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**Management of Higher Activity Waste at AWE**

**Regulatory strategy and enforcement action for the management of higher activity waste**

Note: The version of this report that has been issued for publication has a small level of redaction associated with it. These areas of the report relate to ongoing negotiations between AWE, MoD and other parties, which could be prejudiced were we to release the details. We have evaluated these against the public interest in disclosure and judged them unsuitable for release.

Note 2: During the process of up-revision we re-sought advice from ONR Legal Liaison (TRIM 2016/46087) and were advised to clarify the terminology 'future risk'. As a result of this advice, throughout this document (wherever highlighted with an asterisk\*) the term 'future risk' has been amended to that of 'risk potential'. However, the wording of Recommendation 1 has not been amended, as this directly correlates to the Schedule attached to IN/2015/ONR/LAG/001.

Project Assessment Report ONR-DEF-PAR-14-027  
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### EXECUTIVE SUMMARY

Following AWE's failure to meet Licence Instrument (LI) 511, a specification made under Licence Condition 32(4), this report considers AWE's current strategy for the management of higher activity waste and makes recommendations regarding the appropriate regulatory approach and enforcement action required to achieve compliance.

In 2000, the Nuclear Installations Inspectorate (NII), the nuclear regulator and predecessor of ONR, issued a Specification (LI 49) which required AWE to have inspected, reduced in volume and packaged 670 drums into NIREX standard containers by 31 December 2006. Recognising this was not going to be achieved, and following discussions with the licensee, LI 511 was issued in March 2007. This was a Specification placed on AWE, under Licence Condition 32(4) and required at least 1000 nominal 205 litre intermediate level waste (ILW) feed drums to have been reduced in volume and encapsulated by 20 February 2014, in line with a proposal received from AWE.

Following the failure of AWE to meet the requirements of LI 511, ONR conducted an investigation in accordance with the ONR Enforcement Policy Statement and Enforcement Management Model. The investigation recommended that ONR should not seek prosecution for the failure of AWE to meet the requirements of LI 511. However, the investigation report recommended additional enforcement action with a view to addressing the remaining compliance gap and achieving compliance with industry good practice and ONR's safety assessment principles.

The intent of the enforcement action over the past 14 years was to ensure AWE had a robust strategy in place for managing the legacy and future ILW drums and to achieve progressive hazard reduction within reasonably practicable timescales. This aligns with ONR's Safety Assessment Principles and established national and international relevant good practice.

As part of my assessment, I have considered AWE's developing higher activity waste strategy and forward programme, taking into account the current condition of the higher activity waste packages and existing storage conditions.

This report, including its conclusions and recommendations, has been subject to consultation and advice from ONR's Legal Liaison and from Defence Programme Assurance.

### Conclusions

This report outlines the ONR's enforcement and regulatory strategy to achieve the following outcomes:

- Passivation of all legacy HAW is implemented in an appropriate time-frame to support:
  - No release of radioactive material from AWE's stock of higher active waste (HAW)
  - Unconditioned HAW packages do not deteriorate to a point where they are unsuitable for one of AWE's chosen passivation processes/facilities/services
- Passivation processes/facilities/services meet relevant good practice from an engineering and safety standpoint
- Final waste products, when produced, remain fit for transport and geological disposal throughout their storage life at AWE

\*In my opinion, AWE has not yet developed and implemented a long-term strategy for the management of higher activity wastes which achieves these outcomes and demonstrates that the risk potential to the public and the workforce from the waste is minimised so far as is

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reasonably practicable throughout the anticipated storage life of the waste on site. I consider that failure (in terms of timeliness) to reduce the risk potential so far as is reasonably practicable constitutes a breach under Health and Safety at Work etc Act 1974 part 1, s2(1) and s3(1).

\*Successfully achieving these outcomes [REDACTED]. ONR's previous use of Specifications at AWE as a tool for achieving this form of hazard reduction has highlighted the shortfalls in using long term enforcement action in these circumstances. It is therefore recommended that the enforcement action, an Improvement Notice, should focus initially on ensuring that at September 2016, AWE completes its process for recommending options to take forward as part of the future HAW programme and that AWE demonstrates that its recommended options for the passivation and storage of its legacy and future HAW reduce the risk potential so far as is reasonably practicable throughout its anticipated storage life.

