

Office for Nuclear Regulation (ONR)

Site Report for Sellafield

West Cumbria Sites Stakeholder Group (WCSSG)

Report period 1 April 2022 - 30 September 2022



Foreword

This report is issued as part of ONR's commitment to make information about inspection and regulatory activities relating to the above site available to the public. Reports are distributed to members for the West Cumbria Sites Stakeholder Group and are also available on the ONR website (<http://www.onr.org.uk/llc/>).

Site inspectors from ONR usually attend West Cumbria Sites Stakeholder Group meetings where these reports are presented and will respond to any questions raised there. Any person wishing to inquire about matters covered by this report should contact ONR.

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List of Abbreviations

| | |
|-----------|--|
| AGR | Advanced Gas-cooled Reactor |
| AHF | Active Handling Facility |
| BEP | Box Encapsulation Plant |
| BEPPS-DIF | Box Encapsulation Plant Product Store-Direct Import Facility |
| C10 | Compartment 10 |
| CA | Competent Authority |
| CHS | Conventional Health and Safety |
| COMAH | Control Of Major Accident Hazard (Regulations 2015) |
| COSHH | Control of Substances Hazardous to Health (Regulations 2002) |
| EIMC | Enhanced Implementation Monitoring and Control |
| EPS | Encapsulation Product Store |
| FCHP | Fellside Combined Heat and Power |
| FGFL | First Generation Finishing Line |
| FGMSP | First Generation Magnox Storage Pond |
| FHP | Fuel Handling Plant |
| HALES | Highly Active Liquor Evaporation and Storage |
| HLWP | High Level Waste Plants |
| HPCP | Hold Point Control Plan |
| HSWA74 | Health and Safety at Work Act 1974 |
| INES | International Nuclear Event Scale |
| IRR17 | Ionising Radiations Regulations 2017 |
| ISF | Interim Storage Facility |
| KDM | Key Decommissioning Milestone |
| LC | Licence Condition |
| LI | Licence Instrument |
| LOLER | Lifting Operations and Lifting Equipment Regulations 1998 |
| MBGW | Miscellaneous Beta Gamma Waste |
| MHSWR99 | Management of Health and Safety at Work Regulations 1999 |
| MOP | Magnox Operating Plan |
| MRF | Magnox Reprocessing Facility |
| MSSS | Magnox Swarf Storage Silo |
| NIA65 | Nuclear Installation Act 1965 |
| NNL | National Nuclear Laboratory |
| OB | Original Building |

| | |
|-----------|--|
| ONR | Office for Nuclear Regulation |
| PFCS | Pile Fuel Cladding Silo |
| PICTS | Procurement of Information, Communications and Technology Services |
| PFSP | Pile Fuel Storage Pond |
| PSR | Periodic Safety Review |
| PSSR 2000 | Pressure Systems Safety Regulations 2000 |
| RAP | Replacement Analytical Project |
| SBI | System Based Inspection |
| SFM | Spent Fuel Management |
| SFS | Spent Fuel Services |
| SNM | Special Nuclear Materials |
| SPRS | Sellafield Product and Residue Store |
| SRP | Sellafield Product and Residue Store Retreatment Plant |
| SSB | Self Shielded Box |
| THORP | Thermal Oxide Reprocessing Plant |
| WTC | Waste Treatment Complex |
| WTR | Waste Treatment Route |

1. Inspections

1.1. Dates of Inspection

The ONR site inspectors made inspections on the following dates during the report period 01 April 2022 – 30 September 2022.

| | April 2022 | May 2022 | June 2022 | July 2022 | August 2022 | September 2022 |
|--|-------------------|-----------------|------------------|------------------|--------------------|-----------------------|
| Special Nuclear Materials (SNM) | 26-27 | 17 | 8-9,14 | 12-13 | - | 6 |
| Retrievals | - | 3-4, 10-11 | - | - | 9-10 | - |
| Remediation | 21, 26 | 11,12 | 15-16 | 4, 7 | - | 28-29 |
| Spent Fuel Management (SFM) | 6, 22, 27 | 11,17 | 15 | 14 | 3-4 | 26-27 |
| Site Management | - | - | 8-9, 14 | 13 | - | - |
| Corporate | 12 | 17-19 | 15-16, 21-22 | 20 | 31 | 1, 2, 13-15 21 |

2. Routine Matters

2.1. Inspections

Inspections are undertaken as part of the process for monitoring compliance with:

- the conditions attached by ONR to the nuclear site licence granted under the Nuclear Installations Act 1965 (NIA65) (as amended);
- the Energy Act 2013
- the Health and Safety at Work etc Act 1974 (HSWA74); and
- regulations made under HSWA74, for example the Ionising Radiations Regulations 2017 (IRR17) and the Management of Health and Safety at Work Regulations 1999 (MHSWR99).

