



HAL Stocks

Project Assessment Report – HAL Stocks Specification

Project Assessment Report ONR-SEL-PAR-14-015
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EXECUTIVE SUMMARY

HAL Stocks Specification – HALES Operating Rule for the Reduction in Highly Active Liquor Stocks.

Permission Requested

Sellafield Limited (SL) is requesting that the Office for Nuclear Regulation (ONR) accepts its strategy to control Highly Activity Liquor (HAL) stocks using a new Operating Rule (OR) instead of the current HAL Stocks Specification (LI793).

Background

HAL Stocks were approximately 20,000teU in 2001 when ONR issued the original HAL stocks specification. HAL stocks have been reduced by approximately 70% since then and currently stand at [REDACTED]. The HAL stocks specification limit is currently at 6524 teU and reduces each month until July 2015 when it reaches a steady state buffer level of 5500teU.

SL has successfully complied with the HAL Stocks specifications for the past 14 years and remained on target with the conditions of the specification until November 2013 when there was a loss of power at the Waste Vitrification Plant (WVP) leading to gross contamination of Line 3 (L3) resulting in its unavailability for 11 months. ONR has investigated this event and issued an improvement notice requiring SL to improve the resilience and containment at WVP. The resultant unavailability of WVP L3 has resulted in SL vitrifying significantly less HAL than planned making it likely that the HAL stocks specification will be temporarily breached. ONR's conservative projections indicate that SL will breach the specification in April 2015, and the size of the breach will peak at about 6% (350teU) in July 2015. HAL stocks will continue to be reduced as L3 is returned to service and SL will come back into compliance with the specification in July 2016.

The regulatory expectation in a situation such as this is that SL would reduce/stop reprocessing operations to prevent a breach of the HAL stocks specification. However Sellafield has presented a strategy stating that overall risks on site reduced As Low As Reasonably Practicable (ALARP) if they continue to operate the Thermal Oxide Reprocessing Plant (THORP) and temporarily breach the specification rather than stopping or reducing reprocessing. This is due to the increase in risk associated with prolonging the end date of reprocessing as there would be additional fuel to reprocess alongside the additional strain placed on aging downstream plant and facilities. Sellafield Ltd has also produced a paper describing a new operating rule that will be used to control HAL stock levels going forward in place of the specification.

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

ONR has assessed the submission documents from Sellafield Ltd. In addition to this there has been a series of Level 3 and Level 4 meetings between ONR inspectors and SL to discuss the potential impact and advise SL on the way forward for the on going management of HAL at Sellafield.

There has been no separate specialist assessment work in consideration of this submission, largely as a result of the new operating rule not requiring any intrusive changes to plant, people or processes.

Matters arising from ONR's work

SL's ALARP assessment argues that it is better to keep the THORP running and exceed the current HAL stock specification (LI793) as this gives the lowest overall risk on site. ONR judges that this argument is supportable. The reasons for this are as follows:

- a. Slightly higher HAL stocks results in only a modest increase in hazard and only a slight increase in risk.

- b. Pausing THORP operations extends the end date of reprocessing by longer than the pause.
- c. Shutting THORP now would be a significant deviation to the current plan and would have huge impacts relating to long term storage of spent fuel at Sellafield.

ONR is content that an OR is a suitable mechanism to control HAL stocks going forward as this provides more flexibility than using a new specification under License Condition (LC) 32 as specifications cannot be withdrawn or modified.

The proposed OR states that “*Over a one year period, the total HAL input to Highly Active Liquor Evaporation and Storage (HALES) facility resulting from reprocessing operations must be less than the total HAL output from HALES as a result of Vitrification Operations.*” This locks in the requirement for SL to reduce HAL stocks year on year in line with the key principles used to derive the existing specification. The OR will be monitored on a fiscal year basis starting from April 2015.

Further enforcement action over a potential HAL stock specification breach is not appropriate as ONR has already taken formal enforcement via an improvement notice over the initiating WVP Contamination event. If this event had not happened SL would have met the specification. Since ONR has already taken enforcement action, and SL has provided an adequate ALARP justification to continue operations it would not be proportionate to take further enforcement action for any subsequent breach that was directly caused by the same initial event.

Conclusions

The HAL stocks specifications have successfully delivered significant HAL stock reductions over the past 14 years. It is ONR's judgement that replacing the specification with a new OR provides adequate regulatory control whilst continuing to deliver year on year reductions in the HAL stocks at Sellafield.

Recommendations

I recommend that ONR issues letter SEL77525 to Sellafield Limited stating that we will not be continuing to enforce the current HAL stocks specification (LI793).