\*The enforcement action recommended does not bring AWE back into compliance with the requirements of LI 511; it aims to ensure they develop a robust and underpinned strategy for doing so. Once this Improvement Notice is closed, and AWE have prepared a robust strategy for HAW management which demonstrates that the potential for risk is reduced so far as is reasonably practicable throughout the waste's anticipated storage life, then appropriate consideration should be given to further enforcement action to ensure that the strategy is implemented, and the waste is passivated, in a timely manner. This staged approach is in line with the recommendations from ONR's investigation into AWE's failure to meet the requirements of LI 511.

Alongside this enforcement strategy, a wider engagement and intervention plan should be developed and implemented to influence timely delivery of programmes of work and provide confidence in the continued safe and secure storage of the legacy/future waste until the optioneering is complete, the passivation projects are implemented and the outcomes are achieved.

The recommendations from this project assessment report capture all the applicable recommendations from ONR's investigation into AWE's failure to meet the requirements of LI 511. These recommendations will be incorporated within an intervention task sheet and tracked to completion by the weapons sub-programme Intervention Management Group (IMG).

### Recommendations

The following recommendations are made:

**Recommendation 1:** Issue an Improvement Notice (IN/2015/ONR/LAG/001) to AWE plc for the contravention under section 2(1) and 3(1) of the Health and Safety at Work Act 1974. The schedule attached to the improvement notice should include:

1. Complete the activities that enable AWE to recommend options to take forward as part of the future Higher Active Waste programme.
2. Demonstrate that the options recommended to manage Higher Active Wastes on Aldermaston Site minimise the risks to the health and safety of the public and your employees from the waste so far as is reasonably practicable throughout the anticipated storage life of the waste on the site.

**Recommendation 2:** Key milestones to complete the option recommendation process for the higher activity waste programme should be agreed with AWE and monitored through AWE's Nuclear, Environment, Explosive Safety Programme, or equivalent.

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**Recommendation 3:** Confirm with AWE their response to item 2 of the Improvement Notice Schedule to agree a basis for the closure of the Improvement Notice.

**Recommendation 4:** Provide AWE with advice and guidance on the structure and content of radioactive waste management cases and on the principles of ALARP.

**Recommendation 5:** Consider the requirements for further enforcement action upon closure of Improvement Notice (IN/2015/ONR/LAG/001) to require AWE to implement the recommended options to passivate legacy/future HAW in reasonably practicable timescales.

**Recommendation 6:** Key milestones from the forward action plan for the ILW stores are agreed with AWE and monitored via AWE's Nuclear, Environment, Explosives Safety Programme (NEESP) or the relevant Hold Point Control Plan (HPCP).

**Recommendation 7:** Prepare and implement an engagement and intervention plan for the regulation of holistic through-life management of AWE's HAW programme. The plan's scope should include engagement with relevant stakeholders.

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### LIST OF ABBREVIATIONS

ALARP	As low as reasonably practicable
CPS	Crown Prosecution Service
EMM	Enforcement Management Model
GDF	Geological Disposal Facility
HAW	Higher Activity Waste
██████	████████████████████
HEPA	High Efficiency Particulate Arrestance
HOW2	(Office for Nuclear Regulation) Business Management System
HPCP	Hold Point Control Plan
HSE	Health and Safety Executive
IAEA	International Atomic Energy Agency
IA2	Investment Appraisal gate 2
ILW	Intermediate Level Waste
IMG	Intervention Management Group
LI	Licence Instrument
MoD	Ministry of Defence
NDA	Nuclear Decommissioning Authority
NEESP	Nuclear, Environment, Explosives Safety Programme
ONR	Office for Nuclear Regulation
PRS	Periodic Review of Safety
PSR	Preliminary Safety Report
RGP	Relevant Good Practice
SAP	Safety Assessment Principle(s)
SFAIRP	So far as is reasonably practicable
SWPT	Strategic Weapons Project Team
TAG	Technical Assessment Guide (ONR)
WENRA	Western European Nuclear Regulators Association
WTC1	Waste Treatment Complex 1

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### 1 INTRODUCTION

1. This report considers AWEs current strategy for the management of higher activity waste and details the future regulatory strategy for this part of the licensee's undertaking. The report makes a number of recommendations, including formal enforcement action.

