



**OFFICIAL**

**Package Integrity Recovery Programme**

**Agreement to commence the operation of the FL4 Repack Glovebox Facility for the over-packing of Type 1 Packages within SNM North**

Project Assessment Report ONR-SDFW-PAR-18-035  
Revision A  
22 July 2019

**OFFICIAL**

## OFFICIAL

© Office for Nuclear Regulation, 2019

If you wish to reuse this information visit [www.onr.org.uk/copyright](http://www.onr.org.uk/copyright) for details.

Published 09/19

*For published documents, the electronic copy on the ONR website remains the most current publicly available version and copying or printing renders this document uncontrolled.*

## OFFICIAL

### EXECUTIVE SUMMARY

#### Title

Agreement to commence the operation of the FL4 Repack Glovebox Facility for the over-packing of Type 1 Packages within SNM North

#### Permission Requested

Sellafield Ltd (SL) has requested the Office for Nuclear Regulation's (ONR) agreement to commence the operation of Finishing Line 4 (FL4) Repack Glovebox Facility for the over-packing of Type 1 Packages within Special Nuclear Materials (SNM) North. SL's request is in accordance with its arrangements made under Licence Condition (LC) 22: *Modification or experiment on existing plant*.

#### Background

Within SL's SNM inventory there is a population of multi-layered packages currently stored within a bespoke SNM store. The store is located in a facility within the SNM-North (SNM(N)) complex. The packages consist of a metallic inner can, containing the SNM, and an over-layer of polyvinyl chloride (PVC). The inner can and PVC layer are then packed within a metallic intermediate can and finally a Type 1 stainless steel outer can.

SNM packages containing PVC may deteriorate in storage. The PVC layer can degrade as a result of thermal and radiolytic effects. The degradation products can corrode the package materials of construction. Also, the packages can pressurise as a result of gas generation during storage. Both these mechanisms potentially challenge packages' structural integrity. SL's extant safety case that justifies the safe storage of the packages takes account of the risk of package deterioration. SL plans to construct a new facility on site, known as the Sellafield Product and Residue Retreatment Plant (SRP), to condition SNM packages for safe long-term storage.

Recent inspections by SL identified that a small number of the Type 1 overpacks appear to be degrading at faster rates than SL predicted. SL considers that the degree of degradation is such that it presents a significant challenge to package integrity, and therefore nuclear safety, before SRP is available to remove the risk of failure. SL is proposing to retrieve all the Type 1 overpacks from the store and transfer them to a new glove box suite within the redundant Finishing Line 4 area located within the SNM(N) complex.

Operation of the store within SNM(N) is key to SL being able to meet its objective of risk reduction and safe storage of nuclear material. Loss of containment could result in widespread contamination of the store (due to its design of open racking and forced cooling), which would present significant challenges to its continued operation and wider ability to treat the SNM population.

Within the glove box containment, the overpacks will then be opened and as much of the PVC removed as reasonably practicable before placing the SNM inner can into two new additional layers of vented stainless steel overpack. The packages will then be transported back into the SNM store. The operations will be undertaken using a combination of manual and automated equipment, utilising both new and existing plant and processes. SL considers that the work will be sufficient to ensure that the remediated packages will be safe to store until SRP is available. Based on our assessment, ONR judges SL's position on this aspect to be valid.

ONR has a Level 1 Regulatory Issue associated with the risk of loss of containment from deteriorated SNM packages. The issue is the highest level of importance and reflects the potential safety impact arising from the deteriorated packages. This project is part of SL's response to the actions attached to the Issue.

#### Assessment and inspection work carried out by ONR in consideration of this request

Following initial consideration of SL's proposed modification and associated safety case; I judged it proportionate to obtain specialist safety inspector advice based on the significance of

OFFICIAL

## OFFICIAL

the potential faults and consequences that could arise from its implementation. I sought advice from fault studies, criticality, chemical engineering, radiological protection, mechanical engineering and human factors ONR specialist inspectors. In addition, ONR has undertaken a readiness inspection to assess SL's implementation of its safety case under its LC 22 arrangements for the proposed modification to inform the permissioning decision. My assessment also took account of SL's due process for developing and justifying the proposal including the findings of SL's internal regulator, who provided additional oversight and challenge.

