainage systems are minimised by design and operational controls:</p> <ul style="list-style-type: none"> • Any fuel storage or hydraulic oils required by plant working in the dock bottom (e.g. in cutting and replacement of hull inserts) is in suitable containers on the dockside with management procedures followed to minimise risks of spillage. • Any residual liquids found in the pipe systems are packaged in sealed carboys in the RC, placed within a second container. These are lifted six at a time in a caged pallet to the dockside, thus minimising the risk of dropping into the dock bottom. 	<p>Compliance with the Good Housekeeping Policy [Reference 23] is required.</p>

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Environmental Topic/Sub- Topic	Nature of Impact	Mitigation Measure	Action
3b. Local impact	<p>The working areas of Rosyth Business Park have hard surfaces and offer minimal habitat. There is negligible impact on natural systems in the Rosyth Business Park.</p> <p>But in 2019, there was potential for detrimental impact on nesting of Schedule 1 birds, a pair of peregrine falcons and their 3 chicks in No.2 Dock.</p>	<p>Materials management, containment and good housekeeping.</p> <p>The nesting birds could have been affected by disturbance due to activities in the dock and by fumes from the paint to be sprayed onto the hull. The RSPB was consulted and paint spraying was not carried out. Activities were managed to allow successful fledging of the three chicks.</p> <p>Note that they nested below flood-up level.</p>	<p>Compliance with the Good Housekeeping Policy [Reference 23] is required.</p> <p>Liaison with the RSPB has suggested the installation of nesting boxes on site. These have been procured but not installed as yet. The Peregrine Falcons did not return this year.</p>
4. Landscape and Visual Amenity	Where new buildings, large infrastructure or lighting to be required, there is a potential for impact on landscape and visual amenity.	The new crane is of a height below the established skyline. New modular support buildings are of a similar scale to existing. Any additional lighting is shielded and avoids visual disturbance.	Lighting is used only as required.

Environmental Topic/Sub- Topic	Nature of Impact	Mitigation Measure	Action
5. Material Assets including Cultural Heritage	Unsympathetic work can cause damage to listed buildings or historic sites and artifacts.	No impact is envisaged on the listed buildings in or adjacent to Rosyth Business Park. Only very minor excavations are required and there is negligible chance of finding artifacts.	Annual review of this assessment by the Project. The historic environment has not been affected by the preliminary works and no impacts are anticipated in 2021.
6. Population, Socio-economics and Health and Wellbeing			
6a. Socio-Economics	Direct and indirect economic benefits, both local and national.	The maintenance of employment and skills enhancement of an increased and SQEP workforce. Local firms are involved in the infrastructure upgrades and modification and in lagging removal. Specialist UK firms are involved in LLW removal/treatment and in LLW removal/treatment and in Stage 2 planning.	The team has expanded in 2019-20 with additional engineering/design project staff and specialist blue collar workers being appointed and trained, with skills transfer to the younger generation. Apprentices are now employed on rotation in the operations department.
6b. Health and Wellbeing Characteristics	Concern over nature of nuclear related work.	Good communication with local residents; any complaints to be responded to, investigated and action taken where appropriate.	The 2020 LLC meeting was cancelled due to COVID19, however, all stakeholders were informed of site activities via a comprehensive brief.

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Environmental Topic/Sub- Topic	Nature of Impact	Mitigation Measure	Action
<p>7. Soil, Geology, Hydrogeology and Land Contamination</p>	<p>Impacts can arise from pollution incidents, when land and water may become contaminated with secondary impacts on people, vegetation and aquatic life.</p>	<p>Potentially contaminating materials are identified, properly stored and disposed of appropriately to avoid land contamination.</p> <p>Secondary bunding and above ground storage is required by SEPA to minimise the risk of loss of aqueous radiologically contaminated water from HP laundry and RCL and consequent land contamination.</p>	<p>Radiologically contaminated asbestos lagging has been disposed to a local Authorised Asbestos Disposal Site.</p> <p>Special waste has been identified and disposed of appropriately.</p> <p>Provision of these tanks is being progressed although delay in completion has been caused by COVID19. Mitigation measures are in place in the form of daily inspections.</p> <p>Compliance is required with the Good Housekeeping Policy [Reference 23] and Disposal of Special Waste Policy [Reference.22].</p>

Environmental Topic/Sub- Topic	Nature of Impact	Mitigation Measure	Action
<p>8. Water Quality and Resources</p>	<p>Discharges/ Spills to the dock and to drainage systems could impact on Forth Estuary.</p>	<p>See Section 1a above. Cutting operations are dry, where possible. Use of water is minimal.</p> <p>See Section 7. Above re replacement of current underground storage for HP laundry and RCL aqueous waste to minimise risk of water pollution.</p> <p>All work with potential for radioactive waste generation is in containment. Residual quantities of oils and other liquids is contained and disposed of appropriately. See Environmental Subtopic 3a and 3b.</p>	<p>See above. Compliance is required with the policy for Radioactive Waste Management [Reference 20], the Good Housekeeping Policy [Reference 23] and with Disposal of Special Waste Policy [Reference 22].</p>
<p>9. Noise, Vibration and Nuisance including dust emissions</p>	<p>These have potential for impact on human health both of workers and the general public.</p>	<p>Risk assessments are routinely undertaken as part of work planning, with appropriate mitigation measures incorporated where necessary.</p> <p>Dust production is negligible; levels of noise and vibration are not likely to be greater than the usual levels. For lighting, see Section 4 above.</p>	<p>Noise levels are monitored (when risk assessment requires) to ensure works cause neither damage to health of workers or nuisance to other people in the Rosyth Business Park or nearby residents.</p>

