

**Environmental Management Plan 2021**

**Submarine Dismantling Project**

**Initial Dismantling at Rosyth Business Park**

**Nuclear Licensed Site**



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## REVISION

Revision	Date	Comment	Author	Checked	Approved
Issue 1	16 <sup>th</sup> December 2014	1 <sup>st</sup> Issue	Deborah McLaren	GM	FA
Draft 1A	9 <sup>th</sup> October 2015	Draft Issue	Deborah McLaren	GM	FA
Draft 1B	12 <sup>th</sup> October 2015	Updated with comments	Deborah McLaren	GM	FA
Issue 2	25 <sup>th</sup> October 2015	2 <sup>nd</sup> Issue	Deborah McLaren	GM	AC
Draft A	10 <sup>th</sup> October 2016	Updated with comments	Deborah McLaren	GM	FA
Issue 3	16 <sup>th</sup> November 2016	3 <sup>rd</sup> Issue	Deborah McLaren	HF	GM
Draft 4A	25 <sup>th</sup> October 2017	For Comment	Deborah McLaren		
Issue 4	27 <sup>th</sup> November 2017	4 <sup>th</sup> Issue	Deborah McLaren	MM	GM
Draft 5A	16 <sup>th</sup> October 2018	For Comment	Deborah McLaren		
Draft 5B	11 <sup>th</sup> November 2018	Editorial Corrections	Deborah McLaren		
Issue 5	30 <sup>th</sup> November 2018	Issue 5	Deborah McLaren	MM	GM
Draft 6A	29 <sup>th</sup> October 2019	For Comments	Deborah McLaren		
Draft 6B	25 <sup>th</sup> November 2019	For Comments after editorial correction	Deborah McLaren		
Issue 6	4 <sup>th</sup> December 2019	6 <sup>th</sup> Issue	Deborah McLaren	MM	GM
Draft 7A	5 <sup>th</sup> January 2021	For Comment	Paige-Marie Settle		
Draft 7B	18 <sup>th</sup> January 2021	Updated with comments	Paige-Marie Settle		
Draft 7	07 February 2021	Updated to close outstanding comments	Paige-Marie Settle	MM	GM
Draft 8A	14 February 2021	For Comment	Kim Vignitchouk		
Draft 8B	15 February 2021	Updated with comments	Kim Vignitchouk		
Draft 8C	16 February 2021	Updated to close out comments	Kim Vignitchouk		
Issue 8	17 February 2021	8 <sup>th</sup> Issue	Kim Vignitchouk	MM	GM

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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 Resolution and Revenge.

Authorisation was received from the Scottish Environment Protection Agency on 1<sup>st</sup> 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 to reflect planned operational requirements, 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 contract 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. Further 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. Swiftsure solid waste was consigned off-site for final treatment and disposal and the small volume of liquid waste was processed on site in the Portable Effluent Treatment Facility.

After de-lagging of the Reactor Compartment systems 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 and Low Level Waste removal was completed in June 2021. The radioactive waste from Resolution and Revenge remains on site while characterisation for disposal is finalised.

Stage 2 activities are currently in 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 that the down-selected option remained the appropriate solution for the site. That work concluded and the work has commenced on the original down selected solution from March 2021. 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 fifth 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 1<sup>st</sup> 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

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LAM	Large Articles Monitor
LfE	Learning from Experience
LLC	Local Liaison Committee
LLW	Low Level (Radioactive) Waste
LLWR	Low Level Waste Repository
LoA	Letter of Approval
LTA	Lost Time Accident
LUSM	Laid Up Submarine
MOD	Ministry of Defence
MoU	Memorandum of Understanding
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
RIDDOR	Reporting of Injuries, Diseases and Dangerous Occurrences

RPV	Reactor Pressure Vessel
RRDL	Rosyth Royal Dockyard Limited
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



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## **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 2020 to August 2021.

## **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 conducted during 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 the Primary Shield Tank in which it is housed.

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 refines radiation dose and discharge projections.

### 2.1.1 Stage 1 ID Programme Overview

On 1<sup>st</sup> December 2016, two necessary 'permissions' were issued by the Scottish Environment Protection Agency (SEPA). These were;

- The Letter of Approval (LoA) 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 environment<sup>1</sup>.

A new Memorandum of Understanding (MoU) between SEPA and MOD is in the process of being agreed. Once the MoU has been signed, this will enable the new LoA to be issued to MOD under EASR18. This will supersede the current LoA issued under RSA93. RRDL intend to vary their permit to allow LLW to be received from MOD and to increase discharge limits related to Stage 2 dismantling. Until the new LoA is received the current arrangements will remain extant.

Stage 1 dismantling of the first 'demonstrator' submarine, Laid Up Submarine (LUSM) Swiftsure commenced in December 2016. The waste generated was segregated in two separate waste streams, active and non-active (Out of Scope)<sup>2</sup>. The active waste is then disposed of as low level radioactive waste, following treatment to segregate waste which can be recycled. The Out of Scope waste is routed through the reassurance monitoring facility into the conventional waste stream.

Active metal waste is transported to the Active Waste Accumulation Facility (AWAF) and is anonymised, packaged and transported to a waste treatment/disposal facility.