The inspections entail monitoring the licensee's actions on the site in relation to incidents, operations, maintenance, projects, modifications, safety case changes and any other matters that may affect safety. The licensee is required to make and implement adequate arrangements under the conditions attached to the licence in order to ensure legal compliance. Inspections seek to judge both the adequacy of these arrangements and their implementation.

In the reporting period, we judged the arrangements made and implemented by the site in response to safety requirements to be satisfactory in the areas inspected. Where improvements have been identified, Sellafield Limited has made a commitment to address those issues, and ONR inspectors will closely monitor progress during future site inspections. Where necessary, we will take formal regulatory enforcement action to ensure that appropriate remedial measures are implemented to reasonably practicable timescales.

Members of the public, who would like further information on ONR's inspection activities during the reporting period, can view site Intervention Reports at www.onr.org.uk/intervention-records on our website www.onr.org.uk. Should you have any queries regarding our inspection activities, please email contact@onr.gov.uk.

Special Nuclear Materials Value Stream (SNM)

During the reporting period within the SNM value stream, we carried out four planned Licence Condition (LC) compliance inspections and one System Based Inspection (SBI) covering:

- LC 26 – Control and supervision of operations
- LC 32 – Accumulation of radioactive waste
- LC 35 – Decommissioning
- LC 36 – Organisational capability
- SBI – Ventilation of the Sellafield Product and Residues Store (SPRS)

The purpose of these inspections was to confirm Sellafield Limited's compliance with its corporate arrangements for LC 26, LC 32, LC 35 and LC 36 in SNM. In addition we carried out an Ionising Radiations Regulations (IRR) 2017 compliance inspection focussing on glove box management.

For all the planned LC compliance inspections, we judged that compliance with the LC met the legal standard and assigned green (no formal action) inspection ratings. We also judged that compliance with the IRRs met the legal standard and assigned a green (no formal action) inspection rating.

The SBI was against the standard set of licence conditions for such inspections; LC 10 - training, LC 23 - operating rules, LC 24 - operating instructions, LC 27 - safety mechanisms, devices and circuits, LC 28 - examination, inspection, maintenance and testing, and LC 34 - leakage and escape of radioactive material and radioactive waste. We judged that compliance with all the six standard licence conditions met the legal standard and assigned green (no formal action) inspection ratings. Our overall judgement was that the ventilation system fulfils the requirements of the safety case.

Retrievals Value Stream

During the reporting period within the retrievals value stream, we carried out two planned LC compliance inspections covering:

- LC 7 – Incidents on site
- LC 32 – Accumulation of radioactive waste

During the reporting period one SBI was postponed due to the UK Level 4 red warning for exceptional heat and associated travel restrictions. This inspection will now be undertaken during November 2022.

Pile Fuel Cladding Silo (PFCS)

Two planned compliance inspections were undertaken at the Pile Fuel Cladding Silo (PFCS) on the Sellafield Site. The purpose of these inspections was to confirm Sellafield Limited's compliance with its corporate arrangements for LC 7 and LC 32 in PFCS.

For all the planned LC compliance inspections, we judged that compliance with the LC met the legal standard and assigned green (no formal action) inspection ratings.

Remediation Value Stream

During the reporting period within the remediation value stream, we carried out 18 planned LC compliance inspections, one control of asbestos regulations 2012 compliance inspection and one Pressure Systems Safety Regulations 2000 (PSSR 2000) compliance inspection covering:

- LC 6 – Documents, records, authorities and certificates
- LC 7 – Incidents on the site
- LC 10 – Training
- LC 12 – Duly authorised and other suitably qualified and experienced persons

- LC 22 – Modification or experiment on existing plant
- LC 23 – Operating rules
- LC 24 – Operating Instructions
- LC 26 – Control and supervision of operation
- LC 27 – Safety mechanisms, devices and circuits
- LC 28 – Examination, inspection, maintenance and testing
- LC 34 – Leakage and escape of radioactive material and radioactive waste
- LC 36 – Organisational capability
- Control of Asbestos Regulations 2012, Regulation 4
- PSSR 2000 – Pressure Systems Safety Regulations 2000

Beta Gamma Operating Unit

A planned compliance inspection was conducted across the beta gamma operating unit on the Sellafield site. The purpose of the inspection was to confirm Sellafield Limited's compliance with its corporate arrangements for LC 36 across the beta gamma operating unit.

For the planned LC compliance inspection, we judged that compliance with LC 36 met the legal standard and assigned a green (no formal action) inspection rating.

Beta Gamma Operating Unit – B6

A planned compliance inspection was conducted at B6 on the Sellafield site. The purpose of the inspection was to confirm Sellafield Limited's compliance with its corporate arrangements for LC 6 in B6.

For the planned LC compliance inspection, we judged that compliance with LC 6 met the legal standard and assigned a green (no formal action) inspection rating.