### 2 BACKGROUND

2. In 2000, the Nuclear Installations Inspectorate (NII), the nuclear regulator and predecessor of ONR, issued a Specification (LI 49)<sup>(2)</sup> under Licence Condition 32(4). This required AWE to have inspected, reduced in volume and packaged 670 Intermediate Level Waste (ILW) drums into NIREX standard containers by 31 December 2006. Recognising this was not going to be achieved, and following discussions with the licensee, LI 511<sup>(1)</sup> was issued in March 2007. This was a Specification placed on AWE, under Licence Condition 32(4) and required at least 1000 nominal 205 litre ILW feed drums to have been reduced in volume and encapsulated by 20 February 2014, in line with a proposal received from AWE.
3. In March 2014, following the failure of AWE to meet the requirements of LI 511, ONR conducted an investigation<sup>(3)</sup> in accordance with the ONR Enforcement Policy Statement<sup>(4)</sup> and Enforcement Management Model<sup>(5)</sup>. The Enforcement Assessment Record (EMM1) was completed as part of the investigation<sup>(3)</sup>. Based on the application of the EMM to the circumstances, and taking into account both duty holder and strategic factors, the investigation report recommended that ONR would not seek prosecution for the failure of AWE to meet the requirements of LI511. By also taking into account the requirements of the Crown Prosecution Service (CPS) Code for Crown Prosecutors and that the intermediate level waste currently stored on the Aldermaston does not pose a significant risk to the public or the workforce in the short/medium term, the investigation report considered that a proportionate response to the breach of the Specification would be for ONR to seek improvements through alternative regulatory and enforcement action. The aim of any enforcement action should be to address the remaining compliance gap and achieve compliance with industry good practice and ONR's safety assessment principles.
4. The focus of previous enforcement action was the legacy ILW drums. However to achieve compliance with industry good practice and ONR's safety assessment principles, implementation of a robust higher activity waste management strategy and plan should consider the processing and storage of all Higher Activity Waste (HAW) streams. In considering the appropriate enforcement action and regulatory strategy to ensure that AWE derive and implement such a strategy for their HAW arisings, I have considered AWE's HAW forward programme<sup>(6), (7)</sup>, taking into account the current condition of the higher activity waste packages<sup>(8)</sup> and existing storage conditions<sup>(9)</sup>.
5. This report, including its conclusions and recommendations, has been subject to consultation and advice from ONR's Legal Liaison and from Defence Programme Assurance.

### 3 GOOD PRACTICE FOR THE MANAGEMENT OF HIGHER ACTIVITY RADIOACTIVE WASTE

6. Within the UK, ILW and relatively small amounts of Low Level Waste (LLW) is referred to as higher activity waste (HAW). There is currently no disposal facility for HAW within the UK. In the long-term, government policy (England and Wales) is for a geological disposal facility (GDF) to be constructed; however this will not be available for many decades. In Scotland, the policy is that the long-term management of HAW

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should be in near surface facilities. Licensees therefore need to provide safe and secure long-term interim storage of HAW until it can be safely disposed of.

7. This assessment report has been produced taking into account the following national and international guidance on how to achieve the safe, long-term storage of HAW:
  - **ONR Safety assessment principles<sup>(10)</sup>**  
The key ONR safety assessment principles (SAPs) applied within this report are:
    - RW.5 Radioactive waste should be stored in accordance with good engineering practice and in a passively safe state.
    - RW.6 Radiological hazards should be reduced systemically and progressively. The waste should be processed into a passively safe state as soon as is reasonably practicable.
  - **ONR technical assessment guides**  
The following ONR technical assessment guide has been used as part of this assessment:
    - NS-TAST-GD-024<sup>(11)</sup> Management of radioactive materials and radioactive waste on nuclear licensed sites
  - **Joint Guidance on the Management of Higher Activity Radioactive Waste on Nuclear Licensed Sites, 2015<sup>(12)</sup>**
  - **Industry Guidance, Interim storage of higher activity waste packages<sup>(13)</sup>**
  - **International standards and guidance**
    - IAEA Safety Standards – Predisposal management of radioactive waste – General Safety requirements part 5 (GSR part 5)<sup>(14)</sup>
    - IAEA Safety Standards – Predisposal management of low and intermediate level radioactive waste management – Safety Guide WS-G-2.5<sup>(15)</sup>
    - IAEA Safety Standards – Storage of radioactive waste – Safety Guide WS-G-6.1<sup>(16)</sup>
    - WENRA Waste and Spent Fuel Storage Safety Reference Levels, version 2.2<sup>(20)</sup>
8. \*In line with the relevant good practice listed above, regulatory expectation is that licensees will reduce the volume of HAW stored in an untreated form and will condition waste to achieve long-term passively safe storage in reasonably practicable timescales. This should be implemented as part of an overall strategy which manages waste from its generation, through conditioning, storage and up to removal from site for eventual disposal. The aim should be to demonstrate that radioactive waste is managed throughout its lifecycle, including its anticipated storage life in a way which minimises risks to the health and safety of employees and the public, so far as is reasonably practicable (SFAIRP). Following advice on enforcement options from ONR Legal Liaison, I consider that failure (in terms of timeliness) to reduce the risk potential SFAIRP constitutes a breach under sections 2 and 3 of the Health and Safety at Work Act 1974..
- 4 **MANAGEMENT OF HIGHER ACTIVITY WASTE AT AWE**
9. AWE manages a number of higher activity waste streams, which have arisen from operations and decommissioning activities over a number of years since the practice of sea disposal ceased in 1983. Based on the nature of the operations carried out at the Aldermaston site, the radioactive waste does not require any remote handling