### **Matters arising from ONR's work**

ONR's specialist inspectors did not identify any nuclear safety shortfalls or raise any recommendations to prevent ONR agreeing to SL's request. As a result, all support ONR agreeing to SL's request.

ONR's readiness inspection judged SL's implementation of its safety case under its LC 22 arrangements for the proposed modification as adequate. In addition, SL has confirmed to my satisfaction that its proposal has been subject to independent internal governance by its Management Safety Committee and oversight by its internal regulator. All have concluded that they have no objection to SL's proposed modification, which provides additional regulatory confidence.

### **Conclusions**

Based on the safety case evidence sampled, I am of the opinion that for SL's proposed modification, SL has provided adequate evidence to demonstrate that:

- It has done all that is reasonably practicable within the conduct of its undertaking, such that for the proposed activity the risks to the public and workers are reduced to ALARP.
- Suitable and sufficient safety measures have been designed and implemented.
- It has adequately implemented its safety case in accordance with arrangements made under the LC 22 such that there are no safety shortfalls that would prevent ONR agreeing to SL's request.
- It has been subject to an adequate level of independent internal challenge and governance in accordance with SL's established arrangements.

### **Recommendations**

ONR should issue Licence Instrument 522 agreeing to SL's request.

## LIST OF ABBREVIATIONS

ALARP	As Low As Reasonably Practicable
EA	Environment Agency
EIM&T	Examination, Inspection, Maintenance and Testing
FL	Finishing Line
HF	Human Factors
LC	Licence Condition
mSv	milli-Sievert
ONR	Office for Nuclear Regulation
PAR	Project Assessment Report
PVC	Polyvinyl Chloride
RGP	Relevant Good Practice
RI	Regulatory Issue
SAP	Safety Assessment Principles
SFC	Safety Function Classification
SL	Sellafield Limited
SQEP	Suitably Qualified and Experienced Person
SNM	Special Nuclear Material
SRP	Sellafield Product and Residue Store Retreatment Plant

**OFFICIAL**

**TABLE OF CONTENTS**

1	PERMISSION REQUESTED .....	7
2	BACKGROUND .....	7
3	ASSESSMENT AND INSPECTION WORK CARRIED OUT BY ONR IN CONSIDERATION OF THIS REQUEST .....	8
4	MATTERS ARISING FROM ONR'S WORK.....	9
5	CONCLUSIONS .....	14
6	RECOMMENDATIONS.....	15
7	REFERENCES .....	16

## OFFICIAL

### 1 PERMISSION REQUESTED

1. Sellafield Ltd (SL) has requested Office for Nuclear Regulation's (ONR) agreement to commence the operation of the Finishing Line (FL) 4 Repack Glovebox Facility for the over-packing of Type 1 Packages within SNM North (Ref. 1). SL's request is in accordance with its arrangements made under Licence Condition (LC) 22: *Modification or experiment on existing plant*.
2. In support of SL's request, it has submitted an associated Plant Modification Proposal (Ref. 2), which has been subjected to consideration and approval at SL's Special Nuclear Material (SNM) (North) Management Safety Committee (Ref. 3).
3. SL's proposed modification has also been subject to independent oversight by its Internal Regulator (the scope of which is identified by Ref. 4). This has included an assessment of the design and safety case and an independent readiness review by a team of SL subject matter experts (Ref.'s 5 & 6 respectively). Both reviews have confirmed that there are no outstanding safety issues from a SL perspective that would prevent implementation of the proposed modification.
4. This project assessment report (PAR) provides the ONR judgement on SL's request. It has been produced in accordance with ONR guidance (Ref. 7). The permissioning strategy for this regulatory hold point has been previously agreed with the ONR Sellafield sub-division Delivery Lead (Ref. 8).