Beta Gamma Operating Unit – B14

Five planned compliance inspections were conducted at B14 on the Sellafield site. The purpose of these inspections was to confirm Sellafield Limited's compliance with its corporate arrangements for LC 23, LC 27, LC 28, LC 34 and the Control of Asbestos Regulations 2012, Regulation 4 in B14.

For all the planned LC compliance inspections, we judged that compliance with the LC met the legal standard and assigned green (no formal action) inspection ratings. We also judged that compliance with the Control of Asbestos Regulations 2012, Regulation 4 met the legal standard and assigned a green (no formal action) inspection rating.

Alpha Operating Unit – Waste Treatment Complex (WTC)

Four planned compliance inspections were conducted at the Waste Treatment Complex (WTC) on the Sellafield site. The purpose of these inspections was to confirm Sellafield Limited's compliance to its corporate arrangements for LC10, LC12, LC 24 and LC 26 in WTC.

For all the planned LC compliance inspections, we judged that compliance with the LC met the legal standard and assigned green (no formal action) inspection ratings.

Analytical Services – Laboratory 54/54A

Four planned compliance inspections were conducted at the analytical services laboratory 54/54A on the Sellafield site. The purpose of these inspections was to confirm Sellafield Limited's compliance to its corporate arrangements for LC 23, LC 27, LC 28 and LC 34 in laboratory 54/54A.

For all the planned LC compliance inspections, we judged that compliance with the LC met the legal standard and assigned green (no formal action) inspection ratings.

Thermal Oxide Reprocessing Plant (THORP)

Five planned compliance inspections were undertaken at the Thermal Oxide Reprocessing Plant (THORP) on the Sellafield Site. The purpose of these inspections was to confirm Sellafield Limited's compliance with its corporate arrangements for LC 7, LC 22, LC 27 and LC 28 in THORP. In addition, we carried out a PSSR 2000 compliance inspection.

For all the planned LC compliance inspections, we judged that compliance with the LC met the legal standard and assigned green (no formal action) inspection ratings. We also judged that compliance with PSSR 2000 met the legal standard and assigned a green (no formal action) inspection rating.

Spent Fuel Management (SFM) Value Stream

During the reporting period within the Spent Fuel Management (SFM) value stream, we carried out 11 planned LC compliance inspections and one control of Substances Hazardous to Health (COSHH) regulations 2002 compliance inspection covering:

- LC 7 – Incidents on site
- LC 10 – Training
- LC 11 – Emergency arrangements
- LC 12 – Duly authorised and other suitably qualified and experienced persons
- LC 35 – Decommissioning
- LC 36 – Organisational capability
- Control of Substances Hazardous to Health 2002 (COSHH 2002)

Highly Active Liquor Evaporation and Storage (HALES)

Three planned compliance inspections were conducted at the Highly Active Liquor Evaporation and Storage (HALES) facility. The purpose of these inspections was to confirm Sellafield Limited's compliance with its corporate arrangements for LC 7, LC 35 and LC 36 in HALES.

For all the planned LC compliance inspections, we judged that compliance with the LC met the legal standard and assigned green (no formal action) inspection ratings.

High Level Waste Plants (HLWP)

Three planned compliance inspections were conducted at the High Level Waste Plants (HLWP). The purpose of these inspections was to confirm Sellafield Limited's compliance with its corporate arrangements for LC 7, LC 35 and LC 36 in HLWP.

For all the planned LC compliance inspections, we judged that compliance with the LC met the legal standard and assigned green (no formal action) inspection ratings.

Magnox Reprocessing Facility (MRF)

Two planned compliance inspections were conducted at the Magnox Reprocessing Facility (MRF) facility on the Sellafield site. The purpose of these inspections was to confirm Sellafield Limited's compliance with its corporate arrangements for LC 10 and LC 36.

For all the planned LC compliance inspections, we judged that compliance with the LC met the legal standard and assigned green (no formal action) inspection ratings.

Spent Fuel Services (SFS)

Three planned compliance inspections were conducted at the Spent Fuel Services (SFS) facility on the Sellafield site. The purpose of these inspections was to confirm Sellafield Limited's compliance with its corporate arrangements for LC 10, LC 11 and LC 12 in SFS. In addition, we carried out a Control of Substances Hazardous to Health 2002 (COSHH 2002) compliance inspection looking at the control of legionella.

For all the planned LC compliance inspections, we judged that compliance with the LC met the legal standard and assigned green (no formal action) inspection ratings.

During the COSHH 2002 compliance inspection, we were not satisfied that SFS was progressing the actions required by its own legionella risk assessment. We therefore judged that compliance against COSHH 2002 was below the legal standard and assigned an amber (seek improvement) inspection rating. In accordance with our Enforcement Management Model (EMM) an enforcement letter (ONR-EL-22-013) has been issued to seek the necessary improvements and this is being monitored via a level 3 regulatory issue.

