

Sellafield Programme

ONR review of the FGMS LTPR submission

Project Assessment Report: ONR-SEL-PAR-15-015
Revision 0
February 2016

© Office for Nuclear Regulation, 2016

If you wish to reuse this information visit www.onr.org.uk/copyright for details.

Published 06/16

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.

EXECUTIVE SUMMARY

ONR review of the FGMSF LTPR submission

This report summarises ONR's assessment of Sellafield Ltd.'s Long Term Periodic Review (LTPR) of its First Generation Magnox Storage Pond (FGMSF) safety case.

Permission Requested

The FGMSF LTPR was received by ONR by its due date, 21 January 2015. No Licence Instrument or formal permission is required under the Sellafield Ltd.'s Licence Condition 15 (LC 15, Periodic Review) arrangements. Instead, the ONR arrangements require a PSR Decision Letter from ONR advising Sellafield Ltd of the outcome of ONR's assessment and identifying any assessment findings that we consider Sellafield Ltd should address.

This Project Assessment Report (PAR) records the basis of ONR's decision to issue a decision letter confirming its opinion that Sellafield Ltd has carried out an adequate review of safety for FGMSF.

Background

The FGMSF is an ageing, high risk legacy facility that requires ongoing and proportionate action to prevent both the absolute risk and the time this risk prevails from increasing as the facility continues to degrade. The FGMSF was built in the 1950's to store used (i.e. irradiated) Magnox fuel and the main storage ponds are single-skinned, reinforced concrete structures which are open to the atmosphere. The facility also includes wet bays and decanner caves, which were used to de-clad the fuel prior to reprocessing the uranium bars in the Magnox Reprocessing Facility.

The overall risk from FGMSF remains high and will not reduce significantly until inventory (spent fuel, waste etc.) retrievals from the facility have been undertaken. The LTPR explains that a major programme of work is underway to address immediate concerns over the integrity of the containment and to provide a capability to retrieve the inventory. Due to the intended change from a control and surveillance regime to a bulk retrievals phase, the LTPR not only addressed the extant safety case but also considered the arrangements for managing safety and maintaining risks ALARP during this period of change.

Assessment and inspection work carried out by ONR

ONR carried out an initial fault studies scoping study to assist in determining the dominant hazards in FGMSF as a guide to structuring its review of the adequacy of the LTPR. ONR's subsequent review of the LTPR was conducted by a multidisciplinary assessment team of specialist inspectors who looked at compliance with Licence Condition (LC) 15 (Periodic Safety Reviews) and followed the lines of enquiry recommended in the fault studies scoping study.

Matters arising from ONR's work

The LTPR submission notes that the FGMSF continues to degrade, falls short of modern safety standards and is one of the highest hazards on the Sellafield site. The primary concerns identified are the uncertainty over its structural integrity, the chemically reactive waste inventory, and the degraded services to the building.

Sellafield Ltd has in place a campaign of hazard and risk reduction activities to support retrieval operations, although these do not currently provide solutions for long term safe storage. Consequently, the LTPR coincides with a period of major change at FGMSF and few

significant improvements were identified by Sellafield Ltd.'s LTPR that had not already been identified through other safety reviews conducted by Sellafield Ltd.

ONR's multidisciplinary assessment concluded that the submitted 2015 FGMSP LTPR was below standard because it was not a full PSR review of the existing safety case in line with ONR's guidance for performing such reviews. In particular, the review failed to articulate (as a standalone document) why Sellafield Ltd considers it is controlling FGMSP risks to ALARP. Not carrying out a full review is nevertheless acceptable and appropriate in the circumstances – Sellafield Ltd.'s focus has rightly been on expediting retrievals in a safe and secure manner and ought not to be on reviewing the safety case for a facility that cannot realistically be brought up to modern standards. This focus has nevertheless included a number of safety improvement initiatives generated in the interests of facilitating safe and secure retrievals. That noted, it is unfortunate that the LTPR did not adequately capture these various initiatives. Consequently, I asked the ONR assessors to widen the scope of their review to take into account not only the LTPR submission but also the additional safety review and improvement work that Sellafield Ltd had undertaken but which was not documented in the LTPR.

Following a consideration of all the evidence examined and based on the assessments carried out, I am content that Sellafield Ltd has carried out an adequate review of safety for FGMSP.

Conclusions

This PAR documents the progress made by ONR's FGMSP LTPR project up until December 2015 when Sellafield Ltd submitted its COSL.