### 2 BACKGROUND

5. Within SL's SNM inventory there is a population of multi-layered packages currently stored within a bespoke SNM store. The store is located in a facility within the SNM-North (SNM(N)) complex. The packages consist of a metallic inner can, containing the SNM, and an over-layer of polyvinyl chloride (PVC). The inner can and PVC layer are then packed within a metallic intermediate can and finally a Type 1 stainless steel outer can.
6. SL identified that SNM packages containing PVC may deteriorate in storage. The PVC layer can degrade as a result of thermal and radiolytic effects. The degradation products can corrode the package materials of construction. Also, the packages can pressurise as a result of gas generation during storage. Both these mechanisms potentially challenge packages' structural integrity. SL's extant safety case that justifies the safe storage of the packages takes account of the risk of package deterioration. SL has plans to construct a new facility on site, known as the Sellafield Product and Residue Retreatment Plant (SRP), to condition SNM packages for long-term storage.
7. Recent inspections by SL identified that a small number of the Type 1 overpacks appear to be degrading at faster rates than predicted. The degree of degradation is such that it presents significant challenge to package integrity, and therefore nuclear safety, before SRP is available to remove the risk of failure. SL is proposing to retrieve all the Type 1 overpacks from their store and internally transport them to a new glove box suite within the redundant Finishing Line 4 area located within the SNM(N) complex.
8. Operation of the store within SNM(N) is key to SL being able to meet its objective of risk reduction and safe storage of nuclear material. Loss of containment could result in widespread contamination of the store (due to its design of open racking and forced cooling), which would present significant challenges to its continued operation.
9. Within the glove box containment, the overpacks will be opened and as much of the PVC removed as reasonably practicable before placing the SNM inner can into two

OFFICIAL

## OFFICIAL

new additional layers of vented stainless steel overpack. The packages will then be transported back into the SNM store. The operations will be undertaken using a combination of manual and automated equipment, utilising both new and existing plant and processes. SL considers that the work will be sufficient to ensure that the remediated packages will be safe to store until SRP is available.

10. ONR has a Level 1 Regulatory Issue associated with the risk of loss of containment from deteriorated SNM packages. The issue is the highest level of importance and reflects the potential safety impact arising from the deteriorated packages. This project is part of SL's response to the actions attached to the Issue.
11. Once implemented, the proposed modification will improve the store's resilience to loss of containment faults and will also inform the science programme for the development of the future long-term conditioning capability.

### 3 ASSESSMENT AND INSPECTION WORK CARRIED OUT BY ONR IN CONSIDERATION OF THIS REQUEST

12. Given the increase in radiological risk to operators and potential high dose fault consequences posed by the recovery and repacking of these potentially degraded overpacks, I judged it proportionate to obtain ONR specialist safety inspector advice. I therefore sought advice from the following specialist areas, which was initially agreed with the ONR Sellafield sub-division Delivery Lead as part of agreeing the regulatory permissioning strategy (Ref.8):

- Fault studies
- Criticality
- Human factors
- Mechanical engineering
- Radiological protection
- Chemical engineering

13. Following my initial consideration of SL's proposed modification, I targeted the above disciplines given that:

- The key faults identified comprise loss of containment and criticality, which are mitigated by operational controls and mechanical systems, structures and components with significant safety functional claims;
- Operator doses could increase during normal operations and could be significant during fault conditions due to the nature of the material being handled;
- Specific safety claims are made on the potential for a flammable atmosphere within the packages during handling.

14. To initiate the regulatory engagement on SL's proposed modification, an initial intervention was held between SL and ONR that focussed on clarifying ONR's understanding of the modification and supporting safety case, and also provided the opportunity to advise on regulatory expectations (Ref. 9). An additional intervention was also undertaken, which allowed ONR to witness the final glove box assembly and proposed operations at works prior to shipping to the Sellafield site (Ref. 10)

15. The permissioning decision has also been informed by an ONR facility-based readiness inspection to assess SL's implementation of its LC 22 arrangements for the proposed modification (Ref. 11).

16. In accordance with the ONR/Environment Agency (EA) Memorandum of Understanding, I have consulted with the EA whether it had any objections on environmental grounds to ONR agreeing to SL's request. The EA has confirmed that it

OFFICIAL



## OFFICIAL

has no objection (Ref. 12). Similarly, the ONR safeguards and civil nuclear security division have confirmed that they have no objection to ONR agreeing to SL's request (Ref.'s 13 and 14 respectively).

