Office for Nuclear Regulation

# Sellafield Limited Magnox Reprocessing Separation Plant Events and Operating Instruction Breaches

## Basis of enforcement decision following Magnox Reprocessing Separation Plant Events and Operating Instruction Breaches

Project Assessment Report ONR-SEL-PAR-15-001
Revision 0
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## EXECUTIVE SUMMARY

This report details ONR's basis for the enforcement decision taken following a number of events and Operating Instruction breaches at Sellafield Limited's (SL's) Magnox Reprocessing Separation plant. It is my opinion that SL has not ensured that all operations which may affect safety, including those subject to limits and conditions necessary in the interests of safety identified in the safety case, are carried out in accordance with written instructions.

### Background

Under the conditions of its nuclear site licence, SL has a duty to ensure that all operations that may affect safety are controlled and carried out in accordance with the safety conditions and limits (known as Operating Rules, ORs) identified in the plant's safety case. In addition, it also has duties to ensure that all operations that may affect safety are carried out in accordance with written instructions (termed Operating Instructions, OIs) and to ensure that its suite of OIs include any instructions necessary either in the interests of safety or to implement its Operating Rules. In line with ONR's guidance on compliance with these duties, the term 'ensuring' includes organisational activities such as providing adequate training, adequate instructions and an appropriate level of compliance checking. These duties are in addition to general duties under the Management of Health and Safety at Work Regulations 1999 (MHSWR) in regard to controlling work activities appropriately.

Since the start of 2014, there have been a number of events in the Magnox Reprocessing Separation plant at Sellafield associated with failure to follow OIs, some of which are derived directly from the facility's ORs.

The events at the Magnox Reprocessing Separation plant include:

- the partial loss of a reagent to a mixer settler vessel with the potential to result in a criticality accident downstream of the vessel;
- a failure to enact specified substitution arrangements (i.e. alternative equipment and/or administrative arrangements to compensate for unavailability of plant or equipment) when ten neutron monitors became unavailable due to a faulty power supply;
- a failure to enact substitution arrangements for an iodine 129 monitor on a discharge stack after alarms had suggested the instrument had ceased to operate and
- ten further breaches of OIs.

In each of these events, diligent adherence to the plant's OIs was an important part of SL's suite of measures designed to prevent accidents with significant radiological consequences (which in the case of criticality accidents may even be fatal consequences).

### Basis for Enforcement Decision

All these events compromised one of the multiple barriers SL had put in place to ensure nuclear safety. Contributory causes to these events are judged to include inadequate decision-making by SL's Duly Authorised Persons (DAPs, a specific supervisory role required under licence conditions) to oversee compliance with OIs, deficiencies in how the OIs were written and failures to comply with the written OIs. Whilst no harm or release of radioactivity occurred in any of these events, ONR has been mindful when considering an appropriate enforcement response of the importance of following OIs to preventing accidents with significant radiological consequences.

This report describes how these events led to apparent contraventions by SL of several of its legal duties, including those under Licence Condition (LC) 24 'Operating instructions' and MHSWR Regulation 5(1). It further documents ONR's application of our Enforcement Management Model to determine an appropriate regulatory response that reflects the seriousness of these events when considered in aggregate.

## Conclusions

This report concludes that events at SL's Magnox Reprocessing Separation plant are apparent breaches of a number of legal duties, including LC24(1), LC24(2) and Regulation 5(1) of the MHSWR. I have applied the EMM to these events and subsequent intervention findings and conclude that it is appropriate to take formal enforcement action in the form of an Improvement Notice.

As the apparent breaches include interrelated duties under both the Health and Safety at Work (etc) Act 1974 and the Energy Act 2013, legal due process requires ONR to select which of these Acts is the most appropriate vehicle for formal enforcement. I conclude that LC24 is most appropriate duty to enforce against in the circumstances as it is specific to the shortfalls whilst sufficiently broad to address the range of issues raised by these events. This points to enforcing under the Energy Act 2013.

SL agrees that these events highlight significant shortfalls in its management of nuclear safety and has already responded by preparing an improvement programme. The schedule attached to the Improvement Notice should be based on aspects of this programme aimed at remedying the most important shortfalls. I have made proposals for the content of the schedule which should be used in discussions with SL to identify appropriate timings for the individual improvements in the schedule.

## Recommendations

I recommend issuing an Improvement Notice under the Energy Act 2013 for apparent contraventions of LC24(1). I recommend a schedule is attached to the Improvement Notice based on elements of SL's improvement programme.

The covering letter issued with this Improvement Notice containing guidance relevant to the Improvement Notice should detail other matters cited in this report which require action from SL to raise standards within the Magnox Reprocessing Separation plant.