Site Management

During the reporting period within the site management value stream, we carried out 6 LC compliance inspections including an assessment of the site's emergency exercise covering:

- LC 10 - Training
- LC 11 – Emergency arrangements
- LC 22 – Modification or experiment on existing plant
- LC 26 – Control and supervision of operations
- LC 28 – Examination, inspection, maintenance and testing
- LC 32 – Accumulation of radioactive waste

Infrastructure

Three planned compliance inspections were undertaken at the Fellside Combined Heat and Power (FCHP) plant which is operated by Px on behalf of Sellafield Limited. The purpose of these inspections was to confirm Px's compliance with Sellafield Limited's corporate arrangements for LC 12, LC 26 and LC 28.

For all the planned LC compliance inspections, we judged that compliance with the LC met the legal standard and assigned green (no formal action) inspection ratings.

Security and Resilience

A planned compliance inspection was undertaken of the Sellafield Limited Level 1 safety demonstration exercise (Exercise SIERRA LIMA 2). The purpose of this inspection was to observe the on-site emergency response exercise to confirm Sellafield Limited's compliance with its corporate arrangements for LC 11.

For the planned LC compliance inspection, we judged that compliance with LC 11 met the legal standard and assigned a green (no formal action) inspection rating.

Active Handling Facility (AHF)

Two planned compliance inspections were undertaken at the Active Handling Facility (AHF) operated by the National Nuclear Laboratory (NNL). The purpose of these inspections was to confirm NNL's compliance with Sellafield Limited's corporate arrangements for LC 10 and LC 32.

For all the planned LC compliance inspections, we judged that compliance with the LC met the legal standard and assigned green (no formal action) inspection ratings.

Corporate

Our corporate inspection programme for the Sellafield site has two main areas of focus:

- Undertaking a programme of corporate LC inspections to examine the adequacy of the corporate arrangements that Sellafield Limited has made to comply with its nuclear site licence, and sample the corporate/site-wide implementation of these arrangements; and
- Overseeing strategic change at Sellafield, including leadership and culture.

Corporate LC Inspections

During the reporting period we carried out four planned corporate LC inspections covering:

- LC 3 – Control of property transactions
- LC 7 – Incidents on the site
- LC 28 – Examination, inspection, maintenance and testing
- LC 36 – Organisational capability

Although LC 7 does not explicitly cover wider matters such as operational experience and organisational learning, we consider these aspects important for nuclear safety.

For this reason, the scope of the LC 7 corporate inspection covered wider operational experience/ organisational learning matters. In relation to these matters, we were satisfied that Sellafield Limited has defined an organisational learning improvement programme which should produce a sustained improvement. We will monitor this improvement programme to ensure that the necessary improvements are made.

For all the planned LC inspections, we judged that the arrangements met the legal standard and assigned green (no formal action) inspection ratings.

During the reporting period, we also continued to monitor improvement actions being taken by Sellafield Limited in response to previous corporate LC inspections.

Strategic Enterprise Change

Sellafield Limited is implementing a portfolio of wide-ranging business change aligned to its enterprise strategy. During the reporting period we have continued to maintain oversight of a number of strategic enterprise changes including: -

- Alternative delivery models for group business services and the Procurement of Information, Communications, and Technology Services (PICTS).
- Continued development of Sellafield Limited's intelligent customer organisation for the Programme and Project Partners contracts.
- Development of the new Sellafield Enterprise Management System.

In all cases we are satisfied that Sellafield Limited is controlling the changes in line with legal requirements including LC 36 - Organisational capability.

We also continue to engage with Sellafield Limited on trials that are ongoing at PFCS and HLWP of new arrangements for work delivery. Sellafield Limited is now considering whether to roll out these new work delivery arrangements to other facilities on the site.

During this reporting period, we undertook an assessment of the corporate governance of safety at Sellafield Limited. ONR specialist inspectors reviewed corporate governance arrangements and board papers related to safety, interviewed several board members, and observed a meeting of the Sellafield Limited board as well as one of its sub-committees. This is one of several planned corporate governance interventions being carried out across Great Britain's nuclear estate, normally undertaken on a five-yearly cycle for large licensee organisations. Further information will be provided in our next report to the WCSSG.

2.2. Other Work

Periodic Safety Review (PSR)

We have continued to engage with Sellafield Limited over identified opportunities for improvements within the PSR programme and to monitor and support the delivery of improvements identified during earlier PSR inspections.

During the reporting period, the “deep dive” assessment of the PSR of the Advanced Gas-cooled Reactor (AGR) storage pond within the SFM value stream will continue into the next reporting period.

We have also completed our reviews of the B277 and HALES PSR’s and are satisfied that Sellafield Limited has undertaken fit for purpose periodic safety reviews and met our expectations for LC 15 compliance. Notwithstanding this we continue to monitor the improvements identified during the periodic safety review in HALES.