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 was completed successfully and completed hull restoration works allowed undocking and her return to her berth in the Non-Tidal Basin (NTB) on 27<sup>th</sup> 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.

LUSM Resolution was docked down on 13<sup>th</sup> December 2018. Removal of Stage 1 LLW was completed and she returned to afloat storage on 9<sup>th</sup> March 2020. Aqueous waste was generated from Resolution and was processed through onsite Portable ETP, then discharged to sea.

To support best practicable means assessments for waste disposal, sampling campaigns were planned and conducted in late 2021. Sampling was carried out on large low level waste items and pipework on Resolution and Revenge and was sent to an off-site laboratory for analysis. Radioactive waste from

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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.

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Resolution has been characterised and waste disposal is currently being arranged. Characterisation of Revenge and Large Low Level waste items is in progress and waste currently remains on site.

LUSM Revenge was docked in March 2020 and Stage 1 LLW removals were completed in June 2021. Large item low level waste removals are scheduled to begin in September. Dismantling work of LUSM Revenge is expected to be completed by the end of January 2022. Dismantling work on LUSM Repulse will commence in February 2022.

Planning is underway for the removal of historical ILW ion exchange resins from Rosyth, and operations are expected to start in 2023.

A new waste storage and characterisation facility is being planned to support removal activities from the boats more efficiently. This facility will provide the increased capacity and capability that will be required for the handling of Large LLW and Out of Scope wastes. It is expected that the 5 year integrated programme for the disposal of 7 boats will be finalised and in use by April 2022.

### **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 2021**

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 5.3. Repulse will undergo Stage 1 LLW removal prior to any Stage 2 dismantling.

## **2.2 Matters outside the Scope of the EMP**

Activities out with the RRDL scope of responsibility, 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. RRDL has expressed an interest in undertaking this activity.
- 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 now forms 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 are 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 2021 LLC has been deferred. The site has made several attempts to hold the meeting but the constantly changing evolution of COVID19 restrictions has prevented this. The site did not want to repeat the 2020 exercise of sending a brief to the members therefore, the meeting will be held on Microsoft Teams after the reporting period. Committee members and regulators have been kept informed.

## **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 Occupational Health and Safety and Environmental Policy Statement [Reference 6] are 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: 2015<sup>3</sup>, 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 are certified to International Organisation for Standardisation's (ISO) ISO 45001 This accreditation was achieved on the 22<sup>nd</sup> September 2020.

There were no RIDDOR nor Lost Time Accident (LTA) reportable accidents<sup>4</sup> since September 2020 within SDP. 895,000 project hours have been executed and recorded between Feb 2013 and Aug 2021. A number of safety initiatives have been introduced, together with training and workshops for safety culture improvement.

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

<sup>4</sup> 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.



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**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 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 Environmental Aspect Registers (EARs) for activities in Survey and Docking Period (SADP), the AWF, 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 mechanisms<sup>5</sup>, highlighting any environmentally critical control equipment.

An ISO 14001:2015 re-certification audit was carried out by Lloyds in 2021 and no recommendations or non-conformance were raised from this. Moreover, the EARs are reviewed on a yearly basis by the owners of the Submarine Dismantling Projects to ensure the information contained within is extant and up to date.

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

- 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.

Babcock Marine Sustainability strategy is progressing well across the group with a number of key initiatives, which focus on environmental, societal and Governance arrangements.

A key environmental objective, which dovetails into the Babcock Marine Sustainability strategy is the development and implementation of a group-wide reduction carbon strategy called PlanZero40 project. This project will drive an extensive decarbonisation programme across the Babcock estate, assets and operations. PlanZero40 commits Babcock to ambitious Science Based Targets in line with a 1.5°C limit to global warming and to deliver Net Zero by 2040. As part of this group wide strategy, Babcock Rosyth is nearing the final planning stage of fitting part of their site with a Solar Farm and wind turbines which will produce a significant amount of green energy for the site. There are also other initiatives that are currently been developed to support the journey towards Net Zero.

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<sup>5</sup> Relevant control measures are local or company policies, procedures, process maps, risk assessments and other engineered control mechanisms and equipment.

#### 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 ONR Chief Inspectors Annual Report, [Reference 17], the ONR statement confirmed that RRDL 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.

No formal SEPA reports were issued since March 2020 due to COVID19. In response to the changes to site working arrangements that were implemented to comply with government guidance (described in detail in Section 7.1), SEPA requested a weekly meeting to be set up with RRDL to keep site inspectors updated on activities and any issues due to COVID19. These meetings ended towards the end of 2020 but recommenced in 2021 following a cyber-attack on SEPA on 24<sup>th</sup> December 2020, which left SEPA without IT systems. From 2022 these meetings will be held on a monthly basis. SEPA held its first Annual Review of the Environment in March 2021 when RRDL presented an overview of its activities undertaken in 2020, including updates to any inspection actions.

Upgrades to the ventilation High-Efficiency Particulate Air (HEPA) filtration systems testing arrangements were completed to ensure full compliance with the conditions in the Permit issued under EASR18. An injection point was 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 AWAFF 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]. Dispersed Oil Particulate (DOP) techniques are now used to test the filter efficiency on an annual basis; this has now been incorporated into the site maintenance management system, (IFS), and will automatically generate a work order to maintain the periodicity of the test.