The Improvement Notice should refer to SL's duty to ensure that all operations that may affect safety, including those subject to limits and conditions necessary in the interests of safety identified in the safety case, are carried out in accordance with written OIs.

The covering letter should further state that SL should ensure that:

a. OIs and the means of complying with them are clearly and unambiguously expressed and communicated;
b. All staff controlling and supervising operations that may affect safety are suitably competent in their role and familiar with their responsibilities in relation to OIs;
c. There is adequate control, monitoring and review of compliance with OIs.

ONR should engage with SL to determine timings for the improvements necessary to comply with this Improvement Notice and an underpinning regulatory programme that also includes other items within SL's improvement programme. The regulatory programme should include key milestones, with evidence of progress against these key milestones being submitted to ONR at suitable intervals to demonstrate progress towards full delivery of the Improvement Notice work by its due date.

## LIST OF ABBREVIATIONS

| | |
|---|---|
| DAP | Duly Authorised Person |
| EMM | Enforcement Management Model |
| LC | Licence Condition |
| MOP | Magnox Operating Plan |
| MHSWR | Management of Health and Safety at Work Regulations |
| OI | Operating Instruction |
| ONR | Office for Nuclear Regulation |
| OR | Operating Rule |
| PAR | Project Assessment Report |
| SL | Sellafield Limited |
| SM | Safety Mechanism |
| SLIR | Sellafield Limited Internal Regulator |
| SAT | Systematic Approach to Training |

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## 1 INTRODUCTION

1. This Project Assessment Report (PAR) details the basis for the Office for Nuclear Regulation's (ONR's) enforcement decision following recent events at the Sellafield Limited (SL) Magnox Reprocessing Separation plant and related intervention findings on SL's Sellafield Nuclear Licensed Site.

2. Operating Rules (ORs) are defined through Licence Condition (LC) 23 as the nuclear safety conditions and limits identified by the licensee in its safety case. These conditions and limits have under LC23 to be complied with and, by virtue of LC24, to be enacted through Operating Instructions (OIs). As such they should be set in measurable /verifiable terms so that the operators can be sure of having complied with them and the facility's safety case. The term OR applies to any condition or limit necessary in the interests of safety identified within the licensee's safety case and in particular, is not limited to those limits and conditions termed "Operating Rules" within a licensee's safety management arrangements.

3. OIs implementing ORs are a subset of the written instructions a licensee needs to have to comply with its licence conditions. LC24 also requires licensees to ensure that all operations which may affect safety are carried out in accordance with written instructions (OIs). To meet this duty SL has identified a range of different types of instructions necessary for ensuring safety. All these types of instructions are OIs within the definition in LC24.

4. This PAR considers the appropriate enforcement action following a series of recent events at SL's Magnox Reprocessing Separation plant in which the above duties under LC23 and LC24 do not appear to have been met.

## 2 DESCRIPTION OF RECENT EVENTS IN THE MAGNOX REPROCESSING SEPARATION PLANT

5. In February 2014, an event occurred involving the partial loss of Ferrous Sulphamate reagent to the plant's PS4 mixer settler vessel. The loss of the reagent had potential to result in a criticality downstream of the mixer settler vessel if other protection systems had also failed. A criticality would have resulted in significantly elevated radiation doses (the dose incurred would depend on the size of the criticality, but could potentially be fatal) to a small number of workers, but no consequences for the public. Due to SL's prompt and conservative response to the incident there was no criticality, and no breach of safety case limits (as the plant was shut down prior to any limits being breached). The SL investigation (Ref. 1) recognised that the quality of OIs and failures to adhere to them were contributory factors to the incident. Specifically there was a failure to comply with two OIs requiring routine wash-out of the reagent lines and associated tanks. Following these OIs would have prevented the incident. SL's investigation also confirmed that alarm values specified in the OIs had inconsistencies compared to the actual alarm settings and that the plant's mode of operation and configuration were not in accordance with the OIs.

6. ONR was satisfied with SL's investigation and the corrective actions identified. However, because of the potentially serious consequences of this event, ONR later held a senior level meeting with SL to gain assurance that lessons had been learnt from the event. SL confirmed that adherence to OIs was recognised as an issue, and the use of human performance tools and task observations should improve this. OI quality was also recognised as an issue (and was being progressed, through a site-wide programme of improving and simplifying OIs) prior to the PS4 incident. It was confirmed at this meeting (Ref. 2) that ONR would not be taking formal regulatory action as a result of this incident, primarily because SL reassured ONR that lessons

had been learnt and promulgated effectively across the Sellafield site, and that this would prevent occurrence of similar incidents in the future.