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operations. There are currently around [REDACTED] in storage at AWE with many more additional packages still to be generated from the future operational and decommissioning programmes at both Aldermaston and Burghfield sites. The following higher activity waste streams form part of the HAW programme at AWE<sup>(18)</sup>:

- Solid higher activity waste is generated from operations and decommissioning which comprises the majority of the existing and future higher activity wastes. There are approximately [REDACTED] existing drums and the same order of magnitude will be produced in the future as part of the planned decommissioning operations. The majority of this waste is stored in 205 litre drums and would be suitable for super-compaction. These drums were the subject of the Specification, LI511. A small proportion of this waste is not suitable for super-compaction either due to the drum type or the level of contamination within the drums.
- [REDACTED]
- HEPA Filters (59 boxes)
- Legacy concrete lined drums (743 drums)
- Contaminated oils (approximately 5m<sup>3</sup>)
- Contaminated mercury (approximately 300kg)
- Contaminated storage vessels

10. Alongside this, there are other contaminated oils which are not part of the HAW programme and are managed separately by the facility. In addition, processing and/or disposal of some pyrochemical residues are managed via a separate project

### 4.1 HIGHER ACTIVITY WASTE STRATEGY

11. In line with ONR's safety assessment principles and guidance, licensees should provide a strategy which represents an overview of a licensee's approach to the current and future management of radioactive waste. The strategy should encompass the anticipated timescales for the management of radioactive waste, from generation to final disposal, and demonstrate how the hazards posed by legacy waste are reduced systematically and progressively.

12. AWE reviewed its HAW strategy in 2013<sup>(18)</sup>. The strategy provides an overview of the higher activity waste streams generated on site and what is currently being done to manage higher activity waste, including the existing storage arrangements. The strategy identifies a number of aims; however it does not define specific goals and milestones to achieve these aims. The strategy also fails to identify the significant assumptions, risks and constraints and how will they be managed.

13. The strategy fails to provide a forward look at how HAW will be managed during the anticipated lifetime of the waste, from generation to final disposal.

### 4.2 HIGHER ACTIVITY WASTE PROGRAMME

14. The current HAW programme has been developed by AWE over the past three years, and combines a number of waste treatment projects and also considers the storage requirements for both conditioned and unconditioned waste. The programme consists of a number of work-streams covering all the HAW waste forms listed in section 4 above.

15. In October 2014, the HAW programme received [REDACTED] complete the scope of work to Investment Appraisal gate 2 (IA2) in May 2016. AWE has provided a logic diagram<sup>(6)</sup> and key deliverables and milestones<sup>(7)</sup> for the programme of work up to IA2 in May 2016. After IA2, the [REDACTED] scope of work will be agreed through

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AWE and MoD governance processes. The [REDACTED] waste project, which consists of up to [REDACTED] is more mature than the other work streams and detailed design on the selected option is underway. Implementation of the next stage of this project is subject to investment appraisal in approximately November 2016. Optioneering of treatment options for other waste streams is less well advanced.