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 5.2.

One emergency response exercise was carried out in between September 2020 and August 2021. This was held on 28<sup>th</sup> September 2020 and was carried out in accordance with a risk assessment which required all participants to use COVID19 PPE. Exercise play was limited to the main control room and simulated events were injected into the room at appropriate times by a SIMCELL. Due to COVID19 restrictions ONR were not present, but it was internally assessed as an ‘Adequate’ demonstration of RRDL’s arrangements.

#### 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 Energy and Marine (Rosyth) Occupational Health, Safety and Environmental Policy Statement [Reference 6] to maximise utilisation of renewable energy sources. Energy assessment and energy saving identifications are currently being undertaken as part of the Babcock Group response to the Energy Savings Opportunity Scheme.



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LED lighting has been fitted onto the submarines and in the AWAf building. RRDL is also looking into purchasing solar panels for the AWAf building.

## **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).

### **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.

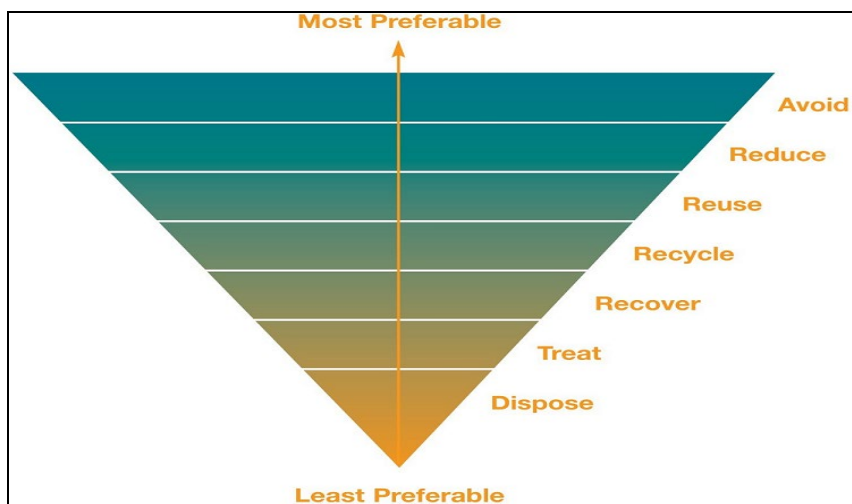


Figure 2: Waste Management Hierarchy (reproduced from Reference 20)

Where characterisation indicates that materials are contaminated rather than activated, treatment and recycling routes are included in the options considered for waste management.

#### 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 are 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. Movement to the AWAFF or Reassurance Monitoring Facility, subsequent further monitoring, treatment and dispatch is all carried out 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 have been described in some detail in Sections 7.2 and 7.3 of the Environmental Management Plan 2017 [Reference 22] and mitigation measures are summarised in Appendix B, Mitigation Measures Minimising Environmental Impacts Learning from Experience

The site waste strategy has undergone improvements as a result of questionable/non-credible data arising from the Swiftsure waste recycling campaign.

Swiftsure's metallic LLW was treated by the specialist contractor and the "melt report" was 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.

The results received were questioned as regards their validity therefore all disposals of generated metallic waste both LLW and "Out of Scope" were temporarily paused whilst an investigation was carried out.

The investigation concluded that the melt report results related to the mixing of SDP waste with another operator's waste. Nonetheless, the improvements we implemented as a result of the discrepancy has allowed us to make our characterisation and monitoring methods more robust.

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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 2020 to August 2021**

### **5.1 LUSM Revenge Stage 1 Dismantling**

Most of the LLW scope was completed by end of August 2021; all waste removal was carried out in accordance with the contracted scheduled work packages. All waste removals were carried out by the Nuclear Operations team and under the control of the Health Physics team. All wastes were segregated as LLW or "out of scope" following radiological monitoring in the IDI facility.

Figure 3 offers a full breakdown of waste categories removed.

At this point, we have been contracted to execute the removal of the Large LLW (the Pressuriser and Steam Generators). This work is due to commence in September 2021.