7. In August 2014 there was a separate event in which SL's specified substitution arrangements were not put in place for ten neutron monitors associated with the PS4 mixer settler vessel which (the neutron monitors) became unavailable due to a faulty power supply. During the incident the plant was not shut down on the timescales specified in the safety case, resulting in the breach of an OI. The purpose of the neutron monitors (classified by SL as Safety Mechanisms, SM) is to monitor any build-up of neutrons in PS4. An excessive build-up of neutrons could have resulted in a criticality and in turn, significantly elevated radiation doses (which in extremis could be fatal) to a small number of workers, but no with consequences for the public.

8. SL's investigation (Ref. 3) identified a number of factors that contributed to this event. Of particular concern were:

- That during the event, OI and safety case documentation which specified the substitution arrangements were not reviewed by the duty Duly Authorised Person (DAP);
- The DAP's decision-making process did not consider the safety case requirements but focussed instead on operational aspects; and
- The DAP's decision-making process was not carried out in accordance with SL's written arrangements (i.e. its means of ensuring LC24 compliance), was insular and did not receive sufficient challenge.

9. ONR was nevertheless satisfied with SL's investigation and the corrective actions identified. This was confirmed to SL verbally (Ref. 4) and that no regulatory action would be taken because SL had provided ONR with convincing evidence that lessons had been learnt from this event and these were being promulgated effectively. A significant factor in ONR's decision not to take further regulatory action was that the neutron profile across the PS4 contactor was monitored throughout the incident by the duty DAP using other installed neutron monitors (PS4 is equipped with more than the ten neutron monitors rendered unavailable by the faulty power supply).

10. However, in December 2014 there was a third event. On this occasion, SL's specified substitution arrangements were not put in place for an iodine 129 monitor on a discharge stack (equipment classified by SL as a Safety Measure, its highest safety designation) when the monitor failure alarm sounded. Furthermore, the plant was then not shut down within the timescales specified in the safety case. There was no failure to follow OIs in this instance. Nevertheless the event highlighted significant deficiencies in SL's OIs and its ability to comply with its safety case.

11. SL's investigation (Ref. 5) identified a number of factors that contributed to this event. SL established that the duty DAP did not fully record the basis for his decision-making to determine whether the failure alarm was genuine, nor formally use the decision-making tools that ought to have been used in these circumstances.

12. ONR undertook an intervention in response to the iodine 129 monitor event (Refs. 6, 7 and 8) and identified a number of issues of concern. For instance: the ARI asked for the genuineness of the alarms to be established before taking action rather than assuming they were genuine until proven otherwise (i.e. it was not conservative in regard to nuclear safety); there did not appear to be routine checking of operational records and logs completed by operators or DAPs to document compliance with OIs; and the DAPs are not all trained in control and supervision or conservative decision-making to better equip them to fulfil their duties.

13. In additional to these three events, there were a further nine occasions in 2014 where OIs detailing limits and conditions derived from the safety case were breached in the Magnox Reprocessing Separation plant. ONR decided not follow up these individual incidents in detail, apart from gaining assurance that they did not pose significant challenges to nuclear safety in their own right, and that SL had responded appropriately. My subsequent review of these incidents now suggests that for three of them, ambiguous or inadequate instructions were contributory causes (e.g. in one of the incidents the OI was missing a key element). The other contributory causes were wide-ranging, but include human error (including deficiencies in DAP's logs).

14. To date in 2015 there has been one further occasion where an OI detailing limits and conditions derived from the safety case was breached at Magnox Reprocessing. In this event, a tank was not emptied within the periodicity specified in the criticality safety case. This aspect of the safety case is however very conservative and there would have had to be several successive failures to empty the tank before a criticality was credible. SL had, at the time of writing, not yet completed its own internal investigation of this event. However, the prime cause of this event appears to be the duty DAP commencing tank-emptying too late (because of operational pressures) to finish within the timescales set by the OI.

## 3 REGULATORY ENGAGEMENT WITH THE LICENSEE

15. In line with ONR standard practice, our inspectors have been proactive in engaging with SL following incidents on the Sellafield site and in regard to findings from Licence Condition (LC) compliance inspections and the ongoing assurance work undertaken by SL's Internal Regulator (SLIR). As a result of the sequence of events and OI breaches in the Magnox Reprocessing Separation plant described above, this engagement has increasingly focussed on 'conduct of operations' (a technical nuclear safety term which may be interpreted colloquially as 'people doing what they are meant to do in situations affecting safety').