LIST OF ABBREVIATIONS

AGR	Advanced Gas-Cooled Reactor
ALARP	As Low As Reasonably Practicable
FCC	Feed Clarifier Cell (an area within THORP)
FGMSP	First Generation Magnox Storage Pond
FHP	Fuel Handling Plant
HA	Highly Active
HAL	Highly Active Liquor
HALES	Highly Active Liquor Evaporation and Storage
HAST	High Activity Storage Tanks
HLWP	High Level Waste Plants (HALES & WVP)
HOW2	(Office for Nuclear Regulation) Business Management System
L3	(WVP) Line 3
LC23	Licence Condition 23 – Operating Rules
LC32	Licence Condition 32 – Accumulation of Radioactive Waste
LI	Licence Instrument
MSC	Management Safety Committee
NSC	Nuclear Safety Committee
ONR	Office for Nuclear Regulation
OR	Operating Rule
PAR	Project Assessment Report
POCO	Post Operations Clean Out
SCIP	Safety Case Implementation Plan
SL	Sellafield Limited
SQEP	Suitably Qualified and Experienced Personnel
TAG	(ONR) Technical Assessment Guide
teU	Tonnes of Uranium Equivalent
THORP	Thermal Oxide Reprocessing Plant
VPS	Vitrified Product Store

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1 PERMISSION REQUESTED

1. Sellafeld Limited (SL) is requesting that the Office for Nuclear Regulation (ONR) accepts its strategy to control Highly Activity Liquor (HAL) stocks using a new Operating Rule (OR) instead of the current HAL Stocks Specification (LI793).

2 BACKGROUND

2.1 Facility Information

2. The function of the Highly Active Liquor Evaporation and Storage (HALES) facility is to receive and store HAL from spent fuel reprocessing facilities on the Sellafeld Limited (SL) site, and to concentrate these liquors prior to export for vitrification.
3. HALES is essentially an 'L' shaped building with a series of reinforced concrete cells that house vessels and pipe work. HALES can be divided into two areas, Storage, and Evaporation. HALES currently comprises [REDACTED] Highly Active Storage Tanks (HASTs), 3 evaporators A, B, C (a fourth evaporator, Evaporator D, is currently under construction) and ancillary equipment. Parts of the facility were constructed in the 1950's and have since been extended and modified over subsequent years and so comprises of different generations of HASTs and Evaporators.
4. HALES supports both the Thermal Oxide Reprocessing Plant (THORP) and Magnox reprocessing operations by receiving their highly active liquid waste streams, known as raffinate into buffer storage. The volume of the raffinate is reduced through the distillation process in the evaporators (i.e. boiling up the liquor) this concentrated liquor is known as HAL. The HAL is held in safe interim storage within the HASTs prior to it being transferred to the Waste Vitrification Plant (WVP) where it is processed into glass (known as Vitrification). The molten glass is then poured into stainless steel containers ready for long term storage in a passive immobile safe form.
5. The safe storage of HAL within the HASTs has key nuclear safety considerations to the public and workforce as due to the high radioactivity HAL is self-heating and requires continuous active cooling. This continuous cooling and the very high radiation levels make it desirable to reduce HAL stocks as far as reasonably practicable.

2.2 Regulatory Background

6. In 2001, ONR issued the first HAL stock specification (LI343) (Ref 6) requiring SL to reduce its accumulation of HAL in the HALES facility at Sellafeld to a prescribed programme. This specification was revised in 2007 to lock-in the reductions in HAL stocks arising from the long-term outage at THORP in the wake of the Feed Clarification Cell (FCC) event of 2004/5.
7. In 2011, the Office for Nuclear Regulation (ONR) updated the Specification (Ref 6) for providing regulatory control of the Highly Active Liquor (HAL) stocks at Sellafeld, in line with ONR's long-term aims to ensure that:
 - HAL stocks are maintained as low as reasonably practicable.
 - Sellafeld Ltd continues to reduce hazard potential across the Sellafeld site.
8. ONR's regulatory approach has been very successful. Sellafeld Ltd has fully complied with the Specifications since their introduction in 2001. HAL stocks have been reduced significantly and are now at their lowest levels since the 1980s and are within current Specification limits (See Figure 1).