I consider the submitted 2015 LTPR to be below standard as it did not document why Sellafield Ltd considers it is controlling risks ALARP and did not adequately capture the safety implications of the extensive safety review work that Sellafield Ltd had separately undertaken. I am, however, content that Sellafield Ltd has undertaken suitable and sufficient safety reviews overall and consequently it is taking reasonable steps to ensure the facility will continue to operate so that risks are reduced to ALARP. The work to support hazard and risk reduction and in particular the drive to retrieve the hazardous material from the facility has complemented the LTPR resulting in an effective periodic safety review.

I am satisfied that little safety benefit would accrue for FGMSP by undertaking a full LTPR at this stage, as Sellafield Ltd has an effective remediation plan in place, which ONR project inspectors are actively regulating, in order to accelerate waste retrievals and so reduce the hazard.

The assessment team concluded that based on a sample from the PSR improvements identified during the cycle 1 PSR and this PSR, that Sellafield Ltd is adequately managing the implementation of the findings from its PSR process.

The COSL was received in December 2015 and provides the evidence ONR sought to support Sellafield Ltd.'s ALARP argument and the case for safety. Hence I am satisfied that Sellafield Ltd has undertaken an adequate periodic review of safety meeting the requirements of LC15. The COSL has:

- Clarified how Sellafield Ltd will manage the outstanding improvements.
- Provided the ALARP arguments for the continued operation of FGMSP
- Provided a clear résumé of the additional work and reviews Sellafield Ltd has undertaken to demonstrate that it has undertaken a suitable periodic review of safety.

Recommendations

ONR should send a decision letter confirming it is satisfied that Sellafield Ltd has performed an adequate review of safety for FGMSP.

ONR should continue to regulate Sellafield Ltd in its remediation work and monitor progress after it closes out the PSR review. This should include ONR monitoring the following work to ensure that the recommendations from ONR's assessments are duly resolved:

- Sellafield Ltd.'s introduction of a civil inspection regime of the Skip Handler Machine crane gantry, with appropriate arrangements in place for undertaking repairs, should they be required.
- As part of the above, Sellafield Ltd.'s refurbishment of the Gantry Refurbishment System.
- Sellafield Ltd.'s development of an appropriate plan for the care and future removal of the redundant Rotary Skip Wash structure.

LIST OF ABBREVIATIONS

ALARP	As low as reasonably practicable
BSL	Basic Safety Level (in SAPs)
BSO	Basic Safety Objective (in SAPs)
HOW2	(Office for Nuclear Regulation) Business Management System
HSE	The Health and Safety Executive
IAEA	The International Atomic Energy Agency
NDA	Nuclear Decommissioning Authority
ONR	Office for Nuclear Regulation
PSR	Periodic Safety Review
RGP	Relevant Good Practice
SAP	Safety Assessment Principle(s) (ONR)
SFAIRP	So far as is reasonably practicable
SIXEP	Sellafield Ion Exchange Plant
SSC	System, Structure and Component
TAG	(ONR) Technical Assessment Guide

TABLE OF CONTENTS

1	PERMISSION REQUESTED.....	8
2	BACKGROUND.....	8
3	ASSESSMENT FINDINGS.....	10
4	MATTERS ARISING FROM ONR'S WORK.....	15
5	POST INSPECTION WORK.....	16
6	CONCLUSIONS.....	16
7	RECOMMENDATIONS.....	17
8	REFERENCES.....	18

1 PERMISSION REQUESTED

1. The 2015 LTPR [1] was received by ONR by its due date, in January 2015. No Licence Instrument or formal permission is required under Sellafield Ltd.'s Licence Condition 15 (LC 15, Periodic Review) arrangements. Instead Sellafield Ltd.'s LC15 arrangements require a PSR decision letter from ONR advising Sellafield Ltd of the outcome of ONR's assessment and identifying any further assessment findings we consider Sellafield Ltd should address.
2. Our letter would confirm that ONR is satisfied that Sellafield Ltd has performed a fit for purpose review of safety for the FGMSP in the context of addressing the most significant consequence fault sequences and recognising the programme of work to retrieve nuclear waste and reduce the radiological hazard.
3. This Project Assessment Report (PAR) records the basis for our decision to issue the letter.