16. By late 2014 ONR had become increasingly concerned that the number and nature of events and OI breaches in the Magnox Reprocessing Separation plant that appeared to be related to conduct of operations (e.g. events that drew DAP performance in regard to ensuring compliance with OIs into question; deficiencies in OIs; and failures to follow OIs) indicated underlying significant deficiencies. These concerns reached a pivotal point with the December 2014 iodine 129 stack monitor event.

17. Adequate conduct of operations is of critical importance at the Magnox Reprocessing Separation Plant, which is more than 50 years old and requires a high level of manual intervention by plant operators to maintain a safe operating state. ONR accepts there will inevitably be instances (which may lead to events) where plant components may fail due to the age of the plant. This however makes SL's adoption of robust arrangements for meeting its legal duty to ensure that all operations that may affect safety are carried out in accordance with clear and unambiguous OIs all the more important.

18. Following the stack monitor event, ONR (supported by SLIR) undertook an inspection (Ref. 9) in the Magnox Reprocessing Separation plant focussing on the operations required to prevent the onset of a criticality in one of its tanks. The inspection found the plant arrangements detailing how documents were managed were not up to date and there was no formal requirement for audits to be undertaken to confirm that operational records required by OIs were being correctly completed and managed appropriately. Pertinent to this PAR, we learned that SL expected its DAPs to discharge their responsibilities (including confirming whether OIs have been complied with) without the requirement for independent checking. Prior to this inspection, SLIR had suggested SL's safety arrangements could be improved by identifying key nuclear

safety operational records and subjecting them to independent checking. This and other improvements to the management of OIs are now being progressed by SL under an operational record improvement programme (Ref. 10).

19. In January 2015, SLIR issued a Letter of Concern (Ref. 11) stating "Over the past 6 months there have been a number of events relating to [the Magnox Reprocessing Separation plant] which indicate a potential worsening trend in the plant's compliance with its nuclear safety standards … you have agreed that these issues are indicative of a shortfall in nuclear safety performance and that action should be taken to address the performance gap.". SL's response to the Letter of Concern was to put in place an action plan (Ref. 12) to remedy the deficiencies, which includes elements pertinent to ensuring compliance with OIs.

20. Separate to this, in January 2015, ONR wrote to the SL Managing Director (Ref. 13) expressing "growing concern regarding the number of events on the Sellafield site in which inadequate human performance and/or management and supervision appear to be significant contributors". This letter confirmed "our inspectors are currently gathering and analysing information on some of these events, e.g. ones in Magnox [Reprocessing]".

21. In February 2015, ONR wrote again to the SL Chief Operating Officer (Ref. 14), this time in regard to the iodine 129 stack monitor event. The letter stated "Our recent findings regarding the functionality of alarms, alarm response instructions, decision making/recording and event investigation raise significant questions regarding whether operations in Magnox are being carried out safely. Consequently, I would be grateful if you would explain the basis of your belief that it is safe for Magnox Reprocessing operations to continue. In particular, it is my expectation that you will give high priority to demonstrating that safety-critical alarms have appropriate functionality, alarm response instructions are adequate and decision-making is suitably conservative and recorded contemporaneously".

22. SL responded to Ref. 14 in the following month, explaining why it considers that Magnox Reprocessing operations are safe to continue (Ref. 15). Specifically, an improvement programme (Ref. 16) was presented that when delivered will improve safety within the plant. ONR acknowledged the positive and prompt action taken by SL following receipt of ONR's letters and noted that some items on the improvement programme were already being progressed prior to ONR's involvement.

## 4 REGULATORY STRATEGY TO SECURE IMPROVEMENTS IN NUCLEAR SAFETY

23. SL fully accepts that having clear and unambiguous OIs, trained, competent staff to control and supervise compliance with OIs and adequate controls in place to review OIs and their adherence are essential aspects of ensuring the safety of its operations. ONR welcomes the commitment SL is now showing to make improvements in these areas at the Magnox Reprocessing Separation plant.

24. However, history suggests that priorities in the Magnox Reprocessing Separation plant will inevitably be subject to change at short notice, e.g. in response to plant incidents, or external factors (continued operation of the plant is necessary to deliver the UK's Magnox Operating Plan [MOP]). These changes are not all subject to ONR's regulatory approval, nor necessarily within the full control of the Magnox Reprocessing Separation plant manager. Nevertheless, full and timely implementation of SL's improvement plan needs to be sustained despite changes in the plant's operating environment. These factors point towards applying some form of formal enforcement to ensure the improvements are delivered in line with SL's planned timescales.

