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Review of Magnox Reprocessing Separation Plant Regulatory Strategy

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EXECUTIVE SUMMARY

Title

Review of Magnox Reprocessing Separation Plant Regulatory Strategy

Purpose

This Office for Nuclear Regulation (ONR) report describes the current regulatory strategy for the Magnox Reprocessing Separation Plant on the Sellafield site, and considers if it is appropriate to move the regulation of the UK Magnox Operating Programme (UKMOP) aspect to the Project Delivery sub programme to recognise the national importance of safe delivery of this programme.

Background

The Magnox Reprocessing Separation Plant (MRSP) has an important role within the UK nuclear industry up until circa 2020, as it supports a number of UK national risk and hazard reduction programmes. This signifies that if this plant was unavailable it could potentially have a significant knock-on effect to a number of other nuclear facilities which could result in safety and security issues.

In June 2015 an Improvement notice (IN) was issued to MRSP in relation to compliance with LC24 (Licence Condition related to Operating Instructions) breaches. In drawing together the basis for this enforcement action the ONR inspector aggregated a number of previous events and breaches which had taken place over the past 14 months.

Since the IN was served, there have been further issues reported in relation to operations of MRSP. Traditionally this would lead ONR to escalate the level of enforcement, potentially leading to a cessation of operations. This would therefore impact delivery of the UKMOP.

This review has been identified to further consider our regulatory approach associated with the MRSP in light of the enforcement action taken to date. It is in recognition of our on-going regulatory concerns related with the operation of the plant and the strategic role the plant has across a number of important UK nuclear safety and security programmes.

Scope of the review

This report will describe the balance of the pros and cons of the existing approach to provide a recommendation on the optimum regulatory strategy for MRSP.

To determine if it is appropriate to employ the wider ONR Sellafield Programme regulatory strategy I have sought to establish;

- The regulatory background which has prompted this review.
- The strategic factors associated with the continued operation of the plant.
- The regulatory options available and how these could be effectively implemented.
- That any revised regulatory approach maintains consistency to ONR enforcement policy principles and our mission.

Conclusions

It is concluded that the strategy employed by the wider Sellafield programme will offer the best approach to regulating the UKMOP or MRSP, providing significantly enhanced attention but with regulatory action informed by holistic rather than individual considerations. It is believed that this should be delivered as a separate project by the ONR Sellafield Project Delivery sub-programme and will achieve a better balance between improving nuclear safety, providing stakeholder confidence and meeting the safe delivery of the UKMOP.

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Recommendation

I recommend that the alternative regulatory strategy outlined in this report be adopted on the Magnox Reprocessing Separation, this is to be formally reviewed for assessment of its impact and on-going suitability in six months' time by the ONR Sellafield programme board.

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LIST OF ABBREVIATIONS

ALARP	As low as reasonably practicable
DFR	Dounreay Fast Reactor
EMM	Enforcement Management Model
FGMSP	First Generation Magnox Storage Pond
FHP	Fuel Handling Plant
HOW2	(Office for Nuclear Regulation) Business Management System
IN	Improvement Notice
LC	Licence Condition
MOP	Magnox Operating Programme
MRSP	Magnox Reprocessing Separation Plant
NDA	Nuclear Decommissioning Authority
ONR	Office for Nuclear Regulation
OSPAR	OSlo PARis Convention
SCIE	Sellafield Compliance, Intelligence and Enforcement
SL	Sellafield Limited
UKMOP	UK Magnox Operating Programme

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1 PURPOSE OF THE REPORT

1. This Office for Nuclear Regulation (ONR) report describes the current regulatory strategy for the Magnox Reprocessing Separation Plant (MRSP) on the Sellafield site, and considers if it is appropriate to move the regulation of the UK Magnox Operating Programme (UKMOP) to the Project Delivery sub programme to recognise the national importance of safe delivery of this programme.
2. This Project Assessment Report (PAR) is written in accordance with ONR guidance on writing reports, (Ref. 1).