### 4 MATTERS ARISING FROM ONR'S WORK

#### 4.1 ONR ASSESSMENT

17. The process employed by ONR in carrying out its permissioning activities is defined in ONR procedures (Ref. 7). As in all aspects of its regulatory activities, ONR employs a sampling regime in the assessment of safety cases. Specialist assessors have applied appropriate national and international standards, the relevant ONR Safety Assessment Principles (SAPs) (Ref. 7) and ONR Technical Assessment Guides (Ref. 7). Having sought ONR specialist assessment advice on claims, arguments and evidence presented within SL's proposed modification, the advice and conclusions provided are summarised as follows.
18. The fault studies inspector has undertaken an assessment of SL's proposal, predominately focussing on the adequacy of SL's fault identification and analysis process, including the identification of suitable and sufficient safety measures with appropriate safety classification. The inspector has also considered SL's application of the defence in depth principle and the resilience of the facility (Ref. 15).
19. The inspector judged that SL has identified a comprehensive list of faults that could lead to radiological consequences and has performed fault analysis in accordance with Relevant Good Practice (RGP) (specifically ONR's SAPs (Ref. 7)). The inspector considers that SL has identified reasonably practicable safety measures to ensure that the risk of a fault leading to radiological consequences has been reduced so far as is reasonably practicable. Further, that SL has applied a safety function and safety classification to the identified safety measures in accordance with the inspector's expectations from the relevant SAPs. The inspector also judges that the facility has appropriately considered defence in depth having identified a number of measures to ensure that a breach of primary containment should not result in consequences to a worker or member of the public.
20. The inspector has assessed SL's claim that it unlikely that the corrosion of the packages will result in bulk release based on the condition of all package layers. To support this position, SL has introduced assumption requirement that operators will perform a visual inspection of the can and if screw threads are visible, should confirm that the outer package lid is hand tight before being transported. Further, SL will be moving the packages in filtered PVC bags, which are identified as a safety feature, with a safety function class of 2. The inspector judges that these measures would support SL's position that bulk release from a package is not reasonably foreseeable.
21. The inspector is content on the adequacy of EIM&T for safety significant SSC. Specifically, but not limited to, the FL4 package transfer trolley, FL4 transfer bench and the castell key system. ONR gained further assurance on the adequacy of these EIM&T arrangements during the readiness inspection (Section 4.2).
22. The inspector identified a shortfall with the lack of formal arrangements detailing how SL assesses contaminated wounds (noting that this was done outside of the radiological assessment). The inspector judged that this is a corporate shortfall rather than project-specific and raised a Level 4 Regulatory Issue to address this from a corporate perspective. The inspector's judgement is based on the fact that SL has assessed this risk for the proposed modification, which has been assessed by the ONR radiological protection, human factors and mechanical engineering inspectors (with their findings detailed later in this section).

OFFICIAL

## OFFICIAL

23. In summary, the fault studies specialist inspector judges that SL has demonstrated that risks from the proposed modification will be ALARP and supports ONR agreeing to SL's request.
24. The criticality inspector has undertaken an assessment of SL's proposed modification predominantly focussing on the bounding fissile material compositions used, criticality safety criterion applied, normal operations and fault conditions (Ref. 16).
25. Based on the simple operations being performed (i.e. one can repackaged at a time in a largely dry process), the inspector is satisfied that SL has demonstrated large criticality safety margins during normal operations and fault conditions. This judgement is based on SL's adequate demonstration that, in accordance with RGP (specifically ONR's SAPs (Ref. 7)), the double contingency principle has been met (i.e. no single fault (or change in process conditions) leads to a critical system); suitable and sufficient fault identification has been undertaken and conservative assumptions within the criticality calculations have been applied to identify conditions and limits for safe operation.
26. The inspector identified that the criticality safety assessment is underpinned by an operating rule that only one Type 1 overpack will be correctly selected from Store 5 and transferred and processed within FL4 at any one time. This will be complied with via an operational designation and Duly Authorised Person verification. The inspector recommended that ONR inspects SL's arrangements to implement this condition. I consider that this was adequately demonstrated by SL during the ONR readiness inspection (See Section 4.2 for details). Based on this, the inspector supports ONR agreeing to SL's request.
27. The human factors inspector has undertaken an assessment of SL's proposal, predominately focussing on whether the licensee has performed a suitable and sufficient human factors analysis of the FL4 Repacking Activity (Ref.17). This included SL's analysis of the FL4 repacking task and the new equipment that will be used to support operations and reduce risks to ALARP. The inspector has also considered the adequacy of the human based safety claims made on the operator for the FL4 repacking task.
28. The HF inspector is content that the task and equipment design supports reliable task performance. Their confidence comes from:
  - The detailed task analysis conducted that identified potential errors and ways in which to prevent these i.e. user requirements
  - The user requirements that have been made and implemented, supported by the Verification Report ,
  - Successful completion of usability trials
  - Compliance with SL's engineering and ergonomic standards, and
  - The extensive operational experience that SL has using gloveboxes.
29. The HF inspector judges that the glovebox design meets RGP expectations and is compliant with SL's engineering standard and relevant sections of its ergonomics guidance (SL Ergonomics Guidance 7273).
30. The inspector is also content that the risk of contaminated wounds has been adequately considered, through provision of appropriate equipment, guards and interlocks to reduce the potential for wounds from mechanical and thermal hazards. The HF inspector is satisfied that SL has minimised the potential for dropped packages/cans through the provision of equipment for FL4 that reduces the requirement for operators to manually handle the FL4 Packages.