25. It would not however be proportionate or appropriate for ONR to take enforcement action to require SL to deliver the full scope of its improvement plan. In particular, elements of its plan go beyond normal standards of relevant good practice (i.e. the legal standard). There is nonetheless a subset of activities within the improvement plan that would address the most significant regulatory concerns ONR has identified, i.e. with respect to ensuring that all operations which may affect safety, including those subject to limits and conditions necessary in the interests of safety identified in the safety case, are carried out in accordance with written instructions.

26. Using formal enforcement to regulate a limited subset of SL's improvements would mean that ONR is, in effect, using these aspects as representative of the wider failings apparent in these events, rather than enforcing on every single aspect. Adopting such an approach is however consistent with the Targeting Principle in ONR's Enforcement Policy (Ref. 17) and considered reasonable in the circumstances (e.g. as it will ensure a focus on improving operating instructions, which is considered to be the main issue needing to be addressed).

## 5 IDENTIFICATION OF BREACHES

27. Two of the events cited in this report relate to fault sequences which, if unchecked could have led to significant (and even fatal) radiation doses. Though OIs are not the only measure SL had in place, they are an important leg in SL's suite of protective measures. All the events and OI breaches compromised at least one of the multiple barriers put in place to ensure that nuclear safety is not compromised.

28. The contributory causes to the events include deficient OIs, failures to follow OIs and failures to put in place robust checking arrangements to ensure OIs are followed. All the events cited have occurred since the start of 2014, suggesting an underlying and continuing problem. Whilst no harm or release of radioactivity occurred in any of these events, ONR has to consider the significant increase in the likelihood of harm suggested by SL's repeated failures to ensure that all operations that may affect safety are carried out in accordance with clear and unambiguous OIs.

29. In the second and third event, SL operated the Magnox Reprocessing Separation plant outside of its safety case limits and conditions. As such I believe that SL has not complied with LC23(3):

*The licensee shall ensure that operations are at all times controlled and carried out in compliance with … operating rules.*

Here "operating rules" is as defined in LC23(1), i.e. the limits and conditions needed to comply with the safety case (paraphrase), and is not limited to those limits and conditions classed as operating rules by SL.

30. As already noted, adequate implementation of limits and conditions from the safety case requires incorporation into OIs which are clear, unambiguous, and worded such that they are not open to interpretation by the personnel who are tasked with implementing them (see for example Ref. 18). The events described above and evidence from ONR's subsequent interventions indicate that OIs in Magnox Reprocessing are not as clear and unambiguous as would appear reasonable, and there is a lack of ownership for ensuring compliance with the OIs.

31. In view of this I consider that SL has also breached the requirements of LC24(1) and LC24(2):

*The licensee shall ensure that all operations which may affect safety are carried out in accordance with written instructions herein referred to as operating instructions.*

*The licensee shall ensure that such operating instructions include any instructions necessary in the interests of safety and any instructions necessary to ensure that any operating rules are implemented.*

Again, as noted above, the term 'ensuring' includes organisational activities such as providing adequate training, adequate instructions and an appropriate level of compliance checking.

32. I am also of the opinion, for the same reasons, that SL has breached Regulation 5(1) of the Management of Health and Safety at Work Regulations (MHSWR)1999 which requires that:

*Every employer shall make and give effect to such arrangements as are appropriate, having regard to the nature of his activities and the size of his undertaking for the effective planning, organisation, control, monitoring and review of the preventative and protective measures.*

33. SL may also have breached other duties, for example Regulation 10(1) of the MHSWR 1999 (which requires that every employer shall provide his employees with comprehensible and relevant information). I have however decided not to recommend enforcement action over these at present in view of the overlap of these duties with the breaches already recommended and in the interests of targeting ONR's enforcement at the most important aspects.

34. Similarly, the apparent breach of LC23(3) appears to primarily be a repercussion of shortfalls in regard to operating instructions. As such, I do not recommend enforcement action here, again in the interests of targeting ONR's enforcement at the most important aspects.

## 6 APPLICATION OF ONR'S ENFORCEMENT MANAGEMENT MODEL

35. ONR's EMM and the guidance on the use of the EMM in ONR (Ref. 19) have been applied to the events and intervention findings cited within this PAR. The completed EMM1 form is at Ref. 20. Section 1 of Ref. 20 provides a brief description of the circumstances and apparent breaches as described above. Section 2 confirms there is now no risk of serious personal injury, and no cause of imminent danger of serious personal injury which requires immediate action.