9. On November 27th 2013 SL experienced a partial site power loss which affected HALES and WVP. This power loss resulted in the migration of activity from the C5 Cells in WVP Line 3 to the C2 Operational areas. This event ceased vitrification operations in L3 from the day of the event in November 2013 until October 2014. This loss of 11 months operations has resulted in approximately 800teU less HAL being vitrified.
10. This loss of production has called into question SLs ability to meet the hazard reduction targets required by ONR Specification LI793. If current reprocessing and vitrification rates continue as projected (See Figure 2) then the HAL Stock limits detailed in Specification LI793 will be breached in April 2015.
11. ONR has previously stated that should a situation such as this arise then we would expect SL to reduce/stop oxide reprocessing operations to prevent a breach of the specification (Ref 6).
12. The purpose of this report is to review SL's decision making process on the way forward for management of HAL stocks. This report will also recommend the actions that ONR should take to address any shortfalls in compliance with the existing HAL stocks specification.

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

13. ONR has completed the following work in support of this Project Assessment Report:
 - Assessment of SL's THORP continued operations justification paper (Ref 8).
 - Assessment of the report produced by SL to cover the new operating rule to replace the current HAL stocks specification LI793 (Ref 9).
 - A high level review of the 2014 HAL Stocks Biennial Review (Ref 10).
 - Meetings and discussions for ONR to feed back its assessment findings, and for Sellafield to present revised proposals (Ref 11-15).
14. We outlined during several meetings (Refs 11-15) ONR's preferred approach for the preparation by Sellafield of a safety case in support of SL's request to change the mechanism for controlling HAL stocks to prevent a breach of specification LI793. ONR suggested that Sellafield should prepare a short high level paper explaining key safety arguments to detail why it was safer long term to continue to operate THORP and a short paper describing the operating rule(s) necessary to control the generation and storage of HAL to ensure HAL stocks are kept ALARP.
15. In line with our expectations SL submission included the following documents:
 - Covering Letter (Ref 7)
 - THORP Continued Operations Justification Paper (Ref 8)
 - HALES Operating Rule for Reduction in HAL stocks (Ref 9)
16. In addition to these I have also considered the 2014 HAL Stocks Biennial Review (Ref 10) to gain regulatory confidence about the current state of the facilities to ensure that SL can manage HAL stocks going forward.
17. The THORP Justification Paper presents SL's decision making process and concludes that it is ALARP to continue to operate THORP and breach LI793 rather than cease

operations at THORP to prevent a breach. The paper details all of the options available and assesses the benefits and constraints of each option to identify the ALARP overall option.

18. The OR paper describes the mechanisms that SL plan to use to control HAL stocks instead of LI793. These describe the manner in which the operating rule will function, the reporting back to ONR and the actions that can be taken by SL to ensure the rules are complied with.
19. Overall SL concludes that the ALARP position is to continue to operate THORP in line with Performance Plan 14 which has been optimised for overall hazard and risk reduction across site. Since this mode of operations is not compatible with the existing HAL stocks specification (LI793) SL has developed an operating rule to provide the framework to ensure HAL stocks are kept ALARP.
20. For simplicity and clarity, the assessment of these reports will be addressed within this PAR.

4 MATTERS ARISING FROM ONR'S WORK

21. Overall I am pleased that SL has considered the HAL stocks position holistically taking into account the impact that HAL stocks has on other facilities and the potential impact on overall hazard and risk reduction activities that would occur in each scenario.

4.1 THORP Paper

22. In this paper SL identifies all the options available, and details the associated consequences, risks and benefits. SL states that its options are to pause, slow or stop reprocessing operations at THORP and/or Magnox. SL concludes that any reduction in Magnox reprocessing is not practicable since reprocessing and vitrification is the only credible solution enabling safe disposal of spent Magnox fuels. SL states that whilst pausing THORP alone can prevent a breach of the specification, a longer pause would be necessary than if both reprocessing plants were slowed or paused.
23. This issue with Magnox fuel is well known to ONR and I have reviewed it as part of this submission and I am satisfied that continuing to reprocess Magnox fuels remains the ALARP position due to the corrosion of the fuel and cladding that takes place during long term pond storage. Oxide fuels are constructed from different materials which are suitable for long term pond storage, therefore I am satisfied that a reduction in oxide reprocessing is an appropriate action for SL to consider.

4.1.1 Pause THORP

24. SL claims that whilst a 12-18 month pause of THORP would prevent a breach of the HAL stocks specification, this would have significant ramifications on the end date for reprocessing as pausing THORP would require additional AGR fuel to be reprocessed as it would have been exposed to demineralised water ponds. In order to maintain electricity generation and legacy pond remediation activities additional fuel storage would be required in the short term. SL state that fuel from the AGRs that would currently occupy the space freed up by reprocessing would now need to be stored in FHP taking the space currently reserved for fuel being removed from the legacy ponds.
25. I have reviewed these claims and I am satisfied that they are reasonable since there is only limited capacity available in FHP and in order to maintain power generation remediation activities may have to be delayed or vice versa. I agree with SL that neither of these outcomes is desirable as they either introduce significant new risk or prevent a significant reduction in risk at Sellafield.