2 BACKGROUND

2.1 FIRST GENERATION MAGNOX STORAGE POND: HISTORY AND FUNCTION

4. The FGMSP complex is an ageing high risk legacy facility that requires ongoing and proportionate action to prevent both the level of risk and time at risk increasing as the facility continues to degrade. The FGMSP was built in the 1950s to store used Magnox fuel. The main storage ponds are single skinned, reinforced concrete structures which are open to the atmosphere. The facility also includes wet bays and decanner caves, which were used to de-clad the fuel prior to reprocessing the uranium bars in the Magnox Reprocessing Facility.
5. The overall risk from FGMSP remains high and will not reduce significantly until inventory (spent fuel, waste etc.) retrievals from the facility have been undertaken. The LTPR explains that a major programme of work is underway to address immediate concerns over the integrity of the containment and to provide a capability to retrieve the inventory. Due to the intended change from a control and surveillance regime to a bulk retrievals phase, the LTPR not only addressed the extant safety case but also considered the arrangements for managing safety and maintaining risks ALARP during this period of change.

2.2 ASSESSMENT APPROACH

6. The emphasis of the ONR review was on ensuring Sellafield Ltd is controlling the plant risks ALARP whilst enabling safe retrievals to take place as soon as practicable. Therefore, ONR's review of the LTPR was strategic, aimed at determining:
 - Whether Sellafield Ltd has performed an adequate review in the circumstances.
 - Whether Sellafield Ltd.'s remediation plans continue to appear appropriate in light of the LTPR
 - Whether risks are reduced ALARP in the period prior to retrievals / remediation
7. This intervention was under LC 15 (Periodic Safety Reviews) and the approach is described in the assessment plan template [2].
8. It is seldom possible, or necessary, to assess an LTPR and associated safety case in its entirety, therefore sampling is frequently used to limit the areas scrutinised, and to improve the overall efficiency of the assessment process. For the 2015 FGMSP LTPR, a scoping study was conducted by the fault studies specialist [3] to identify the high impact fault sequences that ONR's review of the

LTPR should concentrate on. Based on this study the review concentrated on loss of containment from :

- Degradation of the primary containment and crack monitoring
 - Catastrophic failure of primary containment
 - Failure of redundant pipework either from impact or degradation
 - Failure of components penetrating the containment
 - Skip handler or crane faults
9. In addition, it is noted that there are regions around the plant with high dose rates and so the review also considered Sellafield Ltd.'s review of dose controls.
10. ONR assessors communicated with the licensee using technical queries to seek clarification of specific aspects of the LTPR via emails copied to the project inspector. Substantive findings were raised via a Regulatory Observation (RO). Any remaining fundamental concerns ONR had with the LTPR, the implementation plan or the associated safety case for FGMSP at the end of the assessment period would be proposed as Regulatory Issues and would require a resolution plan to be agreed and incorporated into Sellafield Ltd.'s LTPR implementation plan. In this instance, no Regulatory Issues were raised.
11. As project inspector, I selected a multidisciplinary assessment team to review particular aspects of the safety case which comprised specialist inspectors for:
- 1 Civil Engineering
 - 2 Chemical Engineering
 - 3 Radiological Protection
 - 4 Mechanical Engineering
 - 5 Control and Instrumentation
 - 6 Human Factors
 - 7 Fault Studies
12. Each specialism was asked to determine which lines of enquiry were most appropriate for them to pursue and agreed their approach with their Professional Lead.
13. Sellafield Ltd explained its LTPR strategy and how it fitted in with other safety reviews it has conducted and its Business Change Management arrangements at a level 4 meeting [4]. It was the view of the assessors that Sellafield Ltd's Business Change Management arrangements appear to complement the LTPR and should provide the framework to progress retrievals and thereby reduce the hazards from FGMSP. This work was already subject to close regulatory scrutiny from ONR and so this aspect was not pursued further. There were also recommended improvements outstanding from both the 1st cycle and present PSRs (i.e. from ten or more years ago) for which I expected better visibility of how these shortfalls and improvements had been addressed. I therefore raised a Regulatory Observation (RO) [5], which asked Sellafield Ltd to provide an auditable trail for the safety improvements identified during these PSRs and more detailed evidence of sentencing arrangements for specific safety significant improvements.
14. The RO provided the direction for the main assessment [17] and the various assessors raised specific actions against this RO. The assessment team identified a selection of recommended potential improvements from the cycle 1

and present PSR for investigation as RO actions (actions 3-23). These actions asked for evidence that Sellafield Ltd had addressed its identified improvements. In many cases the assessors were only seeking evidence that Sellafield Ltd had closed out its recommendations and the evidence could be as simple as a copy of the signed front sheet of the appropriate Sellafield Ltd document or a copy of the close-out card. In other cases they wanted to understand how Sellafield Ltd has or intends to address the improvement/shortfall and so required a fuller response. It is my opinion that Sellafield Ltd satisfactorily responded to the actions raised and these responses are discussed in the assessment reports [6-12] and at a level 4 review meeting [18].