36. Sections 3, 4, 5 and 6 of Ref. 20 are discussed below.

### 6.1 EMM1 SECTION 3 – BENCHMARK & RISK GAP

37. For the purposes of Section 3 'Benchmark & Risk Gap' of the EMM1 form, the bounding event in terms of risk and hazard has been considered, namely the first PS4 event, which took place in February 2014. This event has been selected as representative because it is not practicable to consider all the events in aggregate and come to meaningful conclusions.

38. The EMM1 form for this event was completed in April 2014 (Ref. 21) to inform whether it was appropriate for ONR to take enforcement action as a result of the incident. The consequence and likelihood of actual risk were judged to be 'serious' and 'remote' respectively. The consequence and likelihood of the benchmark risk were judged to be 'serious' and 'nil/negligible' respectively. Given a potentially fatal dose to a worker could have arisen (in extremis) from the event and the factors that contributed to the event, these judgements and are considered to remain valid. For single/low casualties the EMM indicates there was a 'substantial' risk gap.

### 6.2 EMM1 SECTION 4 – INITIAL ENFORCEMENT EXPECTATION

39. For the purposes of Section 4 'Initial Enforcement Expectation' of the EMM1 form, all the events cited in this PAR have been considered in aggregate.

40. The breaches considered are against LC24(1), LC24(2) and Regulation 5(1) of the MHSWR. These represent a 'defined' standard within the definitions applied in Ref. 20.

41. I judge that SL's level of compliance with these duties to be 'inadequate'. For instance, although SL has established arrangements in place to comply with LC24(1) and LC24(2), it did not follow them consistently, and this gave rise directly to risks from the events cited.

42. Applying the EMM guidance (Ref. 19) indicates an initial enforcement expectation of an Improvement Notice / Direction / Specification.

### 6.3 EMM1 SECTION 5 - DUTYHOLDER FACTORS

43. This section of the EMM determines whether factors relating to SL merit any change (to either increase or reduce the severity) in the initial enforcement expectation arrived at in the previous section.

44. General conditions across the Sellafield site vary considerably, not least because of the differing ages and challenges posed by the different facilities. Against this backdrop, there have been a number of failures of compliance against a range of legal duties in recent years. Whilst some of these are / were due to plant age factors, others relate to matters within the full control of SL, including failures to set and enforce compliance with company / legal standards and expectations (for example in the management of asbestos, where ONR served an Improvement Notice in 2014). More recently ONR has seen evidence of SL apparently failing to comply with LC28 'Examination, Inspection, Maintenance and Testing' at various plants on the Sellafield site including at the Magnox Reprocessing Separation plant. These findings appear to have similar root causes to the matters under consideration here, e.g. an apparent tolerance to not complying with company arrangements put in place to ensure legal duties are met. These observations lead to a rating of 'poor' against the standard of general conditions.

45. Where the initial enforcement expectation in EMM Section 4 is an Improvement Notice / Direction / Specification, the level of confidence in whether the duty holder can and will comply with enforcement action is not a consideration. However, SL has in recent times fully complied with a number of Improvement Notices served by ONR (and its predecessors) in a timely manner, and therefore has a good record of complying positively and promptly with enforcement action.

46. Under the EMM, the above indicates the appropriate enforcement action prior to applying Strategic Factors would be Prosecution/Crown Censure in addition to an Improvement Notice / Direction / Specification.

### 6.4 EMM2 SECTION 6 – STRATEGIC FACTORS

47. This section of the EMM determines whether wider factors (i.e. those beyond SL) merit any change (to either increase or reduce the severity) in the enforcement action suggested in the previous section.

48. For the purposes of Section 6 'Strategic Factors' of the EMM1 form, the duty holder is considered to be SL and the whole of the Sellafield site undertaking has been considered rather than just the Magnox Reprocessing Separation plant.

49. No harm and no spread of radioactivity were caused by any of these events. Further, SL has a good record of taking appropriate action following formal enforcement action. Specifically, SL takes all formal enforcement very seriously, not least in view of the effect this has on its reputation and public relations. This means that applying any formal enforcement action will almost certainly result in the desired nuclear safety improvements and it is very doubtful whether proceeding with a prosecution would have any net benefit in terms of reducing risks, or on the attention SL's management will apply to its planned improvements. Therefore proceeding with prosecution is not judged to be in the public interest. In contrast, proceeding with an Improvement Notice is judged to be in the public interest in view of the range and nature of the failings and their pertinence to SL's effective and appropriate management of nuclear safety.