### 5.1.1 Waste Disposal

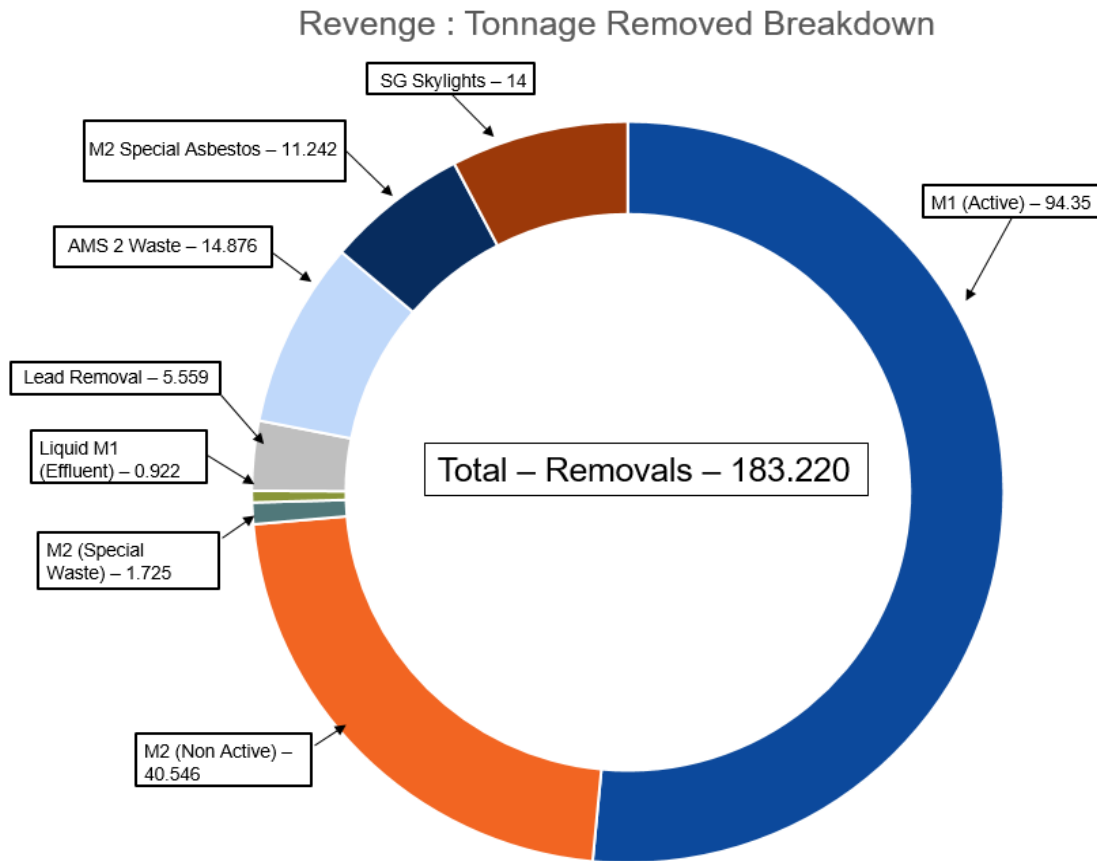


Figure 3: Waste Removed from Revenge in Stage 1 ID (tonnes) to 31/8/21

### 5.1.2 Asbestos-Contaminated Lagging Disposal

Assessment of the data resulting from a detailed sampling and analysis plan of Revenge asbestos contaminated lagging demonstrated that it required 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 de-lagged whilst afloat in the NTB and the waste stored on board until it was brought into No.2 Dock as agreed with SEPA and MOD. The bags of hazardous asbestos lagging waste were removed from Revenge and assayed using the Large Articles Monitor in the AWAf. 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, which was prior to the period of this report. 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 11.24 tonnes. No further lagging has been disposed of in the reporting period.

## 5.2 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 August 2021 and was successful. Re-accreditation will take place in August 2022.

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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 is not currently utilised by the project. Instead, a minimum 2000 litre fully bunded tank with leak detection and filtration will be installed in the present tank location. Control of this system will now be undertaken remotely, meaning sampling, mixing and pumping can be completed with less exposure to the operators.

The HP Laundry aqueous waste will now be stored within a 2000 litre 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. If the effluent is found to contain radionuclides, the tank will be pumped into the Effluent Transport Container and will be treated as active waste and disposed of within that process.

Since the last report, RRDL have now contracted a new supplier for the tank. The general arrangement drawings were received and subsequently reviewed, once technical queries have been accepted the manufacturing of the tanks will be authorised. The manufacturing of the tanks is expected to take 10 weeks. A new installation and commissioning company has yet to be selected.

Lighting upgrades have begun in the AWAFF, replacing all current fittings with lower wattage LED units. To date, all fittings outside the controlled areas have been swapped. The fittings for the controlled areas have now been received and installation work is to be scheduled. Internal light fittings in the ERC have also been changed to lower power LED fittings. Light fittings in the controlled area of the RCL have also been changed to lower power LED fittings.

All valves in the AWAFF heating system have been replaced ensuring that the heating system is performing efficiently throughout. Work is underway to revive the AWAFF heat recovery system which has been out of commission for a number of years; this will ensure that any heat currently being expelled to atmosphere is captured and cycled back into the incoming air system.

### **5.3 Stage 2 Activities**

Following a previous customer request to review the way the RPV is removed from the boat the preferred method was finalised in March 2021 which concluded that the best practical method for removal of the RPV is through an aperture cut in the side of the boat. This decision supported the 'Concept Design' phase which in conjunction with Cavendish Nuclear Ltd. commenced April 2021. The object of Concept Design is to finalise the dismantling methodology with an expected completion April 2022.

Following on from completion of Concept Design, a one year period has been allocated to the Engineering Design of Stage 2. This design and safety work will detail the following:

- Boat hull cutting and remediation; RPV removal from the boat and transportation of the RPV to the dockside.
- Dockside building together with groundwork requirements.
- Dockside building outfitting including building services and production equipment.
- Handling of the ILW and loading the RPVTC in preparation for road transport.
- Nuclear and conventional waste processing and disposal.

ONR and SEPA are being regularly consulted on the Stage 2 design process and the capability of the supporting organisation.