3 ASSESSMENT FINDINGS

15. According to the LTPR, the FGMSF continues to degrade and falls short of modern safety standards, it is one of the highest hazards on the Sellafield site and this situation will not improve significantly until retrievals have been undertaken. The primary concerns are uncertainties over the structural integrity, chemically reactive waste, and the degraded services to the building.
16. ONR's multidisciplinary assessment concluded that the submitted 2015 FGMSF LTPR was below standard in that it was not a full PSR review of the existing safety case and it failed to articulate why Sellafield Ltd considers it is controlling risks to ALARP. Not carrying out a full review is nevertheless acceptable in the circumstances – Sellafield Ltd.'s focus has rightly been on expediting retrievals in a safe and secure manner and ought not to be on reviewing the safety case for a facility that cannot realistically be brought up to modern standards. This focus has nevertheless included a number of safety improvement initiatives generated in the interests of facilitating safe and secure retrievals. That noted, it is unfortunate that the LTPR did not adequately capture these various initiatives. Consequently, I asked the ONR assessors to widen the scope of their review to take into account not only the LTPR submission but also the additional safety review and improvement work that Sellafield Ltd had undertaken but which was not documented in the LTPR.
17. Following consideration of a review of the work that Sellafield Ltd is undertaking to support retrievals, it is my opinion that Sellafield Ltd is taking reasonable steps to ensure the facility will continue to operate safely. It has a Business Change Management process in place and the work to support retrievals has complemented the LTPR resulting in an effective Periodic Safety Review. So, based on the assessments carried out and other evidence that the assessors obtained and examined, I am content that Sellafield Ltd has carried out an adequate review of safety.
18. The ONR assessments are described in the relevant technical area assessment reports [6 - 12]; the conclusions are summarised below.

3.1 CIVIL ENGINEERING

19. Overall the specialist inspector is content that civil engineering aspects are being adequately addressed.
20. The inspector reviewed Sellafield's submission and discussed technical aspects with its suitably qualified and experienced civil engineers. Details of the assessment are contained in [6]. The key findings from the civil engineering inspector are summarised below.
21. The First Generation Magnox Storage Pond has a deteriorating physical condition that is recognised as presenting an intolerable risk. Sellafield Ltd.'s

strategy is to deliver its waste retrieval programme while ensuring risks are maintained ALARP.

22. The inspector is content that no civil engineering shortfalls were carried forward to the Long term Periodic Safety Review Plan. He is broadly satisfied with Sellafield's claims, arguments, evidence and ALARP justification in respect of the previous improvement works to the Skip Handler Machine (SHM) crane gantry, the current pond condition monitoring arrangements and Sellafield Ltd.'s stated future programme of installing additional monitoring equipment.
23. His review gave him adequate regulatory confidence that the civil engineering aspects of Sellafield Ltd.'s safety case support the retrieval operations currently proposed.
24. The inspector made two recommendations for the site inspector to carry forward as part of normal regulatory business.
 - *Recommendation 1* Sellafield Ltd should introduce a rigorous civil inspection regime of the SHM crane gantry, undertaken by suitably qualified and experienced civil engineers with appropriate internal peer review from their intelligent customer capability, at a frequency of inspection determined by the degree of deterioration and usage.
 - *Recommendation 2* Sellafield Ltd should make arrangements and store the necessary materials for undertaking repairs to the crane gantry should these be required.
25. The intent of these recommendations is to ensure that Sellafield Ltd undertakes the inspection work that it has proposed to ensure that any issues with the condition of the SHM gantry can be identified and rectified without unnecessary delay to hazard and risk reduction.