26. I agree that the additional fuel requiring reprocessing would delay the end date for THORP reprocessing by longer than the length of the pause since it will take additional time to be processed. This effect would be exacerbated by the time taking to shut down, safe store and restart what is a large and very complex chemical processing facility. For the required 18 month pause this is likely to add a further 2-3 years onto THORPs operation and hence onto the end point for vitrification. SL states that the increase in risk from this prolonged storage of Fuel and HAL would exceed any benefits from operating with lower HAL stocks in the short term. I agree with SL's assertion as HAL is highly hazardous, meaning the small reduction in total stocks (~6%) does not result in any significant reduction in risk. Bulk reduction in risk from HAL, will not happen until reprocessing operations are completed, therefore I agree that it is better not to unnecessarily delay reprocessing.
27. SL states that one of the perceived benefits of this pause would be the release of the THORP workforce to accelerate other hazard and risk reduction elsewhere on Sellafield site. SL claim that there would only be a modest release of staff from the THORP facility as all the maintenance activities are still required as well as the requirement to maintain a SQEP workforce to support re-starting operations. I am satisfied that this claim is reasonable as it is backed up from the experience gained during the FCC event where only about 10% of the workforce was released during the 2 year shutdown and recovery period. Due to the delay to the end of reprocessing, a pause of THORP may have the opposite effect, essentially delaying the release of staff from THORP to other programmes as they would be required for longer to support THORP to its new delayed end date. Given that there are no tangible benefits in pausing THORP and not breaching the HAL stock specification I accept SLs argument that it is not ALARP to do so.

4.1.2 Slow THORP

28. SL claim that whilst reducing throughput at THORP would reduce HAL stocks it will still result in a specification breach. Whilst this would alleviate some of the issues with pausing THORP, it would still result in an extension to THORPs end date and require more fuel to be reprocessed. Like the pausing THORP option this option would also require in a significant life extension for the Fuel Handling Plant. SL claim that this would also result in sub-optimal use of the HA evaporators resulting in increased corrosion of the coils which could challenge SL ability to reprocess all of the remaining Magnox fuels.
29. I have reviewed SL's HAL stock projections (see figure 2) and agree with them that this would not prevent a breach of the specification. I also agree that there is little to no benefit in slowing down THORP due to the potential impact on Evaporator C. ONR is currently undertaking a detailed assessment of the condition of Evaporator C to ensure SL has an adequate safety case to continue supporting Magnox and oxide reprocessing operations until evaporator D is fully available in 2017.

4.1.3 Stop THORP

30. SL states that whilst stopping THORP now, two to three years earlier than planned, would prevent a HAL stocks breach it would represent a major deviation to the current strategy which has been developed over a number of years and is widely acknowledged to be the ALARP solution. SL state that if it elected to shut THORP now it would require a new site wide strategy to manage spent fuel and waste across site. This would be a significant undertaking requiring a lot of resource which would divert effort and attention from ONR and SL's top priority of legacy ponds and silo remediation. I have considered SL's position and I am satisfied that it is reasonable as the plan has been produced holistically to identify the best solution for Sellafield site.

Any major change to the plans at Sellafield will have a significant impact and result in wholesale changes to fuel management on site. The only time a change of this magnitude would be appropriate would be if it resulted in a step change reduction in risk on site and I am satisfied that shutting THORP early does not meet this criterion.

31. SL state that the main impact of shutting THORP is that fuel that is currently earmarked for reprocessing would have to be long term stored, increasing the demand for fuel storage at FHP which would delay or stop remediation of the legacy ponds. I agree with SL that this would result in a significant life extension at FHP and may require additional new facilities to be built at some point in the future to support on going electricity generation which may not be needed if THORP completes its current plan.
32. SL states that most of the fuel that would now require long term storage has either been exposed to demineralised water environments increasing the likelihood of future failure or is already damaged making it unsuitable for long term storage. Without reprocessing available this fuel requires a new conditioning plant to be built to enable its ultimate safe disposal. Whilst I agree with SL that it is prudent to reprocess this fuel if practicable, there will still be damaged fuel arriving at site in the future so this is not creating a new waste stream as a new damaged fuel conditioning process will be required regardless of the short term availability of THORP. However if all the fuel exposed to demineralised water environments is not reprocessed then the scale of this process would need to be significantly larger than one designed only to handle damaged fuel delivered from reactor sites and the associated risks increased accordingly.