- 16. By far the majority of HAW stored at AWE are those wastes stored in 205 litre ILW drums, and it is these drums that were the subject of the previous Specifications (see section 2). High level optioneering<sup>(18)</sup> undertaken by AWE in 2013, resulted in two options being selected for more detailed consideration in the current Front End Definition phase.
- 17. One option is to construct and operate a super-compactor and encapsulation facility at the Aldermaston Site. This is an established approach within industry and initial disposability assessments of the waste at AWE have been completed by Radioactive Waste Management Limited. At IA2 (approx. May 2016), there is planned to be an agreed concept design and preliminary safety report in place for this option.

18. [REDACTED]

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

19. [REDACTED]

20. [REDACTED]

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21. [REDACTED]
22. At IA2 (approx. May 2016), AWE plans to recommend [REDACTED] [REDACTED] the preferred solution for processing the majority of its HAW stocks (205 litre ILW drums). The other HAW workstreams are also planned by AWE to reach a level of maturity at this stage and, where applicable, the selected options will be taken forward into the next project stage. It is important that any option(s) selected at this stage are subsequently developed in such a way as to minimise risk to the health and safety of the public and the workforce.
23. After IA2, individual projects will be set-up and sanctioned through both AWE and MoD sanction processes. [REDACTED] [REDACTED] The sanctioning process is expected to take approximately 12 months.
24. The scope of the HAW programme also considers the long-term storage strategy for HAW, taking into account the existing storage facilities and future requirements. At IA2, there will be an agreed concept design and preliminary safety report for the construction of a new store which will be suitable for the long-term storage of processed HAW.
25. Over the past 18 months, AWE has had considerable engagement with Radioactive Waste Management Ltd, [REDACTED]. In addition, ONR has had routine regulatory engagement with AWE to monitor progress against the HAW programme. To date, progress has been in line with the programme, providing confidence that by September 2016 AWE will be in a position to recommend appropriate waste processing and storage options for all waste forms. .

**5 EXISTING DRUM STORAGE ARRANGEMENTS**

26. As presented in section 4 above, there are currently approximately [REDACTED] higher activity waste packages currently in storage at AWE. Approximately [REDACTED] of these packages are ILW drums which would be suitable for super-compaction and encapsulation, and were the subject of the previous Specifications. These ILW drums have recently undergone non-destructive assay and radiography, prior to re-stacking in the current ILW stores. During this work AWE did not identify any emerging package integrity issues. However, it should be noted that signs of surface corrosion have been observed on a small number of drums.
27. The drums are currently stacked either four or five high in narrow aisles in steel pallets. The drums are subject to a surveillance regime which is based upon a sample of the different drum types and waste forms.
28. Based on the current stacking arrangements, AWE's existing stores for ILW drums have the capacity for the storage of approximately [REDACTED] drums, whilst still allowing space to relocate enough packages to recover a failing package in the worst case

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position. Based on predicted arisings, it is expected that the existing stores will reach their maximum capacity within ten years.

29. The current ILW Storage and Transport Periodic Review of Safety (PRS) was completed in 2009 and was based on the assumption that an on-site super-compactor would be available for processing the drums by February 2014, in line with the requirements of LI 511. Due to AWE's change in strategy and the subsequent requirement for ILW to be stored for an extended period of time, ONR requested that AWE complete a review of the assumptions made in the 2009 PRS to determine whether there were any short/medium term impacts on the existing storage arrangements. AWE have completed two reviews<sup>(8,9)</sup> and identified a number of recommendations against which a forward action plan is currently being developed by AWE.
30. Following ONR intervention, AWE have made a number of significant improvements to the management of HAW including:
- New storage building constructed and commissioned
  - Old storage buildings closed
  - Implementation of metal post pallets to improve drum retrievability and reduce load on drums during storage
  - A radiography suite was constructed and commissioned
  - Full characterisation of drum inventory through modern standard assay and real time radiography
  - Re-categorisation to LLW of >3800 drums
  - Reduction in rate of production of ILW drums, from ~1200/year in 2006 to ~500/year