3.2 MECHANICAL ENGINEERING

26. The specialist inspector considered that Sellafield Ltd has performed an adequate review of safety for the facility, but the LTPR itself is incomplete. The inspector does not consider that Sellafield Ltd.'s LTPR has been adequate and has identified a number of shortfalls against ONR's expectations.
27. His assessment comprised of a review of safety case documentation, a plant inspection, and a number of Level 4 technical engagements with Sellafield Ltd, including presentations by Sellafield Ltd. Details of his assessment are contained in [7]; this is, at the time of writing a draft assessment. As such, and in line with ONR's HOW2 process (NS-TAST-GD-084 Rev 9) only the conclusions and recommendations from [7] have been agreed. These conclusions and recommendations are summarised below.
28. The LTPR omitted to refer to Sellafield Ltd.'s multiple improvement work streams planned or underway for Hazard and Risk Reduction, and asset care of the facility.
29. The Inspector considers that Sellafield Ltd.'s use of its risk severity based prioritisation tool (NACCI) has been ineffective. This could potentially challenge the licensee's forward work streams. ONR is planning a future intervention in this area and the examples highlighted in this assessment will be considered as part of this intervention.

30. The inspector considers that Sellafield Ltd.'s review of FGMS safety against modern codes and standards to be inadequate. However, the inspector does not consider it proportionate for the licensee to now conduct further reviews of this facility given its age and condition, as both ONR and the licensee accept that it does not comply with modern codes and standards for existing plant. Give the gap, Sellafield Ltd. is progressing the removal of radioactive inventory; work which ONR is regulating to accelerate.
31. As part of the assessment, the inspector identified potential issues with the condition of and future intent for the SHM Gantry Refurbishment System (GRS) and the redundant Rotary Skip Wash Structure. ONR now understands [19] that Sellafield Ltd intends to refurbish the GRS, to facilitate the inspection and maintenance of the gantry rails. The LTPR recommended that the Rotary Skip Wash structure should be removed; ONR understands that it has recently been inspected by Sellafield Ltd and was found to have general surface corrosion with instances of more severely corroded components. Progress on these issues will be monitored by the mechanical engineering specialist inspector in conjunction with ONR's site inspector.
32. Notwithstanding the above issues with the LTPR, the inspector did not identify any significant nuclear safety concerns, based on the mechanical engineering systems he sampled. Considering all of the above, the inspector concluded it would be disproportionate to withhold issuing a decision letter confirming ONR is satisfied that Sellafield Ltd. has performed an adequate review of safety for FGMS.

3.3 RADIOLOGICAL PROTECTION

33. The specialist inspector considers that an adequate periodic safety review of the FGMS safety case has been performed with regard to radiological protection. This is based on his assessment, on a sampling basis, of LTPR documentation, his interactions with site personnel, and two inspections of the FGMS. Details of the assessment are contained in [8]. The key findings from the radiological protection inspector are summarised below:
34. The inspector noted that there will be an increase in transient risk during maintenance and retrieval operations. This requires the implementation of an appropriate strategy to secure the optimisation of worker dose per unit risk reduction, so far as is reasonably practicable and within legal limits.
35. He examined the licensee's arrangements during an Ionising Radiations Regulations (IRR99) compliance intervention and concluded that radiological hazards are well-managed by Sellafield Ltd and it is effectively complying with the requirements of IRR99. He was satisfied that the standard of radiological protection practice within FGMS is adequate to support worker dose optimisation during operations.
36. The inspector also considered the radiological protection and shielding substantiation in support of the FGMS LTPR and the FGMS's Dose Management Strategy document. His review did not identify any shortfalls that would lead him to conclude that the review of radiological protection and shielding, undertaken as part of the LTPR, was inadequate.
37. The inspector identified two lesser safety significant improvements from the 1st cycle PSR (radiological protection) that had not been implemented by Sellafield Ltd. These were on the grounds that they were no longer justified during the present control and surveillance operations. He asked Sellafield Ltd to explain

how these potential shortfalls had been addressed or would be addressed, taking into account the change of plant status. From the responses received, he was satisfied that the two potential shortfalls have been adequately addressed.

3.4 INTERNAL HAZARDS

38. Overall, the specialist inspector is content that Internal Hazards aspects are being adequately addressed. Details of his assessment are contained in [9]. The key findings from the Internal Hazards inspector are summarised below:
39. An Internal Hazards review was not formally undertaken by Sellafield Ltd but Sellafield Ltd stated that Internal Hazards aspects are embedded within the FGMS safety case.
40. The inspector recognised that the FGMS hazard and risk reduction programme is a dynamic situation and that Sellafield Ltd has adequately demonstrated, via the Level 4 interactions that the overall ALARP philosophy considers modern standards and good practice. Thus the inspector is satisfied that Sellafield Ltd is routinely addressing requirements against modern standards and good practice SFAIRP.
41. He is therefore satisfied that Internal Hazards aspects are being adequately addressed as the facility continues its transition from a control and surveillance regime towards bulk retrievals of the radioactive inventory.
42. Based on the sample of relevant improvements identified during the 1st cycle and present PSR, the inspector judged that Sellafield Ltd has demonstrated adequate progress.