4.1.4 Summary

33. SL concludes that the ALARP solution is to continue operating THORP and breach the HAL stocks specification. This is because there is little increase in risk associated with holding slightly higher HAL stocks whereas shutting, pausing or slowing THORP gives a significant increase in risk on site due to the increased complexities in storing fuel and the delays to on going hazard and risk reduction of legacy ponds.
34. The key decision that I need to make is whether tolerating a short term breach of the specification to maintain the current end dates for reprocessing and the decommissioning of HALES is preferable to prolonging the end date of reprocessing and the impact on other facilities of shutting/slowing or pausing oxide reprocessing operations. Since I agree with SL that there is only a limited increase in risk resulting from storing slightly higher HAL stocks than specified in LI793 and I also agree with SL that there is likely to be a significant increase in risk if THORP is paused, slowed or shutdown I accept SL's conclusion that risks are reduced ALARP by continuing to operate THORP. Therefore I accept that the current HAL stocks specification is no longer fit for purpose. Therefore I recommend (Recommendation 1) that ONR issues a letter to state that we will no longer be enforcing the current HAL stocks specification (LI793). Owing to the unusual nature of this letter the sections relating to enforcing LI793 have been reviewed and approved by ONR Legal Liaison (Ref 16).

4.1.5 Enforcement Action

35. Whilst I accept SL's argument that continuing to operate THORP is ALARP, this raises the question as to whether any enforcement action is appropriate relating to SL's management of HAL stocks. The root cause of SL's inability to meet the current specification is due to the power loss incident on WVP in November 2013. ONR undertook a thorough investigation (Ref 17) and issued an improvement notice (Ref 18) requiring SL to improve the containment boundary and the maintenance arrangements within WVP. The Improvement Notice has now been closed out and I am satisfied that improvements made should prevent a similar event from occurring again.

36. Given that WVP L3 has been out of service for 11 months and has the highest throughput of all of the three production lines at WVP there has been a significant reduction in amount of HAL that has been vitrified. Since L3 had just returned to service following a line rebuild earlier in the year and had been performing well I am satisfied that had the power loss incident not occurred SL would have had no problems in meeting the requirements of the specification (Ref 21). Since ONR has already taken enforcement action over the root cause of this potential breach, and I am satisfied that SL's actions and response following the event have been good I judge that it would not be reasonable or proportionate to take further enforcement action over any HAL stocks specification breach.

4.2 New Operating Rule

37. Since ONR will no longer be enforcing the current HAL stocks specification this leaves a gap in regulatory control of HAL stocks at Sellafield. SL and ONR considered three options for controlling HAL stocks going forward (Refs 12-15), first replacing the specification with another specification, second replacing the specification with a new operating rule and finally controlling HAL stocks through normal regulatory interfaces.
38. The use of a replacement specification under LC32 is the best fit for controlling HAL stocks from strict legal perspective as LC32 is solely concerned with control of the accumulation of radioactive waste on site. However, the use of replacement specification is not desirable as specifications are inflexible as they cannot be modified, withdrawn or replaced. Given that WVP, HALES and the reprocessing plants are approaching the end of operations and will be entering POCO and decommissioning phases the feeds and function of the facilities will change significantly over the next few years. This means that it is unlikely that a rigid specification would be able to adequately control HAL stocks through these phases and multiple changes would be necessary. Updating and changing specifications is not a straightforward process and requires significant time and effort from both ONR and Sellafield to develop and implement the changes.
39. Whilst regulating HAL stocks under normal business would give significant extra flexibility and minimise bureaucracy it would represent a significant reduction of control by the regulator. This reduction is unlikely to be acceptable to external stakeholders who expect HAL stocks to be monitored and controlled tightly to ensure SL is doing everything practicable to reduce the stocks as quickly as reasonably practicable. Regulating HAL stocks in this manner would only be possible if Sellafield had demonstrated a clear track record of managing HAL stocks with minimal regulatory pressure. This has not happened historically and taking into account recent events I do not believe that this would be a suitable control mechanism going forward.
40. Using an operating rule to control HAL stocks would give significantly more flexibility than using a specification under LC32 whilst retaining the same level of regulatory control. The key differences are that ORs are controlled by the licensee rather than the regulator so have a mechanism built in to allow them to be modified through the licensee's LC22 arrangements. The main limitation of using an operating rule is that it has to meet the requirements of an OR, which is defined as "a limit or condition in the interest of safety" rather than "limitations as to quantity type and form (of radioactive waste)" for use with a specification under LC32.
41. Since the requirement for additional flexibility going forward will be essential, I judge that the best method to control HAL stocks going forward is through an Operating Rule (Refs 11-15). SL has developed the following operating rule in consultation with ONR: *"Over a one year period, the total HAL input to HALES resulting from reprocessing operations must be less than the total HAL out from HALES as a result of the vitrification operations"*. The key questions relating to this OR are; does it meet the requirements of an OR under LC23, is it consistent with the aims and objectives of the

current HAL stocks specification, and how can SL demonstrate compliance with the new OR?