Chemical Management

ONR continues to monitor Sellafield Limited’s arrangements for management of hazardous chemicals on site. Significant progress has been made with the milestones set out in the improvement plan. It is anticipated that the regulatory issue will be managed to closure this year.

Asbestos Management

Although Sellafield Limited has developed a site-wide asbestos management strategy, we have not seen sustained progress with the improvement programme over this reporting period. Consequently, ONR will be increasing the regulatory focus in this area.

Control Of Major Accident Hazards (COMAH)

The Sellafield site is an upper tier Control of Major Accident Hazards (COMAH) site. ONR as part of the Competent Authority (CA) has conducted a range of interventions focused upon the facility with the most significant off-site risk. This work includes the verification of alarm system installation; review of emergency response arrangements and tactical information plans; sampling effectiveness of major accident hazard control measures across conventional health and safety, process safety, human factors and electrical control and instrumentation disciplines. Shortfalls identified are being addressed through an improvement plan.

Sellafield Limited has made adequate progress with the COMAH improvement plan and our regulatory work for quarter 4 of 2022/23 will focus on verification to ensure the improvements identified are implemented.

There will be an assessment of the Cumbria Council resilience unit modular off-site emergency exercise programme in January 2023.

Conventional Health and Safety (CHS)

There have been a number of recent shortfalls in Conventional Health and Safety (CHS) compliance at the Sellafield site which indicates that the site-wide profile of risks with respect to CHS is not fully understood or given sufficient priority within the business. Although Sellafield Limited has established a system for the analysis of risks to CHS at the level of its Operating Units, it is not clear how this informs the overall site risk profile and corporate level priorities.

Sellafield Limited has acknowledged this and is developing an approach to address these shortfalls. ONR will be undertaking interventions in this area that target leadership and risk profiling for CHS and occupational health risks.

Permissioning Activity

Our permissioning process continues to monitor Sellafield Limited's planned submissions in accordance with its Hold Point Control Plan (HPCP), which forms part of its arrangements made to comply with a number of LCs, such as LC 22 - Modification or experiment on existing plant. This process ensures we have regulatory oversight and control over relevant Sellafield Limited activities.

Within this reporting period, we have released the following LC 22 hold point:

- HPCP 531: Import and Storage of NDA-owned Material at the First Generation Oxide Fuel Storage Pond (Mixed Oxide Repatriation)

NOTE

In line with the ONR Guide NS-PER-GD-001 "[The Purpose and Use of Permissioning](#)", the release mechanism for this hold point was determined as Enhanced Implementation, Monitoring and Control (EIM&C) and not a Licence Instrument (LI). This matter is therefore not included in the list of LIs and Enforcement Notices issued by ONR which are reported in Section 4 "Regulatory Activities".

Projects

Site Infrastructure

Analytical Services

We continue to engage with Sellafield Limited over the need to secure long-term provision of Analytical Services for the Sellafield site. This is necessary to support the safety of ongoing operations and, specifically, hazard and risk reduction activities across the site. The Replacement Analytical Project (RAP) continues to progress the detailed design phase of the project and is working toward securing Government approval for the full business case.

We have also continued to engage with Sellafield Limited on the asset care improvements and the reduction of legacy waste presently stored within the existing Analytical Services facility. Sellafield Limited has continued to make significant

progress in the asset care improvement work and is currently reviewing its options for repackaging, treatment and disposal of any remaining legacy wastes from within this facility post the cessation of the Magnox Operating Plan (MOP).

Special Nuclear Materials (SNM)

Through our three Level 1 regulatory issues (highest level of issue) we continue to engage and influence the delivery of hazard and risk reduction activities regarding the Sellafield Limited SNM facilities. Specifically, this includes asset care improvements on the First Generation Finishing Line (FGFL) facility and the delivery of capabilities to allow continued safe and secure storage of SNM.

With respect to FGFL asset improvements, Sellafield Limited continues to make satisfactory progress on the electrical and containment upgrade tasks within the SNM (North) complex.

During this period Sellafield Limited has also continued to make significant progress with regard to the previously permissioned activities for inspection, retrieval and repackaging of acute risk SNM packages.

ONR's current permissioning focus in this area relates to activities for the retrieval and repackaging of acute risk SNM packages from one of Sellafield Limited's SNM legacy stores.

The on-going construction of the Sellafield Product and Residue Store Retreatment Plant (SRP) is fundamental to the success of the future state programme; and forms part of our continued engagement and influence at Sellafield Limited to ensure the timely implementation of capabilities required for the safe longer-term storage of SNM inventory that has been consolidated from Dounreay to Sellafield.

Remediation Value Stream

Decommissioning Projects

Our regulatory engagements continue with the key remediation projects. We are currently engaging on two demonstrators; the alpha glovebox dismantler and the sort and segregate demonstrator. Sellafield Limited is implementing the lessons learnt from the skip size reduction active demonstrator, permissioned by ONR in July 2021, onto the new demonstrators.