### 5.3.1 Further Options for Stage 2

The high level optioneering process will end following the completion of Stage 2 Concept Design and agreement that the concept developed by RRDL is in line with MoD's expectations. Achievement of this significant concept design milestone will allow the finalisation and submission of the PSR to ONR, paving the way to the commencement of Stage 2 Engineering and Detail Design phases.

## 5.4 Planned Project Activities, September 2021 to August 2022

Activities as described above will continue throughout the remainder of 2022 and in 2023. In addition, the following activities are also planned in this period:

- Storage area for RPV mock-up to be established within the AWAFL licensed site. Engineering work continuing
- New M2 Waste processing facility Engineering works continuing early 2022
- 2 Dock infrastructure repair works. Planned to start pre planning Feb 22
- Continuation of new Radiochemistry Lab Concept Design
- Continuation of engineering design for Resin Disposal.

## 6. Environmental Performance, 1<sup>st</sup> September 2020 to 31<sup>st</sup> August 2021

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 Resolution and Revenge

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

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 disposal 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))

- LLW metallic waste from Resolution ID has been characterised and remains in storage pending disposal using BPM. Approximately 94 tonnes of LLW metallic waste from

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Revenge ID is safely stored in the AWAFF, pending the results of characterisation analysis of samples of the waste to determine the BPM solution for this waste.

- 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 circa 0.76 tonnes of soft LLW in May 2021 using the same specialist UK contractor as in 2020. This included some legacy waste as well as that generated from ID LLW removal.
- RRDL transferred 19 solid radioactive metal waste samples (ex-LUSM Resolution) to GAU-Radioanalytical Laboratories for analysis in October 2020 for characterisation analysis.
- As reported in Section 5.1.1 asbestos lagging from Revenge was disposed of in June 2020 which is prior to the period of this report. No asbestos lagging waste was disposed of in 2021.
- In early 2021, a review was undertaken of monitoring procedures for the Out of Scope waste stream. This review recommended enhancements which will improve the level or rigour used for waste sentencing, which will support future boats clearance. The reviewed process will be implemented for the M2 waste stream in 2022.

*Population, Socio-Economic, Health and Wellbeing Characteristics*

- There is a team of 48 personnel working as part of the Nuclear Operations team which is composed of:
  - 1 x Nuclear Production Manager
  - 2 x Assistant Production Managers
  - 5 x Nuclear Production Supervisors
  - 40 x Nuclear Production personnel (NPP)

The teams of NPP are made up of different industrial job disciplines, working as part of a composite team. Inclusive of: mechanical fitters, electrical fitters, pipe fitters, shipwrights, fabricators, slingers/riggers and skilled labourers.

- Training hours logged in the year are estimated to circa 2 to 3 days per member of the Nuclear Operations team. This includes mandatory training requirements that ensure a team of SQEP personnel is maintained and specific training that ensures Nuclear Operations team members are able to carry out their tasks. Training is provided by internal and external training providers as appropriate.
- Training of six Health Physics Monitors in both external, (NVQ level 2 in radiation protection) and internal topics was successfully completed around March-April 2020 with all of them being awarded the NVQ certificate. They were appointed as qualified HP Monitors around May-June in 2020. Their appointment was delayed by the by initial COVID19 pandemic shutdown. The “on the job” training has been completed over the reporting period. Subsequently, one of this cohort, after a short period in the Procedure Authorisation Group (PAG), has been selected for development as a Trainee Health Physicist.
- No complaints were received from residents or stakeholders pertaining to SDP operations.

#### *Waste Management and Sustainability.*

- 40.5 tonnes of non-active material (M2 Waste) has been removed from Revenge and discharged for appropriate disposal through the normal business 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 5.2):

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 improve 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 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 5.3):

- Multi stakeholder involvement in planning for Stage 2 Concept Design, and subsequent commencement of the Stage 2 Concept Design Phase.
- Engagement with a 'prime' contractor and subsequent specialist sub-contractors to support for the Concept Design Phase.
- Design work completed in accordance with RRDL Design & Safety Justification process, which details the environmental impact assessment activities required to underpin the proposed Stage 2 Concept Design.
- Stage 2 – Functional Specification cascades the RRDL Environmental Impact Assessment requirements to the 'prime' contractor.



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- The Stage 2 Concept Design work is circa 75% complete, at the time of reporting.
  - 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 recruitment and training of SQEP personnel has been of economic benefit nationally and locally.

*Waste Management and Sustainability.*

- Improvements in waste management for all Radiological and non-radiological wastes are in development. Improvements will be in place in early 2022.

The effects of COVID19 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 141 to 145 persons. A prime concern that has been addressed is the skills transfer from an ageing workforce who have many 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 were appointed as qualified HP Monitors around May-June 2020, one of this cohort was selected for development as Trainee Health Physicist.

## **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 was captured and dismantling of LUSM Revenge is underway.

A Lessons Learned/Swiftsure Project Closeout Report is now complete, it summarises the many lessons learned from the LLW removal from Demonstrator Swiftsure. Lessons learned are ongoing throughout the numerous projects being undertaken.