3.5 CHEMICAL ENGINEERING

43. It is the specialist inspector's opinion that Sellafield Ltd has done sufficient to demonstrate that risks are reduced to ALARP at FGMS subject to the successful completion of his recommendations. Details of his assessment are contained in [10]. The key findings from the inspector are summarised below:
44. The inspector observes that the LTPR submission documentation could have been clearer in depicting the management of activities supporting the hazard and risk reduction programme but this is a minor issue and was suitably addressed during Level 4 meetings. The chemical engineering inspector considered that Sellafield Ltd met the objectives expected during a PSR. He is broadly satisfied with the claims, arguments and evidence laid down within the licensee's safety case which gave him confidence in the PSR.
45. He considers however that it was not clear whether the 1st cycle PSR actions were considered appropriately within the Process Engineering Design Substantiation Report (DSR) submission, but the actions were adequately addressed. However, he believes the design base assumptions have not been sufficiently reviewed during the present PSR and so made a Recommendation for Sellafield Ltd to address this.
46. He also notes that despite the Sellafield Ltd site strategy to deliver contingency arrangements for loss of the SIXEP, FGMS is still to demonstrate that should there be a prolonged outage at SIXEP before 2024 (when the replacement plant is scheduled to come on stream) the resultant risk gap will be mitigated. This matter will be taken forward by the Sellafield Site Strategy lead inspector.

47. Finally, the formal close-out of recommendations raised during the present PSR have still to be addressed. He therefore recommends that Sellafield Ltd should provide a close-out strategy in its Confirmation of Safety Letter (COSL).
48. The inspector therefore made two recommendations:
 - Sellafield Ltd should provide confirmation that the design basis assumptions used within FGMSP related to chemical engineering are still valid for areas that have not been modified, as knowledge on plant conditions may have changed.
 - Sellafield Limited should determine how the recommendations related to chemical engineering that were raised during the present PSR are to be formally closed-out. These arrangements are to be placed within the Confirmation of Safety Letter (COSL) for the Project and Site Inspector information.
49. Sellafield Ltd.'s draft COSL [13] was received in December and the inspector reviewed this [14] and has confirmed both his recommendations are now addressed.

3.6 CONTROL AND INSTRUMENTATION.

50. Overall, the specialist inspector is content that control and instrumentation aspects are being adequately addressed.
51. Details of the assessment are contained in [11]. The key findings from the control and instrumentation assessor are summarised below:
52. The inspector considers that the scope of the periodic review is limited as it excludes systems covered by recent safety cases, ongoing remediation and projects scheduled to complete within two years. He reviewed the full list of C&I systems on the live engineering schedule and accepts that this approach to defining the scope of the review has been consistently implemented.
53. Based on the sample that he has considered, it was his opinion that Sellafield Ltd has made adequate progress against the improvements identified, and closed out findings from the previous periodic reviews.
54. He considers that Sellafield Ltd.'s overall FGMSP programme meets the scope requirements of a periodic review. However, the formal LTPR submission [1] does not adequately document the wider context of Sellafield Ltd.'s periodic review and hence justify the submission's limited scope.
55. He has recommended that this context is documented as part of Sellafield Ltd.'s formal submission and I consequently asked Sellafield Ltd [15] to provide a clear summary of the additional work and reviews it has done to demonstrate that it had undertaken a suitable periodic review of safety. The COSL [16] adequately addressed this so this assessment recommendation is now resolved.

3.7 HUMAN FACTORS

56. Overall the specialist inspector is content that in the context of current and future operational phases, Sellafield Ltd has undertaken an adequate HF review as part of the LTPR. Details of the assessment are contained in [12]. The key findings from the HF inspector are summarised below:
57. The inspector considers that suitably qualified and experienced (SQEP) HF resource has been provided in support of the safety case and wider facility both

in relation to the safety assessment aspects and in supporting the transition of the facility from care and maintenance to an active bulk retrievals