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Environmental Topic/Sub- Topic	Nature of Impact	Mitigation Measure	Action
10.Traffic and Transport	Increased traffic can cause problems for local communities or capacity issues for infrastructure.	<p>Security, safety and nuisance avoidance are of great importance. Care is taken in planning of loads and all movements to minimise disturbance and congestion and to carry out transportation of people and materials safely and with the required security.</p> <p>Heavy goods vehicles avoid residential parts of Rosyth and travel on the lower road to the Ferrytoll roundabout and the M90.</p>	With the completion of the Carrier work, vehicular movements in the Business Park are low. The site Traffic Forum meets regularly to plan for any changes and for example, movement of abnormal loads.
11.Waste Management & Sustainability	<p>Poor waste management can lead to detriment to water quality, health and socio-economics and cause land contamination.</p> <p>Wasting opportunity of reuse and recycling leads to overuse of new materials and reduction of availability for future generations.</p>	<p>Almost all of the waste material taken from the submarine in ID is from the RC and may be radioactive. By proper assessment and characterisation, these materials are segregated to ensure the most appropriate disposal/treatment route, minimising disposal to landfill, the Low Level Waste Repository (LLWR) and the GDF.</p> <p>The completion of Swiftsure ID Stage 1 has resulted in radioactive material being consigned to recyclers. The results are being assessed with a view to process improvement for Resolution LLW.</p>	<p>Utilisation of the principles of the Waste Management Hierarchy.</p> <p>Compliance with the policies for Radioactive Waste Management [Reference 18] and Disposal of Special Waste Policy [Reference 22] is required.</p>
12.Land Use and Materials	Sustainability issues.	Where appropriate, plant and tools will have potential for re-use at the end of the project.	

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Environmental Topic/Sub- Topic	Nature of Impact	Mitigation Measure	Action
13.Interaction of Project Impacts & Other Development	Further developments within the Rosyth Business Park and Waterfront have some impact.	Good neighbourly communication is recommended in management of potentially impacting activities, such as movements of abnormal loads.	See Section 10, Traffic and Transport above.

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Appendix C. Key Performance Indicators Record

	SEPA PERMIT LIMIT	Jan- Aug 16	Sept 16- Aug 17	Sept 17- Aug 18	Sept 18- Aug 19	Sept 19 – Aug 20	
Radiological Discharges from RRDL in 12 month period, September to August							
Radioactive Solid Waste							
Volume (m ³)		64.15	0.00	-	103.25	<25.3**	
Weight (Tonnes)			0.00	2.28	55.75	<0.61**	
Type							
	Metallic available for Recycling (Tonnes)		0.00	2.28	52.00	-	
	Non-metallic (Tonnes)		0.00	0.00	3.75**	<0.61**	
	Cobalt-60 (MBq)		Total 959.6**	Total 0.00	Total 1.26	604.20 19,920	16.05** 182.08**
	All other radionuclides (MBq)						
Liquid Radioactive Waste							
	Volume (m ³)		5.40	41	83.55	58.06 60.95	
	Cobalt-60 (MBq)	100	0.71	3.2	5.09	0.89 0.23*	
	Tritium (MBq)	300	10.80	56.35**	11.15	31.32 34.5*	
	All other radionuclides (MBq)	100	0.51	3.43	7.57	3.21 2.81*	
Gaseous Radioactive Waste							
	Volume (m ³)		0.00	0.00	0.00	-	
	Carbon -14 (MBq)	50	0.00	0.00	0.00	5.33E-02* 0.36*	
	Tritium (MBq)	10	0.00	0.00	0.00	2.50E-02* 0.19*	
	All other radionuclides (MBq)	0.10	0.00	0.00	0.00	0.0059 0.045*	
Radiologically contaminated Asbestos (Tonnes)					11	11.29	
* Note these include results that are less than the Limit of Detection. ** includes waste not related to SDP ID Figures in Italics for Liquid R'active Waste Discharge for 2016/7 are corrected values, about 10% higher than before.							
Non-Radiological materials dispatched for Recycling or for Landfill.							
Volume (m ³)							
			0.00	-			
Weight (Tonnes)							
			0.00	22.28	22.71	43.61	
Type							
	Metallic available for Recycling (Tonnes)		0.00	22.28	22.71	43.61	
	Non-metallic (Tonnes)		0.00	0.00	0.00		
SDP Personnel***							
			113***	108	130	141	
*** Note totals in early years allow for retirement of older staff after skills transfer to new recruits							
Training - hours							
			8000	5000	1000+	120	

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Reportable Accidents			0	1	0	0
Manhours worked in Nuclear Business Unit since April 2015 822,534 hours						
Complaints from General Public			0	0	0	0

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