## 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. There has been continual assessment of the lessons learned in order to improve the dismantling process and the supporting facilities for the remaining submarines and the Swiftsure Project Closeout Report has been completed

ID of the second submarine LUSM Resolution is completed and her return to the NTB was achieved on 9<sup>th</sup> March 2020. Radioactive waste from Stage 1 activities is still awaiting characterisation and a decision on waste routing. LUSM Revenge then entered No.2 Dock on 20<sup>th</sup> 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. That work has concluded, and the work has commenced on the down selected solution from March 2021. 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 only remaining issue being 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 February 2018 and a total of 895,000 hours have been worked since April 2015.

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

The project has benefitted the local and national economy with local firms being contracted to undertake infrastructure renovations. 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 disposal route for soft trash (LLW and solid radioactive waste suitable for disposal in normal refuse) has continued to be utilised over the reporting period.

Swiftsure's metallic LLW was treated by the specialist contractor and the "melt report" was 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.

The results received were questioned as regards their validity therefore all disposals of generated metallic waste both LLW and "Out of Scope" were temporarily paused whilst an investigation was carried out.

The investigation concluded that the melt report results related to the mixing of SDP waste with another operator's waste. Nonetheless the improvements we implemented as a result of the discrepancy has allowed us to make our methods more robust.

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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 2020 to August 2021, 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 ongoing dismantling 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**

The effects of COVID19 have continued across many areas of business performance over the reporting period. The operations department have adopted shift work to spread workforce attendance over full 24 hour periods. This has worked well in addition to bespoke risk assessment as there have been no recorded cases of transmission on site. Non operations and support staff have been encouraged to work from home which has also worked well to the extent that Babcock are adopting flexible working as a permanent policy. There have been delays in sourcing external contractors to support operations, but these have been minor and have not affected the overall programme. There have also been delays in the supply chain but again this has had minimal impact on the programme. The area of significant delay has been in the waste issue investigation as samples of waste are checked by an external agency as Rosyth does not presently have the capability to carry out full spread chemical analysis. The external laboratories were closed due to COVID19 therefore full analysis had to wait until they re-opened. Limited analysis was carried out on site to underpin the initial site position that waste had been disposed of correctly, but further full analysis was then done to absolutely prove this case.

#### **7.1.1 ONR**

Although daily reporting requirement ceased on 3<sup>rd</sup> August 2020, in February 2021 ONR requested that weekly reports be resumed 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.

Over this time there has been no reduction in staff numbers that would raise concerns regarding nuclear or radiological safety or emergency response capability.

### 7.1.2 SEPA

There has been no appreciable effect on SEPA/Site interaction over the reporting period. A weekly telephone conference was set up and carried out over the whole reporting period to keep SEPA aware of activities and issues on site. The site inspector did not attend site, but inspections were carried out remotely and all returns have been reported in a timely manner.

**Appendix A - Environmental Policy Statement (Rosyth Business Park)**

Classification: UNCLASSIFIED



**ENERGY & MARINE (ROSYTH)  
OCCUPATIONAL HEALTH, SAFETY AND ENVIRONMENTAL  
POLICY STATEMENT**

**Introduction and Scope**

This Policy applies to Babcock Energy & Marine functions operating at Rosyth Business Park including Babcock Energy & Marine (Rosyth) Ltd; Port Babcock Rosyth Ltd and Rosyth Royal Dockyard Ltd. The Policy aligns with the Babcock International Group & Marine policies to ensure that an integrated approach to Occupational Health, Safety and Environmental Management are applied throughout the organisation in Rosyth with the fundamental aim of sending everybody home safe every day and a commitment to protecting the environment from pollution.

**Policy**

The Organisation shall:

- Ensure there is a commitment to meet the requirements of both ISO 45001:2018 & ISO 14001:2015 certification.
- Commit to providing safe and healthy working conditions for the prevention of work-related injury and ill health that is associated to its operational health and safety risks and opportunities.
- Comply with all applicable legal requirements that relate to our activities including, but not limited to, the responsibilities contained within the Health & Safety at Work etc. Act 1974, the Nuclear Installations Act 1965, the Environmental Protection Act 1990 and any specific Ministry of Defence, customer, interested parties or other requirements to which our organisation subscribes.
- Provide a commitment to fulfil its legal and other compliance obligations.
- Identify and assess hazards arising from our operations and processes and take such steps as necessary, to eliminate or reduce the health, safety and environmental risks so far as is reasonably practicable to employees, visitors, subcontractors and customer personnel whilst at work and who may be affected by their operations.
- Ensure top management communicate to all persons working under the control of the organisation to ensure they are aware of their health, safety and environmental obligations.
- Ensure top management recognise their responsibilities to consult with their employees under the Health and Safety (Consultation with Employees) Regulations.
- Provide information, instruction, training and supervision to ensure all our employees understand and embrace the requirements of the Occupational Health Safety and Environmental Management Systems.
- Identify and assess the environmental aspects and the associated impacts arising from our activities and take such steps as necessary, to eliminate or reduce so far as is reasonably practicable the adverse effects on the environment.
- Ensure there is a commitment to identify improvements in the management of energy, resources, emissions and discharges in all activities where economically viable.
- Ensure there is a commitment to address any identified non-conformities within Occupational Health Safety and Environmental Management Systems.
- Ensure there is a commitment to continual improvement and the progressive enhancement of Occupational Health Safety and Environmental Management Systems performance.
- Identifying and setting Occupational Health Safety and Environmental objectives and providing the framework for measuring and regularly reviewing the objectives and outcome.
- Propagating and developing a proactive Health, Safety and Environmental Just Culture.
- Encourage our colleagues to intervene if we see any unsafe behaviours and encourage others to challenge any unsafe working practices.
- Our organisation recognises that continual improvement in our Occupational Health Safety and Environmental Management Systems has positive benefits to its employees, its customers, the environment and for our company's reputation.