## 6 ONR'S REGULATORY STRATEGY AND ENFORCEMENT ACTION GOING FORWARD

31. \*Over the past 14 years, ONR has issued two Licence Condition 32 Specifications. Neither achieved the risk reduction aims that were intended and were focused around volume reduction and passivation of ILW drums. To achieve compliance with relevant good practice, and to demonstrate that the risk potential is reduced so far as is reasonably practicable, it is considered that the regulatory and enforcement strategy going forward should look to achieve the following outcomes:
- Passivation of all legacy HAW is implemented in an appropriate time-frame to support:
    - No release of radioactive material from AWE's stock of higher active waste (HAW)
    - Unconditioned HAW packages do not deteriorate to a point where they are unsuitable for one of AWE's chosen passivation processes/facilities/services
  - Passivation processes/facilities/services meet relevant good practice from an engineering and safety standpoint
  - Final waste products, when produced, remain fit for transport and geological disposal throughout their storage life at AWE
32. \*Since 2011, AWE have developed a revised HAW strategy (described in section 4) which covers all higher activity waste streams and storage as part of a single programme of work. From a regulatory perspective, progress has been slow and the majority of HAW options are currently only undergoing initial front end definition. This work is currently [REDACTED] and the timescales post-May 2016 for full implementation of the chosen strategy are not yet clear. [REDACTED]

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[REDACTED] Existing storage capacity is limited, with only relatively short timescales to implement additional storage capacity. Until option selection at IA2 is performed, AWE cannot demonstrate that waste will be passivated [REDACTED] or they become unsuitable for their chosen passivation process/facility/service. Therefore, in my opinion, AWE have not yet demonstrated that the long-term strategy for the management of HAW reduces the risk potential to the health and safety of employees and the public, so far as is reasonably practicable (SFAIRP) throughout the anticipated storage life of the waste on site. In my opinion, this is a breach of an employer's legal duties defined in sections 2(1) and 3(1) of the Health and Safety at Work Act 1974.

33. \*This interpretation of the application of the Health and Safety at Work Act in this manner, regarding the potential significant risk in the longer term as a risk integral and the timeliness of risk reduction measures, has been discussed with ONR Legal Liaison. Case law related to risk potential (R vs Trustees of the Science Museum) supports this interpretation.\*Successfully achieving these outcomes [REDACTED] ONR's previous use of Specifications at AWE as a tool for achieving this form of hazard reduction has highlighted the shortfalls in using long term enforcement action in these circumstances. It is therefore recommended that the enforcement action, an Improvement Notice, should focus initially on ensuring that at September 2016, AWE completes its process for recommending options to take forward as part of the future HAW programme and that AWE demonstrates that its recommended options for the passivation and storage of its legacy and future HAW reduces the risk potential from the waste so far as is reasonably practicable throughout its anticipated storage life.

**Recommendation 1:** Issue an Improvement Notice (IN/2015/ONR/LAG/001) for the contravention under section 2(1) and 3(1) of the Health and Safety at Work etc Act 1974. The schedule attached to the improvement notice should include:

- 1) Complete the activities that enable AWE to recommend options to take forward as part of the future Higher Active Waste programme.
  - 2) Demonstrate that the options recommended to manage Higher Active Wastes on Aldermaston Site minimise the risks to the health and safety of the public and your employees from the waste so far as is reasonably practicable throughout the anticipated storage life of the waste on the site.
34. To monitor progress against delivery of AWE's option recommendation process, item 1 of the schedule, it is recommended that progress against key milestones should be agreed with AWE and monitored through AWE's Nuclear, Environment, Explosives Safety Programme (NEESP), or equivalent tracking mechanism. The NEESP identifies key activities which require regulatory permissioning or a level of regulatory review. These milestones will also form part of the completion deliverables associated with the extant regulatory issue 2073 relating to AWE's option selection process for the Higher Active Waste programme. The deliverables within the NEESP are tracked by the Level 2 and 3 Regulatory Interface Meetings. Suggested key milestones include:
- Concept design and preliminary safety case for the new store
  - Concept design and preliminary safety case for the on-site super-compactor
  - Passivation of [REDACTED] waste
  - Option selection for high inventory drums

Other HAW streams, including contaminated mercury and oils, are still at the early stages of developing a processing route. Progress against these areas should be

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tracked at the routine Level 4 Regulatory Interface Meeting. Once process routes are identified, these can be formally tracked via the NEESP.

**Recommendation 2:** Key milestones to complete the option recommendation process for the higher activity waste programme should be agreed with AWE and monitored through AWE's Nuclear, Environment, Explosives Safety Programme (NEESP), or equivalent.

35. AWE need to demonstrate that the options selected to manage higher activity waste at Aldermaston Site minimise the risks to the health and safety of the public and their employees. The joint guidance for the management of higher activity waste<sup>(12)</sup> suggests that radioactive waste management cases could be used as a template for providing such demonstration. This is only guidance and AWE could achieve this expectation in an alternative manner. However, it is recommended that ONR provide AWE with guidance on radioactive waste management cases and the principles of ALARP to ensure that the final outcome will satisfactorily close-out the improvement notice.