The glovebox demonstrator is to develop an efficient and effective capability to semi-remotely decommission alpha-active gloveboxes using laser cutting technology. The sort and segregate demonstrator is trialling an approach to separate the intermediate active wastes from plutonium contaminated material, for a more efficient management of legacy crates. Both these demonstrators will be subject to formal permissioning by ONR in 2023.

Sellafield Limited has made good progress with demolition of the pile 1 chimney by removing the filter gallery in 2014 and completing the diffuser demolition in 2021. This has resulted in the seismic withstand of the remaining chimney section being similar to that of an existing structure. The next step is the removal of the barrel section of the

chimney, which will be carried out by means of a spider crane solution. This will be subject to ONR permission and engagement is currently underway.

We are also continuing our engagements with Sellafield Limited regarding the approach for floc removal from legacy tanks to longer term storage tanks. This plant modification proposal will be subject to ONR permissioning in 2023 / 2024.

Retrievals Value Stream

First Generation Magnox Storage Pond (FGMSP)

The FGMSP still contains significant volumes of historical inventory including various fuels, radioactive sludge and other solid wastes. This inventory presents a significant radiological risk as FGMSP does not meet modern containment standards due to the ageing pond structure and infrastructure obsolescence. Sellafield Limited has therefore developed a programme to reduce this risk systematically and progressively through retrieval of the bulk hazardous radioactive inventory.

Some fuels have been retrieved and exported to Fuel Handling Plant (FHP), and a small volume of sludge has been exported to the sludge packaging plant. Several Key Decommissioning Milestones (KDMs) have been put in place by the licensee in accordance with its arrangements under LC35 to reduce the remaining inventory from the facility.

The ONR regulatory focus continues to be on the retrieval, removal and export of fuel, intermediate level waste, and bulk sludge from the pond.

A key enabler is the removal of skips of radioactive inventory from the pond to Self-Shielded Boxes (SSBs) for interim storage in a purpose-built Interim Storage Facility (ISF). ONR will be monitoring progress via two regulatory Hold Points (HP); HP 271 for a particular waste stream (zeolites) and HP 406 for additional materials.

ONR continues the assessment of the ISF and SSB project in support of permissioning the release of HP 271. Technical engagements continue to discuss additional waste streams for the ISF (HP 406), and whether modifications are necessary for the additional materials.

Inactive commissioning of retrievals activities at FGMSP involving SSBs is planned to recommence in September/October 2022. Delays have arisen following an incident in February 2022 involving a clash of an empty skip with an SSB during inactive commissioning trials. Sellafield Limited has undertaken an investigation and is implementing a design solution. This has resulted in a delay to the ONR permissioning but currently the delay does not prevent achievement of the associated KDM for first export of an SSB to ISF.

We continue to follow-up on the impact of additional delays due to SSB manufacturing, quality, and nuclear safety issues. Some confidence in supply of SSBs has been gained with eight SSBs now on site with a further six being stored at the supplier's facility awaiting delivery.

Pile Fuel Storage Pond (PFSP)

ONR's regulatory focus continues to be on the retrieval, removal and export of intermediate level waste and bulk sludge from this pond, and preparation for its interim (dewatered) state.

Sellafield Limited postponed the deployment of divers in late 2021 when greater than expected radiation dose levels within the bays were identified. Sellafield Limited has now undertaken a review and revised its scope of work. We have therefore recommenced our regulatory assessment working closely with the Environment Agency to ensure regulatory alignment.

Magnox Swarf Storage Silo (MSSS)

The MSSS is deemed to represent an intolerable risk and retrieval of the radioactive waste stored in its twenty-two silo compartments is a priority for high hazard and risk reduction on site. Sellafield Limited has adopted a phased approach to waste retrievals, starting with retrieval of intermediate level radioactive miscellaneous beta gamma waste (MBGW) from compartment 10 (C10).

On 9 April 2022, ONR issued Licence Instrument (LI) 540 agreeing to Sellafield Limited's request to commence retrieval of MBGW from MSSS C10. ONR's assessment of Sellafield Limited's submission concluded that the company had provided appropriate evidence to demonstrate that the risk associated with commencing retrievals from C10 is reduced as low as reasonably practicable. Notwithstanding this, our assessments raised a number of recommendations for further improvements to future retrieval activities. The recommendations are being tracked via regulatory issues. These improvements were not considered of such significance to prevent the commencement of C10 MBGW retrievals.

Sellafield Limited has commenced MBGW retrievals from MSSS C10.

Start of bulk waste retrievals from the MSSS Original Building (OB) and first extension silo compartments is currently due to commence in 2024/25. ONR recognises the complexity of delivering hazard and risk reduction in MSSS and continues to engage with Sellafield Limited to secure regulatory confidence in its delivery plans and that the overall risks to people on and off site remain reduced so far as is reasonably practicable.