4.2.1 Operating Rule Requirements

42. The definition of an OR in the license conditions is “a limit or condition in the interest of safety”. I am satisfied that the proposed OR is a limit or condition as it links the rate of reprocessing to that of vitrification so is quite clearly a limit or condition. Since this OR drives the reduction of HAL stocks, which in turn reduces the consequences of most other fault sequences within HALES, it is clearly in the interest of safety. Whilst the proposed OR does not fully comply with the guidance in TAST-035 (Ref 3) as it has not ultimately been derived from the safety case, it is not unique in this status, and it does comply with the key high level principles supporting its suitability as an OR. TAST-035 has been written to cover the general position for ONR in assessing ORs and not all aspects of the guidance are applicable in all situations. Given that the proposed OR meets the legal definition in LC23 and is broadly compliant with the TAST I am satisfied that the proposed OR meets all the conditions necessary under LC23 and ONR guidance.

4.2.2 Consistency

43. In order to determine if the OR is consistent with the approach taken in deriving the original specification I have reviewed them against the principles developed in 2008 for the production of the current HAL stocks specification (LI793) (Ref 6). If the OR meets the requirements in these six principles it can be considered consistent with the original specification. The six principles presented and agreed between ONR and SL in the 2008 biennial review are:

P1: To prevent any return to excessive accumulated stocks, i.e. more than could be worked off within a reasonable period at nominal full WVP production levels.

P2: Above the absolute minimum so that Sellafield Ltd takes responsibility for ensuring its stocks are maintained at levels as low as reasonably practicable (ALARP), but has reasonable operational flexibility to carry out its legitimate reprocessing activities.

P3: To facilitate the maximum overall rate of reduction of site wide and national hazard potential without creating excessive waste volumes. In particular, the Specification should not limit WVP vitrification to any significant extent

P4: To encourage POCO of redundant HASTs.

P5: Based on Sellafield Ltd.'s existing fleet of HASTs, i.e. not taking the possibility of replacement HASTs into account until there is appropriate confidence in how these will perform (it is anticipated that the replacement HASTs will be smaller than the existing tanks, raising the possibility of operation with lower stocks of HAL once these are brought into operation)

P6: In a manner that aligns with ONR's Enforcement Policy Principles of Proportionality, Consistency, Targeting, Transparency and Accountability.

44. I am satisfied that proposed OR meets the requirements of P1 and P2 as it ensures HAL stocks are reduced on a year on year basis. This will prevent the accumulation to excessive stocks. The proposed OR alongside LC32 forms a legal requirement for SL to maintain HAL stock levels ALARP. Since the OR is reviewed on an annual basis, this means that SL can allow HAL stocks to increase in the short term during normal operations (e.g. WVP and Reprocessing plants annual outages at different times) provided SL has a net reduction over the year. If this required a reduction each month there would be significant operational complexities in aligning the outages for the

facilities to prevent short term increases. This flexibility also allows SL to recover from the normal breakdowns that happen during operations of complex process plant.

45. The OR complies with principle P3 as SL is near the agreed steady state level for HAL stocks, this means that typically they will be reprocessing and vitrifying similar amounts each year from now until the end of reprocessing. I am content that the OR does not limit WVP as all the constraints are placed on the reprocessing plants. This encourages SL not to reprocess spent fuel unless it is confident it can vitrify the resultant waste within a reasonable time.
46. I am satisfied the OR encourages the POCO of redundant HASTs as it drives for the reduction of HAL year on year. As the HAL stocks are reduced the older and poorer condition HASTs can be retired as they will no longer be needed for routine use.
47. P5 is no longer relevant as SL justified not proceeding with the replacement HAST project in 2011. Finally in complying with these principles it demonstrates that the OR is consistent with specification LI793. The OR drives SL to be accountable and manage its facilities in manner to prevent year on year increases in HAL stocks. The OR is proportionate as it is not driving large reductions year on year which would be unreasonable since SL is close to the steady state requirements. The rule is transparent as it is clear, easy to monitor, readily accessible and targeted since it only impacts on the reprocessing plants where the waste is formed.