Catherine O'Reilly  
Human Resources and Corporate Services Director  
Marine & Technology  
March 2021

Sean Donaldson  
Managing Director – Energy & Marine  
March 2021

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## Appendix B - Mitigation Measures Minimising Environmental Impacts

Environmental Topic/Sub- Topic	Nature of Impact	Mitigation Measure	Action
<b>1. Radioactive Discharges</b>	Aqueous, gaseous and solid radioactive discharges are generated that could cause concern to human health and the environment.	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.  Stage 1 ID is being accomplished within lower limits than the previous RRDL discharge limits under EASR18.	RRDL is required to demonstrate compliance with Site License Conditions 32 and 33 regarding Radioactive Waste Management. See Reference 20.  The Head of Radioactive Waste Management and Health Physics has overall responsibility for the provision of a radioactive waste management service.
1a. Radioactive (Aqueous) Liquid Effluent discharges	Discharge is to the internationally designated and environmentally important Forth Estuary.	The cutting processes within the RC and the AWAFF are dry and do not generate liquid arisings.  The Portable Effluent Treatment Plant (PETP) is used to process effluent (from residual water within the ship's systems and tool decontamination) to minimise discharges to the environment.  Stage 1 ID is undertaken within reduced aqueous discharge limits and in accordance with Conditions of the EASR18 Permit.	Engineered measures and administrative controls are employed to minimise volumes and activities of discharges.  All discharges are sampled prior to release and records maintained
1b. Radioactive Potassium Chromate Solution	This is a lightly radioactive oxidising agent with persistent toxic qualities.	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.	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.  For Stage 2, BPM will be demonstrated for handling of potassium chromate solution. Under no circumstances will this be discharged to the aqueous environment

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<b>Environmental Topic/Sub- Topic</b>	<b>Nature of Impact</b>	<b>Mitigation Measure</b>	<b>Action</b>
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.
<b>2. Air Quality and Climate</b>			
2a. Non-Radioactive Discharges to Air	Use of fuels and release of other, greenhouse or ozone depleting gases can influence air quality and climate change.  There will be local, small impact of plant and vehicle exhausts throughout.	Plant and vehicle exhaust gases are minimised by good practice and maintenance but are a necessary part of the project.  Electrification of plant and vehicles would reduce emissions locally.	Energy is used efficiently in compliance with the Energy Policy [Reference 19]. Opportunities are being sought for energy savings.  The site facilities department have upgraded all their vehicles/ vans to electric power

Environmental Topic/Sub- Topic	Nature of Impact	Mitigation Measure	Action
	<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>Such specialised paints are currently required for submarine hull maintenance, but H&amp;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 are 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>The EAR [Reference 8] has been updated and takes 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 23] 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 Repulse was granted. Removal will commence in December.</p>
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>



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Environmental Topic/Sub- Topic	Nature of Impact	Mitigation Measure	Action
<b>3. Flora and Fauna (Ecology)</b>			
<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"> <li>• By radioactive effluent discharged to the estuary,</li> <li>• By discharge to the licensed dock drainage system and discharge to the NTB.</li> <li>• From leaks and spills</li> </ul>	<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"> <li>• 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.</li> <li>• 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.</li> </ul>	<p>Compliance with the Good Housekeeping Policy [Reference 24] is required.</p>

<b>Environmental Topic/Sub- Topic</b>	<b>Nature of Impact</b>	<b>Mitigation Measure</b>	<b>Action</b>
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>Potential nesting areas in dock have been netted to prevent return of the birds to the potentially hazardous areas.</p> <p>Note that they nested below flood-up level.</p>	<p>Compliance with the Good Housekeeping Policy [Reference 24 is required.</p> <p>Liaison with the RSPB has suggested the installation of nesting boxes on site. RSPB recommended nesting boxes have been procured and installed on buildings adjacent to the dock. These will not be checked as it may disturb birds if nesting.</p>
<b>4. Landscape and Visual Amenity</b>	<p>Where new buildings, large infrastructure or lighting to be required, there is a potential for impact on landscape and visual amenity.</p>	<p>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.</p>	<p>Lighting is used only as required.</p>
<b>5. Material Assets including Cultural Heritage</b>	<p>Unsympathetic work can cause damage to listed buildings or historic sites and artefacts.</p>	<p>No impact is envisaged on the listed buildings in or adjacent to Rosyth Business Park.</p> <p>Only very minor excavations are required and there is negligible chance of finding artefacts.</p>	<p>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 2022.</p>