In November 2019, Sellafield Limited reported falling liquid levels from the MSSS OB waste storage compartments. The most probable source of the leak is from historic leak paths to ground from cracks within the OB structure. There was a leak to ground from the OB in the 1970s, which gradually reduced over the decade to the limit of detection.

The current MSSS OB leakage rate did increase with time but has remained relatively unchanged at around 2.3-2.5m³/day since April 2021.

ONR and the Environment Agency issued two joint letters to Sellafield Limited outlining regulatory expectations for managing the risks arising from the MSSS OB leakage to ground. ONR is monitoring progress with the management of the risk via a

level 2 regulatory issue containing ten actions which Sellafield Limited is required to address within appropriate timescales.

There are currently no radiological consequences for the public or workforce resulting from the MSSS OB leakage to ground. Ground modelling and underpinning research concludes that the higher activity radioactive species are bound close to the facility. Migration of significant contamination through the ground is predicted to take decades and any risk to the environment and public would be very low and over an extended timescale. This exceeds the time it will take to remove and remediate the MSSS facility.

Based on ground modelling and underpinning research, there is judged to be no risk to public water supply resulting from this leak. ONR concurs with Sellafield Limited's current judgment on this matter.

On 29 July 2022, Sellafield Limited provided the outstanding responses to the regulatory issue actions. ONR inspectors are currently assessing the responses.

Facilities to support waste retrievals from legacy silos

To support waste retrievals from the legacy silos, MSSS and PFCS, Sellafield Limited needs to progress the construction of several new build facilities and implement modifications to existing facilities. ONR continues to maintain regulatory focus in these areas to ensure we have the necessary regulatory confidence that Sellafield Limited has the key enablers in place to safely store the waste retrieved from the legacy silos and that the overall risks to people on and off site remain reduced so far as is reasonably practicable.

The Box Encapsulation Plant (BEP) is currently under construction and is due to commence active commissioning in 2026. This facility is required to support both MSSS and legacy ponds waste retrievals. Sellafield Limited is continuing to complete installation of plant and equipment to schedule, building regulatory confidence in its delivery plans to ensure the facility is available to deliver the high hazard and risk reduction in MSSS.

Subject to ONR permission, Sellafield Limited expects Box Encapsulation Plant Product Store and Direct Import Facility (BEPPS-DIF) to be available to support PFCS waste retrievals in January 2023.

Waste retrieved from the legacy silos is placed in stainless steel 3m³ boxes to enable on-site storage. Volume manufacture of the 3m³ box design for MSSS waste is proving challenging, as such ONR continues to engage with Sellafield Limited to secure regulatory confidence that boxes will be available to support the future MSSS waste retrieval programme and that there is an adequate process to manage any boxes manufactured outside the specification.

In February 2022, ONR issued the Licence Instrument (LI 537) agreeing to Sellafield Limited's request to commence active commissioning and operation of the Waste Transfer Route (WTR) and Encapsulated Product Store 3 (EPS3) for the receipt,

processing and storage of MSSS C10 MBGW waste packages. The first packages of MBGW from MSSS C10 have been received into EPS3 via WTR during this period.

Pile Fuel Cladding Silo (PFCS) radioactive waste retrieval programme

PFCS is deemed to represent an intolerable risk and retrieval of the radioactive waste stored in its six silo compartments is a priority to achieve high hazard and risk reduction on the site. Sellafield Limited has adopted a two-stage approach. The first stage – ‘Early Retrievals’ - involves accessing only compartment 5 of the silo and removing waste through a high-level penetration in the compartment wall above the level of the waste. This first stage will enable Sellafield Limited to gain sufficient knowledge, experience, and confidence in the waste retrieval approach to implement the second stage – ‘Full Retrievals’ – which will enable waste retrievals from the remaining five compartments.

ONR previously issued Licence Instrument (LI 536) agreeing to the request from Sellafield Limited to commence active commissioning and operation of the waste retrievals equipment installed on PFCS compartment 5 in March 2022. Although Sellafield Limited has commenced active commissioning, operational challenges with the waste retrieval crane have prolonged the active commissioning activities. No waste packages are expected to be produced for export to stores until 2023.

ONR’s regulatory focus will continue in this area to secure regulatory confidence in Sellafield Limited’s delivery plans and that the overall risks to people on and off site remain reduced so far as is reasonably practicable.

Non-Routine Matters

Licensees are required to have arrangements to respond to non-routine matters and events. ONR inspectors judge the adequacy of the licensee's response, including actions taken to implement any necessary improvements.

Matters and events of particular note during the period were:

Spent Fuel Management (SFM) Value Stream

Magnox Reprocessing Facility (MRF)

The investigation into the October 2021 incident where an employee fell from a scaffolding ladder and injured their back whilst undertaking work in the Low Active Cell at MRF is in the later stages. A number of witness statements have been taken and pieces of evidence gathered. ONR is currently reviewing this evidence to determine if any further enforcement action is required.