## OFFICIAL

## OFFICIAL

31. In summary the HF inspector judged that SL has adequately integrated human factors into the FL4 repacking activity. This judgement is based on SL having met their expectations with respect to the relevant ONR's SAPs (Ref: 7) and the fact that SL HF SQEPs have considered the entirety of the repacking task, the equipment to be used for this activity, the people that will be conducting this activity and the administrative controls that will be implemented to control this activity. This resulted in:
- Design changes that support reliable task performance,
  - Procedures that have been developed, subjected to HF review and trialled, and
  - The claims made on the operator being substantiated with further confidence that reliable task performance is achievable due to the training programme, task and equipment design, trial experience and learning from previous glovebox experience.
32. The inspector did raise a number of recommendations to inspect SL's implementation of its arrangements in the following areas:
- Close out of HF outstanding actions identified within SL's Human Factors Verification Report
  - That each of the Duly Authorised Persons supervising the work has appropriate training and experience and that there is a clear understanding of what is meant by 'enhanced supervision'
  - Confirmation that the potential for error has been considered and minimised in relation to the number of bags required by the Operating Assumptions when removing packages from storage
  - That the management of fissile material is adequately managed and the number and use of trolleys is suitably controlled.
  - Adequacy of the check to confirm the tightness of the package lid and confidence in relation to this.
33. These were adequately demonstrated by SL during the ONR readiness inspection (See Section 4.2 for details). Based on this, the inspector supports ONR agreeing to SL's request.
34. The chemical engineering inspector focussed on the key claims underpinning hydrogen hazard management strategy (Ref. 18). The assessment focused on the ability of the packages to passively exchange (vent) gases with the surrounding environment. This included consideration of the package passive ventilation performance and faults associated with the formation of a flammable atmosphere, specifically the blockage of gas pathways and thus a potential hydrogen excursion hazard.
35. The inspector judged that SL has adequately analysed the potential for the generation of hazardous materials through normal processes and fault conditions having met their expectations with respect to the relevant ONR's SAPs (Ref. 7). The inspector also judges that SL has adequately substantiated the passive ventilation performance of the cans and is satisfied with SL's claim that the process selected reduces the risks ALARP when set against the urgent need to repackage them.
36. In conclusion, the inspector is content that SL has adequately demonstrated that: there is a requirement to repackage the SNM packages; the presence of hydrogen will not result in a realistic hazard during the repackaging; and the process selected by SL is adequate with respect to hydrogen safety. Based on this, the inspector supports ONR agreeing to SL's request.
37. The mechanical engineering inspector has undertaken an assessment of SL's proposal (Ref 19). The assessment predominately focussed on the design of the glove

OFFICIAL

## OFFICIAL

box, mechanical opening of the different can layers, sharps assessment, ventilation extract system and package examination, maintenance, inspection and testing (EIM&T). The latter forms part of SL's compliance against LC 28 (EIMT) for the packages. The Safety Function Classification (SFC) for the main FL4 Structures Systems and Components are as follows:

- Glove box – Containment function under normal and fault conditions – SFC 1 (SL's highest safety functional classification)
  - Ventilation extract system – Containment function of extract ductwork under normal and fault conditions – SFC 2
  - SNM package (all types destined for SNM(N) store – Containment function under normal storage and handling conditions – SFC 1
  - SNM package (all types destined for SNM(N) store – Containment function under fault conditions (dropped load) – SFC 2
38. The inspector judged that the design of the glove box to provide its containment function is adequate as it meets RGP expectations for SFC1, namely SL's latest alpha engineering standards and ONR's SAPs (Ref. 7). The inspector is also satisfied that the design of the package unscrewing and cutting equipment is adequate having minimised the risks associated with handling (i.e. sharps) and entanglement to ALARP. The inspector considered the Provision and Use of Work Equipment Regulations 1998 Approved Code of Practice and guidance (Ref. 20) was the appropriate RGP. The inspector judged that SL meets RGP by opening cans using equipment either operated from the outside of the glove box or by using tools within it to minimise direct handling of the cans.
39. SL will be moving the packages in filtered PVC bags, which are identified as a safety feature, with a safety function class of 2. The mechanical engineering inspector judges that these measures would support SL's position that bulk release from a package is not reasonably foreseeable. The mechanical engineering inspector judges that SL has reduced the potential for a dropped load through design of the FL4 operation including, but not limited to, the design of the transfer trolley and transfer bench.
40. The ventilation extract ductwork is designated as SFC 2. SL used a generic assessment of glove box faults to determine the safety case designations for this equipment. The Mechanical Engineering inspector considered this within their assessment (Ref. 9) and was satisfied that it was a reasonable approach. From a mechanical engineering perspective, the inspector is therefore content with the SFC2 designation for these SSC.
41. The specialist inspector's assessment did raise a recommendation to inspect SL's arrangements for recording the amount of any PVC remaining on the legacy inner cans and how this will be used to inform the package EIM&T strategy during storage. These were adequately demonstrated by SL during the ONR readiness inspection (See Section 4.2 for details).
42. The inspector's assessment of the existing building ventilation extract system (that the glove box extract will connect to) concluded that whilst the system is currently delivering its safety function, there are some areas that are suffering visible signs of corrosion. The inspector raised a recommendation to inspect SL's arrangements to manage this issue. These were adequately demonstrated during the ONR readiness inspection (see Section 4.2 for details). However, the inspector did raise a Regulatory Issue (RI) to monitor SL's implementation of the remedial works. In conclusion, the inspector supports ONR agreeing to SL's request.

## OFFICIAL

43. The radiological protection focussed on the measures in place to minimise worker dose exposure, provide containment of radioactive material, and prevent the occurrence of contaminated wounds (Ref. 21).
44. The inspector judged that there are no potential safety improvements that could be reasonably implemented with regard to the identified structures, systems and components that provide a shielding function. SL has calculated that the average effective dose to operators is less than 10% of the Basic Safety Limit, which is a legal limit (Ref.7). The inspector considers that SL has done all that is reasonably practicable to limit external exposure of workers to ionising radiation.
45. The inspector also identifies that SL has taken a number of steps to reduce the risk of exposure from sharps causing perforations to gloves fitted to the glovebox and contaminated wounds. Although there remains some residual risk arising from articles within the glovebox, the inspector judges that SL has demonstrated that the potential for internal exposures from repack operations is ALARP.
46. The inspector did note that the average neutron component of the effective dose is close to 1 milli-Sievert (mSv) and that workers within the SL transport and storage group may therefore receive significant doses (meaning given with regards to The Ionising Radiations Regulations 2017 Regulation 22, greater than 1 mSv a year) from exposure to neutrons. The inspector did raise a recommendation that SL must ensure that the neutron component of effective doses to workers within the Transport and Storage worker group is measured using personal issue neutron dosimeters and assessed by an Approved Dosimetry Service.
47. This aspect was discussed with SL during the ONR readiness inspection (See Section 4.2 for details). The inspector considers that some workers within the Transport and Storage (T & S) worker group could receive neutron doses in excess of 1 mSv per calendar year when cans are processed at the design throughput rate for FL4. The inspector therefore raised a Regulatory Issue which requires SL to **either** demonstrate that neutron doses > 1 mSv are not credible **or** monitor the individual neutron doses to workers within the T&S group. A secondary action has been added to the RI which imposes a limit on FL4 throughput until such time that this issue is resolved. In conclusion, the inspector supports ONR agreeing to SL's request.
48. In summary, the inspector considers that SL's proposed operations are radiologically safe in normal conditions and risks are minimised ALARP, and supports ONR agreeing to SL's request.