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Environmental Topic/Sub- Topic	Nature of Impact	Mitigation Measure	Action
<b>6. Population, Socio-economics and Health and Wellbeing</b>			
6a. Socio-Economics	Direct and indirect economic benefits, both local and national.	<p>The maintenance of employment and skills enhancement of an increased and SQEP workforce.</p> <p>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.</p>	The team has expanded slightly in 2020-21 but further growth is anticipated as SDP progresses through Stage 2. Apprentices are still 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 2021 LLC meeting has been deferred until December due to legislative COVID19 restrictions and local guidance.
<b>7. Soil, Geology, Hydrogeology and Land Contamination</b>	Impacts can arise from pollution incidents, when land and water may become contaminated with secondary impacts on people, vegetation and aquatic life.	<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>

Environmental Topic/Sub- Topic	Nature of Impact	Mitigation Measure	Action
			Compliance is required with the Good Housekeeping Policy [Reference 24] and Disposal of Special Waste Policy [Reference 23].
<b>8. Water Quality and Resources</b>	Discharges/ Spills to the dock and to drainage systems could impact on Forth Estuary.	<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>	See above. Compliance is required with the policy for Radioactive Waste Management [Reference 20], the Good Housekeeping Policy [Reference 24] and with Disposal of Special Waste Policy [Reference 23].
<b>9. Noise, Vibration and Nuisance including dust emissions</b>	These have potential for impact on human health both of workers and the general public.	<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>	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.

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Environmental Topic/Sub- Topic	Nature of Impact	Mitigation Measure	Action
<b>10.Traffic and Transport</b>	Increased traffic can cause problems for local communities or capacity issues for infrastructure.	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.  Heavy goods vehicles avoid residential parts of Rosyth and travel on the lower road to the Ferrytoll roundabout and the M90.	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.
<b>11.Waste Management &amp; Sustainability</b>	Poor waste management can lead to detriment to water quality, health and socio-economics and cause land contamination.  Wasting opportunity of reuse and recycling leads to overuse of new materials and reduction of availability for future generations.	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.  Data from Swiftsure recycling campaign has resulted in an extended delay to Resolution waste leaving site whilst further characterisation of waste is undertaken.	Utilisation of the principles of the Waste Management Hierarchy.  Compliance with the policies for Radioactive Waste Management [Reference 20] and Disposal of Special Waste Policy [Reference23] is required.
<b>12.Land Use and Materials</b>	Sustainability issues.	Where appropriate, plant and tools will have potential for re-use at the end of the project.	

<b>Environmental Topic/Sub- Topic</b>	<b>Nature of Impact</b>	<b>Mitigation Measure</b>	<b>Action</b>
<b>13.Interaction of Project Impacts &amp; Other Development</b>	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.

## 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	Sept 20 – Aug 21	
<b>Radiological Discharges from RRDL in 12 month period, September to August</b>								
Radioactive Solid Waste								
Volume (m <sup>3</sup> )		64.15	0.00	-	103.25	<25.3**	<15	
Weight (Tonnes)			0.00	2.28	55.75	<0.61**	0.76	
Type								
	Metallic available for Recycling (Tonnes)		0.00	2.28	52.00	-	-	
	Non-metallic (Tonnes)		0.00	0.00	3.75**	<0.61**	0.76	
	Cobalt-60 (MBq)		Total 959.6**	Total 0.00	Total 1.26	604.20	16.05**	5.32
	All other radionuclides (MBq)					19,920	182.08**	67.22
Liquid Radioactive Waste								
	Volume (m <sup>3</sup> )		5.40	41	83.55	58.06	60.95	72.4
	Cobalt-60 (MBq)	<b>100</b>	0.71	3.2	5.09	0.89	0.23*	0.95
	Tritium (MBq)	<b>300</b>	10.80	56.35**	11.15	31.32	34.5*	25.14
	All other radionuclides (MBq)	<b>100</b>	0.51	3.43	7.57	3.21	2.81*	3.43
Gaseous Radioactive Waste								
	Volume (m <sup>3</sup> )		0.00	0.00	0.00		-	-
	Carbon -14 (MBq)	<b>50</b>	0.00	0.00	0.00	5.33E-02*	0.36*	0.34
	Tritium (MBq)	<b>10</b>	0.00	0.00	0.00	2.50E-02*	0.19*	0.18
	All other radionuclides (MBq)	<b>0.10</b>	0.00	0.00	0.00	0.0059	0.045*	0.043
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.								
<b>Non-Radiological materials dispatched for Recycling or for Landfill.</b>								
Volume (m <sup>3</sup> )			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			

	SEPA PERMIT LIMIT	Jan- Aug 16	Sept 16- Aug 17	Sept 17-Aug 18	Sept 18- Aug 19	Sept 19 – Aug 20	Sept 20 – Aug 21
<b>SDP Personnel***</b>			<b>113***</b>	<b>108</b>	<b>130</b>	<b>141</b>	<b>145</b>
*** Note totals in early years allow for retirement of older staff after skills transfer to new recruits							
<b>Training - hours</b>			<b>8000</b>	<b>5000</b>	<b>1000+</b>	<b>120</b>	<b>250</b>
<b>Reportable Accidents</b>			<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Manhours worked in Nuclear Business Unit since April 2015 895,000 hours</b>							
<b>Complaints from General Public</b>			<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>



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