58. There was an adequate screening exercise to review the live safety assessments. Whilst Sellafield Ltd did not identify any safety significant operator claims in relation to high consequence faults (unmitigated consequence >500 mSv), there are a number of less significant claims (unmitigated consequences in the range 20 -200 mSv).
59. Sellafield Ltd is not currently able to provide a suitable and sufficient substantiation of these less significant safety claims. However, the inspector has not identified any areas of significant concern and notes that Sellafield Ltd is committed to substantiating these claims as part of its upcoming programme of remediation work. In view of this, the inspector is content that the claims are acceptable on a temporary basis.
60. In respect to Sellafield Ltd.'s HF arrangements (considering both the site wide and locally-implemented FGMSA arrangements), the inspector found a variable picture. There was some good evidence of HF input on projects, and in particular a clear focus on high consequence operator claims. There was however, less evidence of a systematic approach to Human Factor Integration (HFI) or HF input into important bespoke forums and committees that deal with HF-related topics. Where these include corporate activities, the inspector noted that these will be monitored through existing regulatory engagement under Sellafield Strategy Objective 1 on Strategic Improvement Themes. Hence she made no specific recommendations.

3.8 FAULT STUDIES

61. The fault studies specialist inspector reviewed the LTPR report, the fault studies scoping report and the Live Safety Case Summary (Oct 2014). Based on this, he did not think that a detailed fault studies review would add significant value to ONR's LTPR review as in his opinion it would be unlikely to identify any new areas of regulatory interest. He reached this view because:
 - The potential fault sequences that could lead to public and operator doses from this facility are well understood by ONR
 - Sellafield Ltd has appropriate confidence in the safety case management arrangements for FGMSA which have been embedded in the last few years and as such they have undertaken a high level, light touch review of safety cases as part of the LTPR
 - From the presentation by Sellafield Ltd project team [4] it is clear that Sellafield Ltd.'s management of work activities at FGMSA has moved on significantly since the work was undertaken for the LTPR
 - New safety case work to support retrievals is subject to assessment through ONR's permissioning projects
 - Sellafield Ltd has not identified any improvements that it considers appropriate for the LTPR improvement plan
62. The fault studies inspector also advised the other specialist inspectors assessing this LTPR in regard to the relative safety significance of their issues in order to facilitate their engaging with Sellafield Ltd and ensure ONR remained proportionate.

4 MATTERS ARISING FROM ONR'S WORK

63. In November 2015, I emailed Sellafield Ltd to advise it of my expectations from the COSL [15], which requested that Sellafield Ltd:
- Presents the ALARP arguments for FGMSF continued 'operation' supported by providing a clear résumé of the additional work and reviews it has done to demonstrate that it had undertaken a suitable periodic review of safety.
 - Describe how it will manage the outstanding improvements.
64. I advised that the COSL would be reviewed against these criteria to enable me to form a view of whether Sellafield Ltd had performed a fit for purpose review of safety for the FGMSF.

4.1 POST ASSESSMENT WORK

65. The COSL has now been submitted [16] and, having consulted with the specialist inspectors, I consider that it addresses all the matters arising from ONR's LTPR review, except for the recommendations from the civil and mechanical engineering specialist inspectors, which ONR should pursue as part of normal regularity business. Based on this I propose that ONR sends a decision letter to confirm that we are satisfied that Sellafield Ltd has performed an adequate review of safety for FGMSF, subject to:
- a) Satisfactory progress being maintained on the improvement programmes which Sellafield Ltd has committed to in its COSL
 - b) Sellafield Ltd providing three-monthly progress reports on its substantive improvements identified by the LTPR. I envisage this to be via the Sellafield Ltd./ONR PSR interface meeting and Sellafield Ltd.'s Quarterly PSR Update Report.
 - c) Continuing satisfactory adherence to the safety case and compliance with other conditions of the Licence and pertinent legislation.
66. ONR will continue to regulate Sellafield Ltd in its remediation work and monitor progress, after ONR closes out the PSR review.
67. Thus, although I consider the submitted 2015 LTPR was below standard, the other workstreams and in particular the remediation work, have ensured that Sellafield Ltd has undertaken an adequate Periodic Safety Review meeting the requirements of LC 15

5 CONCLUSIONS

68. This PAR documents the progress made by ONR's FGMSF LTPR project up until December 2015 when Sellafield Ltd submitted its COSL
69. I consider the submitted 2015 LTPR to be below standard as it did not document why Sellafield Ltd considers it is controlling risks ALARP and did not adequately capture the safety implications of the extensive safety review work that Sellafield Ltd had separately undertaken. I am, however, content that Sellafield Ltd has undertaken suitable and sufficient safety reviews overall and consequently it is taking reasonable steps to ensure the facility will continue to operate so that risks are reduced to ALARP. The work to support hazard and risk reduction and in particular the drive to retrieve the hazardous material from the facility has complemented the LTPR resulting in an effective periodic safety review.
70. I am satisfied that little safety benefit would accrue for FGMSF by undertaking a full LTPR at this stage, as Sellafield Ltd has an effective remediation plan in

place, which ONR project inspectors are actively regulating, in order to accelerate waste retrievals and so reduce the hazard.