During this period ONR undertook preliminary enquiries in response to an incident where an individual provided a positive urine sample for an intake of radioactive material at MRF. The sample was provided as part of a three yearly routine internal dosimetry monitoring programme.

Following assessment by the Sellafield Limited approved dosimetry service, it was concluded that the individual had received a radiation dose of 23 milli-Sieverts. This exceeds the annual statutory dose limit of 20 milli-Sieverts set in the Ionising Radiations Regulations 2017 (IRR17) for the calendar year of 2020. This incident was provisionally reported as an anomaly on the International Nuclear Event Scale (INES 1) but was subsequently revised to an INES 2 (incident) when the final dose calculations were completed.

Due to the nature of this incident ONR commenced a formal investigation. Despite extensive enquiries by ONR and Sellafield Limited the cause of the elevated dose was unable to be determined. We were satisfied that Sellafield Limited has responded appropriately to this incident by placing the individual on restricted activities (to minimise further radiation dose) and providing support and welfare to the individual.

Since the cause of the increased dose could not be identified, the investigation was concluded. In light of this we were unable to determine if there were any shortfalls in legal compliance that led to this increased dose and hence no formal action was deemed appropriate.

On the 18 July 2022, Sellafield Limited took the operational decision to cease reprocessing activities at MRF. ONR will continue to conduct regular inspections of the MRF whilst it goes through a period of run down and throughout post operation clean out. The remaining spent fuel that was not reprocessed will be stored in a safe and secure location on the Sellafield site pending longer term storage and disposal.

Highly Active Liquor Evaporation and Storage (HALES)

ONR has completed an assessment of a legionella risk and control measures at the HALES facility. We recognise that a significant amount of work has been undertaken to provide improvements in legionella management and acknowledge that the HALES facility has a number of constraints that limit the ability of Sellafield Limited to meet the practical advice outlined in the Health & Safety Executive (HSE) Approved Code of Practice (ACOP) L8 “Legionnaires’ disease”. However, on balance, ONR concluded that Sellafield Limited had not yet demonstrated that it had done all that was reasonably practicable to manage the legionella risk.

In accordance with our Enforcement Management Model (EMM), ONR issued an enforcement letter (ONR-EL-22-006) to seek further improvements to ensure that the legionella risk at HALES is managed to be as low as reasonably practicable.

Retrievals Value Stream

Magnox Swarf Storage Silo (MSSS)

As previously reported, due to an increase in the baseline temperatures seen in the third extension within MSSS, Sellafield Limited is installing a chiller to supplement the existing Mk IV cooler to aid heat management in the third extension. ONR has been monitoring the installation and commissioning of the chiller via a regulatory issue.

ONR undertook preliminary enquiries following an incident where an operative identified contamination on their hands and face when leaving MSSS. Internal dose monitoring and assessment was completed with no significant internal dose being received or recorded on the individual’s dose records. We were therefore satisfied that the ONR criteria for formal investigation was not met. ONR will follow up the actions identified by the Sellafield Limited’s investigation into this event as part of the Ionising Radiations Regulation 2017 inspection planned in the facility in October 2022.

Joint Intervention with the Environment Agency

During the reporting period, we supported the Environment Agency in a series of themed pond inspections at FGMSP, PFSP and the fuel handling plant.

Regulatory Activity

ONR may issue formal documents to ensure compliance with regulatory requirements. Under nuclear site licence conditions, ONR issues regulatory documents, which either permit an activity or require some form of action to be taken; these are usually collectively termed ‘Licence Instruments’ (LIs) but can take other forms. In addition, inspectors may take a range of enforcement actions, to include issuing an Enforcement Notice.

During the reporting period we have issued one Licence instrument and two enforcement letters, the details of which are all discussed above and summarised in the table below :-

Table 1: Licence Instruments and Enforcement Notices Issued by ONR during the reporting period

| <i>Date</i> | <i>Type</i> | <i>Ref. No.</i> | <i>Description</i> |
|------------------|--------------------|-----------------|---|
| 16 May 2022 | Enforcement Letter | ONR-EL-22-006 | HALES – Legionella Management |
| 2 September 2022 | Enforcement Letter | ONR-EL-22-013 | Control of Legionella at Spent fuel Services |
| 9 April 2022 | Agreement | LI 540 | Agreement to commence retrieval of Miscellaneous Beta Gamma Waste from the Magnox Swarf Storage Silo Compartment 10 |

Reports detailing the above regulatory decisions can be found on the ONR website at <http://www.onr.org.uk/pars/>.

News from ONR

For the latest news and information from the Office for Nuclear Regulation, please read and subscribe to our regular email newsletter 'ONR News' at www.onr.org.uk/onrnews

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