### 4.2 ONR READINESS INSPECTION

49. To inform the permissioning decision, ONR has undertaken a readiness inspection to assess the adequacy of SL's implementation of the safety case in accordance with its LC 22 arrangements for the proposed modification (Ref. 11). ONR's inspection included specialist human factors, mechanical engineering and radiological protection inspectors and focussed on the people, process and plant required to safely implement the modification. Specifically, this included seeking evidential assurance that:
  - A systematic approach has been taken to the identification and delivery of personnel competence including assurance of this competence;
  - Suitable and sufficient instructions have been written and validated to support reliable human performance of the operations and there is an adequate system for the validation and verification of important operator actions. This included the adequacy of arrangements for off normal/fault/emergency situations;
  - The operational controls and safety measures are in place and available;
  - Command and control arrangements including responsibilities are clearly defined and recognised, with adequate control and supervision;

OFFICIAL

## OFFICIAL

- Operational learning from the trials and from previous operations and how this has been captured, considered and where relevant, implemented.
50. Based on the evidence inspected, ONR judged that SL's safety case implementation under its LC 22 arrangements as adequate (Ref. 11) as it was judged to align with RGP, specifically the relevant aspects of ONR's Technical Inspection Guide for LC 22 (Ref. 7) and SAPs (Ref.7). This judgement was based on SL's demonstration that:
- The modification is under the control of plant management and being managed in accordance with the established arrangements. This was evidenced by inspection of SL's application of Custody and Safety Transfer Certificate process for equipment associated with the Finishing Line.
  - Operational learning has been reviewed and used to inform the modification's implementation. This was evidenced by the use of previous similar repacking operations to inform how the cans will be processed.
  - A systematic approach has been taken to the identification and delivery of personnel competence including assurance of this competence. This was evidenced through discussion with SL Training team and Duly Appointed Person (DAP) and Operators.
  - Suitable and sufficient instructions have been written and validated to support reliable human performance of the operations and there is an adequate system for the validation and verification of important operator actions. This included the adequacy of arrangements for off normal/fault/emergency situations. This was evidenced by plant walk-throughs and discussion with DAP's and Operators of the steps identified in the Operating Instruction for FL4.
  - The operational controls and safety measures are in place and available; this was evidenced by a detailed walk-down of the FL4 Transfer Table and Transfer Trolley arrangement with castell key security. SL provided assurance that once FL4 operations commence, the Transfer Trolley and Castell Key will be maintained under SL's existing asset management arrangements.
  - Adequacy of the existing facility ventilation system to support FL4 operations. This was evidenced through discussions on the ventilation System Health Report and the EIM&T strategy with the SL System Health Engineer.
  - Recording the amount of any PVC remaining on the legacy inner cans is adequately managed and will be used to inform the package EIM&T strategy during storage. This was evidenced through discussion.
  - Command and control arrangements including responsibilities are clearly defined and recognised, with adequate control and supervision. This was evidenced through discussion with DAP's and Operators who articulated the arrangements for enhanced supervision during initial operation of FL4.
51. No shortfalls were identified during the inspection that would prevent permission being granted for the proposed modification.

## 5 CONCLUSIONS

52. Based on the safety case evidence sampled, I am of the opinion that for the proposed modification SL has provided adequate evidence to demonstrate that:
- It done all that is reasonably practicable within the conduct of its undertaking, such that for the proposed activity it has reduced the risks to the public and workers ALARP.
  - Suitable and sufficient safety measures have been designed and implemented to provide adequate control of the hazards.
  - It has adequately implemented its safety case under LC 22 such that there are no safety shortfalls that would prevent ONR agreeing to SL's request.

OFFICIAL

## OFFICIAL

- It has been subject to an adequate level of independent internal challenge and governance in accordance with SL's established arrangements.

### 6 RECOMMENDATIONS

53. ONR should issue Licence Instrument 522 (Ref. 22) agreeing to SL's request to commence the operation of the FL4 Repack Glovebox Facility for the over-packing of Type 1 Packages within SNM North (Ref. 1).