2 REGULATORY BACKGROUND

3. In February 2014 the ONR Sellafield Programme revised its regulatory strategy (Ref. 2) for Sellafield. The revised strategy identifies three key outcomes:
 - Accelerated hazard and risk reduction across the Sellafield site.
 - Evidence-based confidence that the licensee is complying with its statutory obligations and that workers and the public are protected from the hazards of the site.
 - Stakeholder confidence that ONR's regulatory approach is appropriately targeted, risk-based, proportionate and effective.
4. The strategy is implemented by two sub programmes: the Project Delivery sub-programme focuses on accelerated hazard and risk reduction across the Sellafield site and the Sellafield Compliance, Intelligence and Enforcement (SCIE) sub-programme focuses on evidence-based confidence that the licensee is complying with its statutory obligations.
5. Currently the MRSP is exclusively regulated by the SCIE sub-programme.
6. The MRSP has an important role within the UK nuclear industry up until circa 2020, as it supports a number of UK national risk and hazard reduction programmes. This signifies that if this plant was unavailable, it could potentially have a significant knock-on effect to a number of other nuclear facilities which could result in safety and security issues.
7. In June 2015 an Improvement Notice (IN) was issued to MRSP in relation to compliance with Licence Condition (LC) 24 'Operating Instructions' breaches (Ref. 3). In drawing together the basis for this enforcement action the ONR inspector aggregated a number of previous plant events and Operating Instruction (OI) breaches which had taken place over the past 14 months.
8. Since the IN was served, there have been further issues reported in relation to operations of MRSP. Traditionally this would lead ONR to escalate the level of enforcement potentially leading to a cessation of operations. This would therefore impact delivery of the MOP and it is this aspect linked to our recent enforcement action that has necessitated consideration of our regulatory approach in this PAR.
9. Whilst Sellafield Limited is working on the cultural improvements needed (18 months to deliver the IN schedule), it is likely that there may be further legal breaches pertaining to matters of medium and low level safety significance that may result in further enforcement. Whilst such enforcement action would be proportionate if Sellafield Limited is considered as a dutyholder in isolation, it would not be in the public interest in view of the work of national importance that the plant undertakes.

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10. This position is similar to that of the Sellafield Limited Legacy Ponds and Silos (LP&S), where ONR's approach to regulation has been to facilitate remediation in the national interest whilst still maintaining regulatory oversight of these facilities.
11. This report will describe the balance of the pros and cons of the existing approach to provide a recommendation on the optimum regulatory strategy for MRSP.
12. To determine if an alternative regulatory approach is appropriate I have sought to establish;
 - The regulatory background which has prompted this review.
 - The strategic factors associated with the continued operation of the plant.
 - The regulatory options available and how these could be effectively implemented.
 - That any revised regulatory approach maintains consistency to ONR enforcement policy principles and our mission.

3 STRATEGIC FACTORS

13. The strategic factors (Ref. 4) that are directly related to the continued operation of the MRSP are:
14. **Delivery of the UK's Magnox Operating Programme (UKMOP);** The UKMOP was launched in 2001 by the Nuclear Decommissioning Authority (NDA); it is currently at its ninth edition (Ref. 5) and is the programme which is to deliver the UK's strategy of 'Reprocess all spent Magnox fuel'. The UKMOP is forecast is complete by 2020 (this is the strategic reference point), based upon average reprocessing rate.
15. The UKMOP originally included fuel manufacture, generation, fuel movements, defueling, wetted storage and reprocessing. The latest issue of the UKMOP is focused primarily on Wylfa, Oldbury and Calder Hall defueling and the completion of the associated reprocessing at Sellafield.
16. To date approximately 52,000te of fuel has been reprocessed through the Magnox Reprocessing Separation Plant, and there is approximately 2,300te of Magnox fuel remaining.
17. The UKMOP is a significant UK nuclear programme and its delivery is a priority for government and regulators in view of its importance to nuclear safety, security and minimising costs to UK tax payer.
18. The impact on the UKMOP if Magnox reprocessing was to cease would be to stop defueling at reactor sites until a revised UK strategy could be implemented. Enacting a revised UK strategy would take considerable time (likely years), resulting in the fuel remaining at the sites for longer. If the hazard remains on the site the active safety and security systems will need to be maintained, extending overall the time at risk and the hotel costs associated with maintaining the site for longer.
19. For the wetted fuel already in the Fuel Handling Plant (FHP) pond at the Sellafield site there would be a significant increase in the period of interim storage. Historically on the Sellafield site there have been issues with the corrosion of wetted Magnox fuel complicating its retrieval and means of reprocessing. These matters both increase the risk posed by the fuel and the costs of managing it through to final disposal, in both cases by a significant factor.