50. The functional impact of enforcement action is judged to be acceptable. The main benefits of clear and unambiguous OIs and clear expectations of the requirements to comply with them are to those who undertake, or have control and supervision responsibilities for operations affecting safety. It is not judged that taking formal enforcement action will have a detrimental effect on workforce morale or be a distraction for SL; deficiencies with OIs and SL's means of ensuring compliance with OIs are fully accepted by the licensee. The main benefit of taking this enforcement action is to ensure that the deficiencies are rectified within SL's proposed timescales, given the significant consequences of credible fault sequences at the Magnox Reprocessing Separation plant. It would not be proportionate or appropriate for ONR to require Magnox reprocessing operations to cease whilst the deficiencies are rectified, as this would result in avoidable corrosion of wetted spent Magnox fuel stocks currently awaiting reprocessing, and I judge that it is reasonably practicable for SL to undertake the necessary improvements whilst the plant continues to operate.

51. I have consulted with the Environment Agency who confirms (Ref. 22) no objection to ONR taking formal enforcement action in the form of an Improvement Notice.

52. I judge that taking this formal enforcement action will not adversely impact on SL's ability to deliver hazard and risk reduction activities across the Sellafield site, nor its part in national waste strategies.

53. Following application of Duty Holder factors and Strategic Factors, the indicated enforcement action is an Improvement Notice / Direction / Specification. Specifically, it is judged that proceeding with a Prosecution is not in the public interest and will not result in a reduction in risks over and above that achieved by serving an Improvement Notice / Direction / Specification.

## 7 PROPOSED ENFORCEMENT ACTION

54. The nature of the improvements being sought points naturally towards using an Improvement Notice rather than a Specification or Direction.

55. As the apparent breaches include interrelated duties under both the Health and Safety at Work (etc) Act 1974 and the Energy Act 2013, legal due process requires ONR to select which of these Acts is the most appropriate vehicle for formal enforcement (by virtue of the so-called "one issue, one notice" rule). On balance I conclude that LC24 to be the more appropriate duty to enforce against in the circumstances as it is specific to the shortfalls identified and its provisions are sufficiently broad to address the range of issues raised by these events.

56. As such I conclude that serving an Improvement Notice under the Energy Act 2013, citing breaches against LC24(1), is sufficient to address the range of issues raised by these events and a proportionate regulatory response in the circumstances.

## 8 STRATEGY FOR AND INTENDED OUTCOME OF ENFORCEMENT ACTION

57. As already noted, SL has developed an improvement programme and action plan to set and ensure compliance with appropriate standards at the Magnox Reprocessing Separation plant. These include items which will result in clear and unambiguous OIs and put in place controls to ensure compliance with OIs is reviewed and monitored.

58. SL's programme and plan have been reviewed and key elements that are pertinent to the improvements being sought are recommended for inclusion in the Improvement Notice schedule. These have not been set out here since the due dates have not been agreed with SL for use in such a schedule. Appendix 1 lists the elements of SL's programme that should be considered for inclusion in the schedule.

59. It needs to be recognised that delivering the necessary improvements at the Magnox Reprocessing Separation plant in a sustainable manner cannot be a "quick fix". The likely timescales for delivery of the Improvement Notice schedule are anticipated to be approximately 18 months. During this period, history suggests it is highly likely that there will be further conduct of operation-related events and OI breaches at the plant. Any such occurrence will need to be considered by ONR on a case-by-case basis. However, consideration of enforcement action following such occurrences should be tempered by the existence of the Improvement Notice being proposed here.

## 9 CONCLUSIONS

60. This PAR concludes that events at SL's Magnox Reprocessing Separation plant are apparent breaches of a number of legal duties, including LC24(1), LC24(2) and Regulation 5(1) of the MHSWR. I have applied the EMM to these events and subsequent intervention findings and conclude that it is appropriate to take formal enforcement action in the form of an Improvement Notice.

61. As the apparent breaches include interrelated duties under both the Health and Safety at Work (etc) Act 1974 and the Energy Act 2013, legal due process requires ONR to select which of these Acts is the most appropriate vehicle for formal enforcement. I conclude that LC24 is most appropriate duty to enforce against in the circumstances as it is specific to the shortfalls whilst sufficiently broad to address the range of issues raised by these events. This points to enforcing under the Energy Act 2013.

62. SL agrees that these events highlight significant shortfalls in its management of nuclear safety and has already responded by preparing an improvement programme. The schedule attached to the Improvement Notice should be based on aspects of this programme aimed at remedying the most important shortfalls. I have made proposals for the content of the schedule which should be used in discussions with SL to identify appropriate timings for the individual improvements in the schedule..

## 10 RECOMMENDATIONS

63. I recommend issuing an Improvement Notice under the Energy Act 2013 for apparent contraventions under LC24(1). I recommend a schedule is attached to the Improvement Notice based on elements of SL's improvement programme.