**Recommendation 3:** Confirm with AWE their response to item 2 of the Improvement Notice Schedule to agree a basis for the closure of the Improvement Notice.

**Recommendation 4:** Provide AWE with advice and guidance on the structure and content of radioactive waste management cases and on the principles of ALARP.

36. Once AWE has achieved the requirements of the initial improvement notice, and developed a robust HAW strategy, the next step will be to implement the strategy. Post-May 2016, the recommended options should be appropriately sanctioned by AWE, MoD [REDACTED]. At this point, ONR should consider whether additional enforcement action is required to ensure delivery of the recommended option(s) and to achieve the outcomes identified in paragraph 31. This staged approach is in line with the recommendations from ONR's investigation into AWE's failure to meet the requirements of LI 511.

**Recommendation 5:** Consider the possible requirements for further enforcement action upon closure of Improvement Notice (IN/2015/ONR/LAG/001) to require AWE to implement the recommended options to passivate legacy/future HAW in reasonably practicable timescales.

37. AWE is currently developing a forward action plan to implement all the recommendations from the recent reviews of the ILW Storage and Transport PRS. These recommendations include maintenance of the storage facilities, increased surveillance of the drums and improved environmental monitoring. It is recommended that key milestones from the forward action plan are agreed with AWE and tracked via AWE's NEESP or the relevant Hold Point Control Plan (HPCP) as appropriate:

**Recommendation 6:** Key milestones from the forward action plan for the ILW stores are agreed with AWE and monitored via AWE's Nuclear, Environment, Explosives Safety Programme (NEESP) or the relevant Hold Point Control Plan (HPCP).

38. It is recognised that for AWE to develop and implement a strategy for the management of HAW in a sustainable manner and secure the outcomes outlined in paragraph 31, will not be a "quick fix". In my opinion, AWE's current stock of HAW does not pose a significant risk to the health and safety of the public or the workforce in the short/medium term; however, the storage timescales for the unconditioned packages are not yet defined and will depend upon the processing option and implementation programme selected in approximately May 2016. Therefore, to maintain confidence

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that passivation processes are made available in a timely manner, and to ensure that there is no significant deterioration of the drums in the interim period, part of the regulatory strategy is to:

39. **Recommendation 7:** Prepare and implement an engagement and intervention plan for the regulation of holistic through-life management of AWE's HAW programme. The plan's scope should include engagement with relevant stakeholders.
40. This plan should include the following activities as a minimum:
  - An engagement plan for key MoD decision makers in the project sanctioning process
  - Assessment of AWE's current storage arrangements, including their package surveillance regime
  - Early engagement and/or assessment of key safety documentation for the HAW workstreams
  - [REDACTED]
41. The recommendations from this report will be incorporated within a weapons sub-programme Task Sheet<sup>(19)</sup> and ONR's issue database. This will identify suitable regulatory milestones which will be tracked by the weapons sub-programme Intervention Management Group (IMG).

## 7 CONCLUSIONS

42. This report, including its conclusions and recommendations, has been subject to consultation and advice from ONR's Legal Liaison and from Defence Programme Assurance.
43. This report outlines the ONR's enforcement and regulatory strategy to achieve the following outcomes:
  - Passivation of all legacy HAW is implemented in an appropriate time-frame to support:
    - No release of radioactive material from AWE's stock of higher active waste (HAW)
    - Unconditioned HAW packages do not deteriorate to a point where they are unsuitable for one of AWE's chosen passivation processes/facilities/services
  - Passivation processes/facilities/services meet relevant good practice from an engineering and safety standpoint
  - Final waste products, when produced, remain fit for transport and geological disposal throughout their storage life at AWE
44. \*AWE has not yet developed and implemented a long-term strategy for the management of higher activity wastes which achieves these outcomes and demonstrates that the risk potential to the public and the workforce from the waste is minimised so far as is reasonably practicable throughout the anticipated storage life of the waste on site. This represents a contravention of Health and Safety at Work etc Act 1974 part 1, s2(1) and s3(1).
45. \*Successfully achieving these outcomes [REDACTED]. Previous enforcement action has been taken in this area, and the outcomes of this action have been taken into consideration in selecting the appropriate form of enforcement action here, in line with ONR's Enforcement Management Model – where the duty holder's enforcement record is one factor in ONR's decision making process.