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20. Given that reprocessing is fundamental to the delivery of the UKMOP, the risk of ceasing operations at Magnox reprocessing has been studied and contingency options considered for the dry and wet portions of the UKMOP inventory. Targeted investment has established confidence that these contingency arrangements for managing spent fuel can be deployed if required. However further investment and time will be necessary to get them to the state that they can be deployed. Fuel drying would take between 4.5 to 6.5 years to deploy the capability and a further 1 to 4 year operating period depending on the amount of wetted fuel inventory. Remaining fuel at reactor sites would delay their transition from fuelled sites to defueled sites and then finally to decommissioning sites (the remnant risk posed by the sites decreases successively through this transition). This delay could be a number of decades until interim and final disposal arrangements for the spent fuel are agreed and put into place.
21. **Delivery of High Hazard Reduction Programmes;** Of priority to both government and regulatory bodies is the remediation of legacy ponds on the Sellafield site due to the on-going risks (assessed as “intolerable”) associated with ageing containment structures. An enabler to realising timely remediation of the First Generation Magnox Storage Pond (FGMSP) is to transfer skips of fuel to FHP as this provides the earliest option available to mitigate the risks. Continued fuel decanning and operation of Magnox reprocessing are however necessary to ensure that FHP has enough room to receive these skips. In other words, ceasing operation at Magnox reprocessing will have an immediate effect on addressing this priority national risk reduction programme.
22. **Movement of Dounreay Fast Reactor (DFR) Fuel Programme;** The movement of DFR Breeder material to Sellafield for reprocessing is one of the major work streams to allow Dounreay to reach its interim end state and a key factor in determining the long term security arrangements for the site:
- It supports UK non-proliferation and security objectives by blending (through reprocessing) the material and consolidating the products with other similar materials within the UK.
 - It delivers a key component in reducing the long term safety and security requirements at the Dounreay Site.
23. **Commitments made relating to UK discharge strategy;** The Convention for the Protection of the marine Environment of the North-East Atlantic (the ‘OSPAR Convention’) has been signed onto by Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, the Netherlands, Norway, Portugal, Spain, Sweden, Luxembourg, Switzerland and the United Kingdom of Great Britain and Northern Ireland. The OSPAR Convention entered into force on 25 March 1998.
24. Completion of Magnox reprocessing in the currently forecasted time frames is also linked to the UK discharge strategy and to enabling the UK to meet its UK commitments to the OSPAR convention with a significant step down in discharges in 2020.

4 REGULATORY APPROACH CONSIDERATION

25. ONR’s current regulatory strategy is to obtain evidence-based confidence that the licensee is complying with its statutory obligations and that workers and the public are protected from the hazards of the site.
26. This is achieved by carrying out a targeted inspection plan with an appropriate blend of Systems-Based Inspections and Licence Condition compliance inspections.

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27. At the MRSP, this has resulted in the need for ONR to take enforcement action (e.g. the issue of enforcement letters detailing our concerns relating to conduct of operations and the IN in relation to breaches of LC24) due to the shortfalls identified through the inspections and also following investigation of several events on the plant.
28. The number of shortfalls now being observed reflects the age of the facility and the fact that there will naturally be a gap when compared against facilities built to modern standards. Given that non-completion of the UKMOP presents a significant risk to the UK, ONR believes that it will need to take an alternative approach to ensure it is delivered safely.
29. The regulatory strategy currently employed by the wider Sellafield programme does take such an alternative approach, as it recognises the existing shortfalls and balances these against the wider strategic factors to facilitate and expedite delivery. This strategy has been approved by ONR's Executive Team and Board and has wide support from stakeholders, such as government ministers. It is therefore proposed that this strategy should be applied to ONR's regulation of the UKMOP.
30. It is proposed to transfer delivery of the UKMOP to the Project Delivery sub-programme as a separate self-contained project. This will involve engagement with Sellafield Limited (SL) to identify those areas that are crucial to delivery of the UKMOP, including plant, processes and people, to ensure it is delivered safely. For weaknesses that are identified, we will encourage Sellafield Limited to develop fit-for-purpose solutions.
31. However, should ONR find significant safety concerns in areas dealing with the UKMOP, we will take appropriate action to ensure these are addressed. This may involve encouraging SL to develop appropriate solutions or it may involve ONR taking further enforcement action as informed by our Enforcement Management Model (EMM).
32. For matters identified which have no relevance to the UKMOP these will continue to be regulated under the existing approach and delivered by the Sellafield Compliance, Intelligence and Enforcement (SCIE) sub-programme.
33. I propose that an alternative regulatory strategy is appropriate in this instance as;
 - it reflects our regulatory experience and our concerns regarding operations at this plant by providing significantly enhanced regulatory attention in this area.
 - It is consistent with ONR enforcement policy (Ref. 6).
 - we recognise that whilst SL continues to make cultural and procedural improvements on the plant further breaches are likely to be identified - it is preferable that these are identified in a timely and proactive manner. Efforts to remedy the breaches should be targeted at those which have the greatest safety impact to support delivery of the UKMOP.
 - Sellafield Limited is showing strong and effective leadership of this facility which is providing regulatory confidence and is an enabler for working collaboratively.
 - Non-delivery of the UKMOP has the potential to impact on a number of UK priority risk and hazard reductions programmes.
 - Working with the Magnox Reprocessing management team in a constructive and collaborative manner will result in sustained improvements to nuclear safety and safety culture at the plant.