## OFFICIAL

### 7 REFERENCES

1. *Application for Agreement to commence the operation of the FL4 Repack Glovebox Facility for the over-packing of Type 1 Packages within SNM North.* Sellafield Ltd. ONR/19/12455/01. CM Ref. 2019/60324.
2. *FL4 Repack Facility Operations and Implementation of OSMs RP [REDACTED] SAFE/00035, RP [REDACTED] COSR/SAFE/00383 & RP [REDACTED] /SAFE/00188 (FL4 Repack PMP6).* Sellafield Ltd. SNM(N) [REDACTED] /0168. Issue 1. CM Ref. 2019/54797.
3. *Management Safety Committee Minutes of Meeting SNM(N) MSC(19) 002.* Sellafield Ltd. February 2019. CM Ref. 2019/73395.
4. *Internal Regulation Permissioning Support Plan: FL4 Glovebox Re-purposing.* Sellafield Ltd. IRPSP-0034. Issue 1. CM Ref. 2019/85557.
5. *SL Nuclear Independent Oversight e-mail regarding assurance for closeout of actions identified in its Hazardous Area Readiness Review.* CM Ref. 2019/209223.
6. *NIO Hazardous Activity Readiness Review Emergency Exercise Response.* Sellafield Ltd. TBC 2019. CM Ref. 2019/206231.
7. Office for Nuclear Regulation HOW2 Business Management System - Guidance. ONR. <http://www.onr.org.uk/guidance.htm>
8. *Repacking of Type 1 Over-packs in Special Nuclear Material (North) Finishing Line.* ONR. ONR-SDFW-DR-18-008. Revision 0. CM Ref. 2018/177541.
9. *Special Nuclear Material July 2018 Level 4 Engagements.* ONR. ONR-SDFW-CR-18-304. Revision 0. CM Ref. 2018/220583.
10. *FL4 Glovebox Visit.* ONR. ONR-SDFW-CR-18-881. Revision 0. CM Ref. 2019/26964.
11. *ONR Readiness Inspection for Sellafield Ltd Commence the operation of the FL4 Repack Glovebox Facility for the over-packing of Type 1 Packages within SNM North.* ONR. ONR-SDFW-IR-19-056. Revision 0. CM Ref. 2019/206231.
12. *EA's view on Sellafield Ltd's request to commence the operation of the FL4 Repack Glovebox Facility for the over-packing of Type 1 Packages within SNM North.* Environment Agency. CM Ref. 2019/201125.
13. *Safeguard's view on Sellafield Ltd's request to commence the operation of the FL4 Repack Glovebox Facility for the over-packing of Type 1 Packages within SNM North.* ONR. CM Ref. 2019/202459.
14. *CNS view on Sellafield Ltd's request for Agreement to commence the operation of the FL4 Repack Glovebox Facility for the over-packing of Type 1 Packages within SNM North.* ONR. CM Ref. 2019/202671.
15. *Fault Analysis Assessment of Sellafield Ltd. Finishing Line 4 (FL4) Repacking Safety Submission.* ONR. ONR-SDFW-AR-18-100. Revision 0. CM Ref. 2019/75043.
16. *FL4 Criticality Safety Assessment.* ONR. ONR-SDFW-AR-18-093. Revision 0. CM Ref. 2019/35601.
17. *Human Factors Assessment of FL4 Repacking Operations.* ONR. ONR-SDFW-AR-18-107. Revision 0. CM Ref. 2019/79170.

OFFICIAL



**OFFICIAL**

18. *Chemical Engineering Assessment: Agreement to commence the operation of the FL4 Repack Glovebox Facility for the over-packing of Type 1 Packages within SNM North.* ONR. ONR-SDFW-AR-18-067. Revision 0. CM Ref. 2019/135208.
19. *Mechanical Engineering Assessment of FL4 Repacking Project.* ONR. ONR-SDFW-AR-18-098. Revision 0. CM Ref. 2019/46006.
20. *Safe use of work equipment. Provision and Use of Work Equipment Regulations 1998. Approved Code of Practice and guidance.* Health and Safety Executive. L22  
<http://www.hse.gov.uk/pubns/priced/l22.pdf>
21. *Radiological Protection Assessment of the Finishing Line 4 Repack Safety Case.* ONR. ONR-SDFW-AR-18-095. Revision 0. CM Ref. 2019/106675.
22. *Licence Instrument No.522.* SEL77694N. ONR. CM Ref. 2018/350183.