64. The covering letter issued with this Improvement Notice containing guidance relevant to the Improvement Notice should detail other matters cited in this report which require action from SL to raise standards within the Magnox Reprocessing Separation plant.

65. The Improvement Notice should refer to SL's duty to ensure that all operations that may affect safety, including those subject to limits and conditions necessary in the interests of safety identified in the safety case, are carried out in accordance with adequate written OIs.

66. The covering letter should further state SL should ensure that:

a) OIs and the means of complying with them are clearly and unambiguously expressed and communicated;
b) All staff controlling and supervising operations that may affect safety are suitably competent in their role and familiar with their responsibilities in relation to OIs;
c) There is adequate control, monitoring and review of compliance with OIs.

67. ONR should engage with SL to determine timings for the improvements necessary to comply with this Improvement Notice and an underpinning regulatory programme that also includes other items within SL's improvement programme. The regulatory programme should include key milestones, with evidence of progress against these key milestones being submitted to ONR at suitable intervals to demonstrate progress towards full delivery of the Improvement Notice work by its due date.

## 11 REFERENCES

1. SL Management Investigation Report (BN1402A3086) **[TRIM Ref. 2015/125683]**
2. ONR Contact Record ONR-SEL-CR-14-129 **[TRIM Ref. 2014/250974]**
3. SL Basic Cause Investigation Report (BN1408A3770) **[TRIM Ref. 2015/125708]**
4. ONR Contact Record ONR-SEL-CR-14-285 **[TRIM Ref. 2014/386105]**
5. SL Basic Cause Investigation Report (BN1412A1469) **[TRIM Ref. 2015/125723]**
6. ONR Contact Record ONR-SEL-CR-14-469 **[TRIM Ref. 2015/32611]**
7. ONR Contact Record ONR-SEL-CR-14-473 **[TRIM Ref. 2015/96528]**
8. ONR Intervention Record ONR-SEL-IR-14-145 **[TRIM Ref. 2015/48280]**
9. ONR Intervention Record ONR-SEL-IR-14-132 **[TRIM Ref. 2014/465491]**
10. SL Note for the Record **[TRIM Ref. 2015/86211]**
11. SLIR Letter of Concern RC 14/008 **[TRIM Ref. 2015/5248]**
12. SL Internal Regulator Letter of Concern Action Plan – Observed shortfalls in Operational Standards **[TRIM Ref. 2015/50160]**
13. ONR Letter SEL 77528 **[TRIM Ref. 2015/37330]**
14. ONR Letter SEL 77535N **[TRIM Ref. 2015/48089]**
15. ONR Intervention Record ONR-SEL-IR-14-158 **[TRIM Ref. 2015/115511]**
16. SL Improvement Programme **[TRIM Ref. 2015/124746]**
17. ONR's Enforcement Policy Statement **[http://www.onr.org.uk/documents/2014/enforcement-policy-statement.pdf]**
18. ONR Guidance NS-TAST-GD-035 **[TRIM Ref. 2014/261331]**
19. ONR Guidance NS-ENF-GD-002 **[TRIM Ref. 2013/153269]**
20. ONR EMM1 Form (April 2015) **[TRIM Ref. 2015/132781]**
21. ONR EMM1 From (PS4 Event) **[TRIM Ref. 2014/170032]**
22. Environment Agency confirmation of no objection **[TRIM Ref. 2015/141324]**

## APPENDIX 1 – DRAFT IMPROVEMENT NOTICE SCHEDULE

The following or other equally effective means should be taken to remedy the alleged contravention:

1. All Magnox Reprocessing Separation plant DAPs complete 'Control & Supervision', 'Disciplined Operations' and 'Nuclear Safety' SAT derived DAP training workbooks to better equip them to discharge their duties to check compliance with OIs.

2. Deliver the 'Alarm Improvement Plan' to provide updated alarm schedule, removal of nuisance alarms and correct prioritisation of DCS and hardwired alarms in line with current standard, and update alarm OIs accordingly.

3. Review and amend alarm OIs as necessary to remove ambiguity and provide supporting information and parameters for parametric decision making. The OI reviews should be prioritised in order of importance.

4. Review OIs defining limits and conditions identified in the safety case as being necessary in the interests of safety and amend as necessary to remove ambiguities and clarify when specialist advice must be sought.

5. Review and revise the check sheets required to demonstrate compliance with the OIs and remove identified ambiguities.

6. Produce an OI compliance check sheet audit schedule and implement a rolling independent assurance programme which includes the OI compliance check sheet audit.