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5 CONCLUSIONS

34. A Sellafield strategy informed regulatory approach, providing significantly enhanced attention but with regulatory action informed by holistic rather than individual considerations would achieve a better balance between improving nuclear safety, providing stakeholder confidence and meeting national strategic objectives.
35. Specifically the alternative regulatory strategy provides;
- Recognition of the magnitude of our regulatory concerns relating to operations in the MRSP, and builds on previous enforcement action with significantly enhanced regulatory attention.
 - Is aligned with both ONR's mission and enforcement policy.
 - Recognises the age, the remaining operational life of the plant, and the strategic factors which reflects the wider ONR Sellafield regulatory strategy.
 - Takes a proactive constructive approach with the Sellafield Limited team which will result in improvements to nuclear safety and safety culture.
36. To implement this alternative strategy effectively I propose will require the following;
- Assembly of a small team of experienced ONR inspectors to include the current site inspector from the SCIE sub-programme, a project inspector identified from the Project Delivery sub programme and the support of a leadership and management for safety specialist inspector as required.
 - ONR will proactively and systematically seek assurance from Sellafield Limited that the systems most important to safety are being adequately managed. This will entail employing system based type inspections highlighting the equipment, its maintenance, the associated safety documentation and the level of operator oversight given. These inspections would be intensive, on plant assessments carried out over a six month period and prioritised for the highest safety impact associated with the delivery of the UKMOP.
 - This approach will highlight a number of shortfalls to relevant good practice which will be a result of plant age factors, operational priorities and the discipline of how operations are conducted on the plant. When confronted with shortfalls we will continue to assess the 'risk gap' and determine the appropriate regulatory action.
 - Suspension and significant revision of the current inspection plan for this plant will need to be undertaken. This alternative regulatory approach will only be relevant to facility areas that are crucial to the safe delivery of the UKMOP, and will be delivered by the Project Delivery sub-programme. All other areas will be subject to planned compliance inspection as delivered by the SCIE sub-programme.
 - This alternative approach will be kept under review by the Project Delivery sub programme. It is recommended that a formal review of the approach and the team delivering it is undertaken by the Sellafield Programme board after 6 months to assess its impact and on-going suitability.
37. To conclude, I am recommending to the ONR Sellafield Programme that an alternative regulatory strategy (as outlined in this report) be adopted on the MRSP. This is to be formally reviewed to assess its impact and on-going suitability in six months' time by the ONR Sellafield programme board.

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6 RECOMMENDATIONS

38. I recommend that the alternative regulatory strategy outlined in this report be adopted on the Magnox Reprocessing Separation plant. This is to be formally reviewed to assess its impact and on-going suitability in six months' time by the ONR Sellafield programme board.

7 REFERENCES

1. ONR HOW2 Guide – Guidance on Production of Reports, NS-TAST-GD-084 (AST/003), March 2015, TRIM 2015/111520
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3. Basis of enforcement decision following Magnox Reprocessing Separation Plant Events and Operating Instruction Breaches, ONR-SEL-PAR-15-001 Rev. 0, TRIM 2015/135045.
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6. ONR 'Enforcement Policy Statement', ONR-ENF-POL-001 Revision 0, 1 April 2014