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46. \*It is therefore recommended that the enforcement action, an Improvement Notice (IN/2015/ONR/LAG/001), should focus on ensuring that at September 2016, AWE completes its process for recommending options to take forward as part of the future HAW programme and that AWE demonstrates that its recommended options for the passivation and storage of its legacy and future HAW reduces the risk potential so far as is reasonably practicable throughout its anticipated storage life.
47. \*The enforcement action recommended here does not bring AWE back into compliance with the requirements of LI511, it aims to ensure they develop a robust and underpinned strategy for doing so. Once this Improvement Notice (IN/2015/ONR/LAG/001) is closed, and AWE have prepared a robust strategy for HAW management which demonstrates that the risk potential is reduced so far as is reasonably practicable throughout the waste's anticipated storage life, then appropriate consideration should be given to further enforcement action to ensure that the strategy is implemented, and the waste is passivated, in a timely manner. This staged approach is in line with the recommendations from ONR's investigation into AWE's failure to meet the requirements of LI 511.
48. Alongside this enforcement strategy, a wider engagement and intervention plan should be developed and implemented to influence timely delivery of programmes of work and provide confidence in the continued safe and secure storage of the legacy/future waste until the optioneering is complete, the passivation projects are implemented and the outcomes are achieved. It is recognised that successful implementation of the HAW strategy will require appropriate and timely funding and support from MoD, therefore engagement with MoD will be essential.
49. It is worth noting that the recommendations from this project assessment report capture all the applicable recommendations from ONR's investigation into AWE's failure to meet the requirements of LI511<sup>(3)</sup>. These recommendations will be incorporated within an intervention Task Sheet<sup>(21)</sup> and tracked to completion by the weapons sub-programme Intervention Management Group (IMG).

## 8 RECOMMENDATIONS

The following recommendations are made:

**Recommendation 1:** Issue an Improvement Notice (IN/2015/ONR/LAG/001) to AWE plc for the contravention under section 2(1) and 3(1) of the Health and Safety at Work etc Act 1974. The schedule attached to the improvement notice should include:

1. Complete the activities that enable AWE to recommend options to take forward as part of the future Higher Active Waste programme.
2. Demonstrate that the options recommended to manage Higher Active Wastes on Aldermaston Site minimise the risks to the health and safety of the public and your employees from the waste so far as is reasonably practicable throughout the anticipated storage life of the waste on the site.

**Recommendation 2:** Key milestones to complete the option recommendation process for the higher activity waste programme should be agreed with AWE and monitored through AWE's Nuclear, Environment, Explosives Safety Programme (NEESP), or equivalent.

**Recommendation 3:** Confirm with AWE their response to item 2 of the Improvement Notice Schedule to agree a basis for the closure of the Improvement Notice.

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**Recommendation 4:** Provide AWE with advice and guidance on the structure and content of radioactive waste management cases and on the principles of ALARP.

**Recommendation 5:** Consider the possible requirements for further enforcement action upon closure of Improvement Notice (IN/2015/ONR/LAG/001) to require AWE to implement the recommended options to passivate legacy/future HAW in reasonably practicable timescales.

**Recommendation 6:** Key milestones from the forward action plan for the ILW stores are agreed with AWE and monitored via AWE's Nuclear, Environment, Explosives Safety Programme (NEESP) or the relevant Hold Point Control Plan (HPCP).

**Recommendation 7:** Prepare and implement an engagement and intervention plan for the regulation of holistic through-life management of AWE's HAW programme. The plan's scope should include engagement with relevant stakeholders.

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### 9 REFERENCES

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3. Investigation report into Expiry of LI511, April 2015 (TRIM reference 2015/136048)
4. ONR enforcement policy statement  
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5. Use of the enforcement management model in ONR, NS-ENF-GD-002, revision 4 and HSE enforcement management model operational version 3.2
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16. IAEA Safety Standards – Storage of radioactive waste – Safety Guide WS-G-6.1<sup>(15)</sup>
17. [REDACTED]
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19. Task Sheet for AWE's Higher Active Waste, ONR-Defence-WPNS-TS-099 (TRIM 2015/166963)
20. WENRA Waste and Spent Fuel Storage Reference Levels, Version 2.2, April 2014

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