4.2.3 Compliance & Implementation Arrangements

48. Since there is a high degree of external stakeholder interest in the HAL stocks at Sellafield the OR has been deliberately written at a high level to ensure its functionality and purpose is clear and not obscured by technical compliance issues e.g. dates, conversion factors, inter-tank transfers etc. Therefore, some of the technical details which could have been included in the rule have instead been included in the compliance arrangements. Since SL is currently writing the compliance documentation I have not had the opportunity to review it. However, I have discussed the compliance arrangements with SL in detail and I am satisfied that SL proposals meet regulatory expectations (Ref 24). To confirm this SL has agreed to send a copy of the compliance documentation to ONR for regulatory review prior to implementation.
49. SL has proposed that the OR is linked in with the fiscal year as this correlates with its current reporting processes and other NDA targets. I am satisfied that this is a reasonable approach as it links in with the existing targets for the plants and simplifies SL's operational arrangements by not having multiple different start and end dates for ONR, NDA and production targets. Therefore, I recommend that the new OR runs on annual basis starting from April 1st 2015, hence the first formal compliance check by ONR will be on April 1st 2016.
50. To demonstrate compliance SL will write to ONR detailing its performance over the past 12 months and projecting its performance over the next 12 months (Ref 19) with the first report sent to ONR in April 2015. In addition to this SL will report performance against the OR on a monthly basis, in line with current compliance arrangements for LI793, to enable ONR to monitor its progress against these plans. The calculation that is used to determine the teU equivalent for HAL will remain the same as agreed in the 2008 Biennial review and implemented by LI793 (Ref 6). The annual compliance reports and monthly updates will be approved by the HALES Head of Operations in line with the current compliance arrangements for LI793.
51. My expectation is that it up to SL to manage its facilities to ensure compliance with the new OR as well as the requirements of LC32. I am satisfied that SL should be able to comply with the OR going forward as WVP has a higher throughput than the reprocessing plants combined and SL has met the requirements of the OR for each of

the past 10 years (see figure 1). I take further confidence that SL will continue to reduce HAL stocks as SL has already met the requirements for the 2014/2015 financial year, despite the throughput at WVP being reduced significantly as a result of the 2013 power loss event.

52. If a breach of the OR looks likely, which should be apparent well in advance, then I would expect SL to inform ONR about the situation and review its options to prevent the breach (i.e. consider stopping or reducing reprocessing) before considering any modifications to the OR. SL should only consider modifying the OR if complying with it drives a perverse action i.e. leading to an increase of risk at site. If a modification of the OR is required then I expect this to be implemented via category B PMP and hence be submitted to ONR for consideration in accordance with SL's LC22 arrangements.
53. SL has proposed not to use a PMP to implement the new OR, instead proposing to manage this change through a Safety Case Implementation Plan (SCIP). Whilst this is not strictly in accordance with SL's LC22 arrangements, all the fundamental requirements of PMP process have been met as the proposed OR has been reviewed and approved by both the Nuclear Safety Committee (NSC) (Ref 22) and the Management Safety Committee (MSC) (Ref 23). I am satisfied that there would be little benefit in repeating these reviews again as part of the PMP process. In addition to this there has been significant regulatory involvement from ONR in developing the strategy providing regulatory confidence that the OR and compliance arrangements have been adequately defined and are fit for purpose. Given that there is no detriment to nuclear safety through the implementation of this new operating rule I am satisfied that a SCIP is a suitable implementation mechanism in this instance (Ref 20). However as this is unlikely to be the case for any future modifications, I expect any changes to be implemented through a PMP to ensure it is subject to an appropriate degree of management and regulatory oversight.

4.3 2014 HAL Stocks Biennial Review

54. As well as the OR paper submitted by Sellafield I have reviewed the 2014 HAL Stocks Biennial review (Ref 10) to confirm that the facilities that process HAL are being managed appropriately and that the new OR will not inadvertently impact on POCO of HALES. I am broadly satisfied that this is case as the key enabler to early POCO of HALES only relies on the availabilities of Evaporator D and WVP, hence it should not be impacted by the new OR as this only places constraints on the reprocessing facilities.
55. I am also satisfied that the proposed strategy going forward detailed in the 2014 Biennial review meets regulatory expectations and should not have any unintended consequences as the rate of vitrification is typically double that of reprocessing. I am pleased to report that HAL stocks have continued to fall despite the unavailability of WVP L3 and this gives regulatory confidence that SL can adequately control HAL stocks going forward through the new OR.
56. One of the key risks to the new OR relates to effective outages at the reprocessing and vitrification plants. I am pleased that SL is taking action to improve outage management through its new dedicated outage team in WVP which should minimise the risk of poorly controlled outages leading to an OR breach.
57. In summary I am content that SL has adequately managed its HAL stocks over the two year biennial review reporting period and I am satisfied that it has appropriate strategies in place to manage the POCO of HALES. I am encouraged with the mature way SL has acted following the loss of power incident at WVP and I am confident that the strategies deployed by SL will continue to drive the reduction of HAL stocks.