71. The assessment team concluded that based on a sample from the PSR improvements identified during the cycle 1 PSR and this PSR, that Sellafield Ltd is adequately managing the implementation of the findings from its PSR process.
72. The COSL was received in December 2015 and provides the evidence ONR sought to support Sellafield Ltd.'s ALARP argument and the case for safety. Hence I am satisfied that Sellafield Ltd has undertaken an adequate periodic review of safety meeting the requirements of LC15. The COSL has:
 - Clarified how Sellafield Ltd will manage the outstanding improvements;
 - Provided the ALARP arguments for the continued operation of FGMSP;
 - Provided a clear résumé of the additional work and reviews Sellafield Ltd has undertaken to demonstrate that it has undertaken a suitable periodic review of safety.

6 RECOMMENDATIONS

73. ONR should send a decision letter confirming it is satisfied that Sellafield Ltd has performed an adequate review of safety for FGMSP.
74. ONR should continue to regulate Sellafield Ltd in its remediation work and monitor progress after it closes out the PSR review. This should include ONR monitoring the following work to ensure that the recommendations from ONR's assessments are duly resolved:
 - Sellafield Ltd.'s introduction of a civil inspection regime of the SHM crane gantry, with appropriate arrangements in place for undertaking repairs, should they be required;
 - As part of the above, Sellafield Ltd.'s refurbishment of the GRS;
 - Sellafield Ltd.'s development of an appropriate plan for the care and future removal of the redundant Rotary Skip Wash structure.

7 REFERENCES

1. FGMSP Long Term Periodic Review and Improvement Plan, [REDACTED] MSC/2014/943, RP [REDACTED] SAFE/00181/B, December 2014 TRIM 2015/23201
2. Assessment Plan for FGMSP PSR d1 TRIM 2015/487012
3. FGMSP LTPR Fault Studies Scoping Assessment TRIM2015/23201
4. ONR-SEL-CR-15-134 - Level 4: FGMSP LTPR review meeting - 23 June 2015 - TRIM 2015/247454
5. REGULATORY OBSERVATION RO-01 actions A1-23, 20 Aug. TRIM 2015/414845
6. ONR-SEL-AR-15-029 - Civil engineering Assessment of First Generation Magnox storage pond -- January 2016 TRIM 2016/6608
7. FGMSP LTPR – draft mechanical assessment. TRIM 2015/0467731. Agreed final conclusions and recommendations from this assessment are filed in 2016/51339
8. ONR-SEL-AR-15-028 Radiological Assessment of First Generation Magnox Storage Pond Long Term Periodic Review (Post Peer Review DRAFT for 2nd Peer Review - TRACK CHANGES)TRIM 2015/488634
9. Sellafield - FGMSP LTPR Internal Hazards Routine Assessment Report - October 2015 TRIM 2015/397864
10. Sellafield -SENSITIVE - FGMSP LTPR Chemical Engineering Assessment Report - November 2015 - TRIM 2015/364198
11. ONR-SEL-Assessment Record-15-027 - Control and instrumentation assessment of FGMSP periodic safety review - December 2015 - TRIM 2015/479000
12. ONR-SEL-AR-15-010, Rev 0 Human Factors Assessment of the FGMSP - LTPR, September 2015 TRIM 2015/341118
13. draft FGMSP PSR COSL [OFFICIAL] draft 2 TRIM 2015/488617
14. Chemical Engineering review of draft COSL 2015/487802
15. ONR expectations from COSL for FGMSP TRIM 2015/485696
16. Sellafield Ltd Confirmation of Safety Letter COSL 2015/487854
17. FGMSP LTPR instructions to team following Sellafield Ltd.'s 'war' room presentation TRIM 2015/488544
18. CR ONR-SEL-CR-15-336 - Level 4 FGMSP LTPR review meeting of Sellafield Ltd.'s response to Regulatory Observation Actions - 25 September 2015 - TRIM 2015/362464
19. FGMSP LTPR – update and clarification of LTPR open points for mechanical engineering assessment. TRIM 2016/47944.