5 CONCLUSIONS

58. This report presents the findings of ONR's assessment of SL's proposals to continue to operate THORP following a potential HAL stocks specification breach in 2015. To conclude, I am broadly satisfied with the claims, arguments and evidence laid down within the THORP justification paper that risks on Sellafield site are minimised by continuing THORP operations as planned. This prevents delaying the end date of reprocessing operations and prevents impacting on the remediation activities of legacy facilities which require the operational space in pond storage that would be filled with oxide fuel if THORP operations ceased prematurely.
59. The HAL stocks specifications have successfully delivered significant HAL stock reductions over the past 14 years. It is my judgement that replacing the specification with a new OR provides adequate regulatory control whilst continuing to deliver year on year reductions in the HAL stocks at Sellafield.

6 RECOMMENDATIONS

60. I recommend that ONR issues letter SEL77525 to Sellafield Limited stating that we will not be continuing to enforce the current HAL stocks specification LI793 (See Appendix 1).

7 REFERENCES

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4. 2011/295603 – ONR Public Statement Revised HAL Stock Strategy
5. 2012/206157 - SEL77315 - Letter to Sellafield - Delivery of the performance plan: safety case expectations - 18 May 2012
6. 2010/628788 - Project Assessment Report PAR 120-10 - Revised HAL Stocks Specification (LI793) – December 2010
7. 2014/455581 – ONR/14/11595/01 – SL Submission Cover Letter. November 28 2014
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13. 2014/162930 - ONR-SEL-CR-14-039 - Evaporators, HAL stocks etc. - 24th April 2014
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15. 2014/231538 - ONR-SEL-CR-14-101 - HAL Stocks Specification - New Operating Rule - 11th June 2014 - [REDACTED]
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19. 2014/458688 – HAL Stocks Specification – New OR Regulatory Compliance Expectations. [REDACTED] 12 December 2014

20. 2014/467114 – HAL Stocks Specification – SCIP / PMP Regulatory Expectations. [REDACTED]
[REDACTED] 19 December 2014.
21. 2013/167865 – Sellafield Waste Vitrification Plants – Monitoring of throughputs: actual versus plan against time. January 2015. [REDACTED]
22. 2015/15226 – HAL Stocks Specification – 116th SL NSC Minutes. [REDACTED] November 2014
23. 2015/15227 – HAL Stocks Specification – HALES MSC Minutes 174. [REDACTED]
October 2014
24. 2015/20956 – ONR-SEL-CR-15-452 – Evaporator C ALARP Case and HAL Stock Specification Compliance, [REDACTED] 20th January 2015

Appendix 1 - HAL Stocks Specification Letter

[REDACTED]
[REDACTED]
c/o Regulatory Liaison Office
Room 101, B113
Sellafield Ltd
Sellafield
Seascale
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[REDACTED]
Redgrave Court
Merton Road
Bootle
Merseyside L20 7HS

Telephone: [REDACTED]
Email: [REDACTED]

<http://www.onr.org.uk>

Our Reference: 2015/18341
Unique Number: SEL77525

Your Reference: ONR/14/11595/01

Date: 26 January 2015

For the attention of [REDACTED] Head of Technical and New Build Interface, Engineering.

Dear Sir

ENERGY ACT 2013
NUCLEAR INSTALLATIONS ACT 1965
SELLAFIELD LIMITED
WINDSCALE
NUCLEAR SITE LICENCE No.: 31G
LICENCE CONDITION: 32(4) – ACCUMULATION OF RADIOACTIVE WASTE

TITLE: SPECIFICATION LICENCE INSTRUMENT 793

Thank you for your letter dated 28th November 2014 detailing Sellafield Limited's proposal to control HAL stocks using an Operating Rule instead of Specification Licence Instrument (LI)793.

This letter confirms that ONR no longer expects Sellafield Limited to comply with the requirements of Specification LI793 placed on the HAL stocks accumulated within the HALES facility.

I expect the Operating Rule described in the 'HALES Operating Rule for the Reduction in Highly Active Liquor Stocks' paper dated 27th November 2014 to be fully implemented by April 1st 2015. I also expect that any future modifications to the aforementioned Operating Rule will be significant changes and will therefore be submitted to ONR for regulatory consideration prior to implementation.

I am copying this letter to Sellafield Regulator Liaison for onwards propagation to the relevant Safety Representatives.

Yours faithfully

[REDACTED]

