

**LOG OF RESPONSES TO CONSULTATION ON
OUTLINE OF CoRWM's INTERIM STORAGE REPORT,
DECEMBER 2008 - JANUARY 2009**

INTRODUCTION

On 19 December 2008 CoRWM invited comments (via e-bulletin 28, CoRWM document 2521) on an outline of its proposed March 2009 report to Government on interim storage of higher activity wastes and the management of spent fuels, plutonium and uranium (CoRWM doc. 2500, outline report, dated 19 December 2008). 9 responses were received. These were from:

- British Energy
- NuLeAF
- AWE plc
- National Nuclear Laboratory
- Sellafield Ltd
- HSE
- Environment Agency
- Greenpeace
- NDA.

In addition, CoRWM commissioned 3 independent reviews of the outline report from members of the HSE's Nuclear Safety Advisory Committee (now disbanded).

All the comments received are summarised in Table 1 below, with a note of how they were taken into account in producing a full draft of the report. The comments are shown in full in Annexes A-C.

General comments on CoRWM's interim storage tasks for 2008/09 are summarised in three documents:

- 2302 - comments on CoRWM's draft programme for 2008/9, March 2008
- 2457 - log of responses to invitation to comment on interim storage, September 2008
- 2488 - report of public and stakeholder workshop, 30 October 2008.

Comments on the full draft of the interim storage report (CoRWM doc. 2500, second full draft, dated 2 February 2009) are in two documents:

- 2562 - log of responses to invitation to comment on the full draft report on interim storage, March 2009
- 2563 - report of stakeholder workshop on the draft interim storage report, 19 February 2009.

TABLE 1 SUMMARY OF COMMENTS AND ACTIONS TAKEN IN DRAFTING INTERIM STORAGE REPORT

Commentator and date	Issues (or numbered sections) commented on	CoRWM response - how comments acted on
1. British Energy 31 December 2008	No comments to make or revisions to propose	<ul style="list-style-type: none"> • Noted.
2. A N Other (reviewer commissioned by CoRWM) 5 January 2009	<ul style="list-style-type: none"> • Summary: no real problems with the report • Detailed factual comments e.g. the Berkeley Magnox vaults were indeed meant for long term use • Suggestion that discussion leads into conclusions and thence to recommendations rather than combining the last two 	<ul style="list-style-type: none"> • Noted. • Taken into account as appropriate. • Recommendations placed in boxes after conclusions.
3. David Horsley (reviewer commissioned by CoRWM) 6 January 2009	<ul style="list-style-type: none"> • A good report & summary of the UK nuclear waste management position. Some detailed points e.g. <p>Sec.2</p> <ul style="list-style-type: none"> • Some ILW streams will decay to LLW very slowly. • Challenging legacy wastes can and should be immobilised rather than put in buffer stores. Regulatory system may need more flexibility to enable this to happen safely, timely & affordably. • Who will develop any new strategy? Would any new structure draw resources off existing bodies? <p>Sec.3</p> <ul style="list-style-type: none"> • With legacy facilities, retrieving the waste reduces the risks and the need for early decommissioning. • Some ILW stores may last over 100y but were designed to last a few decades. 	<ul style="list-style-type: none"> • Noted. • Recognised in text. • Text now emphasises preference for prompt immobilisation but notes that this is not always feasible. • Question left open for Government to decide. • Point made in text (but note this is only true for some facilities). • Made clear in text.

Commentator and date	Issues (or numbered sections) commented on	CoRWM response - how comments acted on
	<ul style="list-style-type: none"> • Limited data on store longevity and a review of failure mechanisms would be useful. • Don't shorten design lives; may wait long for a GDF. • For PSE, consider French "advocate" approach? <p>Sec.4</p> <ul style="list-style-type: none"> • Reprocessing all AGR arisings is technically possible but would be uneconomic. • Sizewell B fuel could be reprocessed abroad. • Exotic fuels strategy should reflect that these contain little Pu / U compared to Magnox and AGR fuels <p>Sec.5</p> <ul style="list-style-type: none"> • NDA should consider possibility of building 1+ UK reactors to burn the Pu stock. • Mention U recovered via reprocessing: re-enrichment could be cost-effective. • Consider how to challenge claims made for engineering designs & design concepts when meeting 3rd parties 	<ul style="list-style-type: none"> • For NDA to consider, as an outcome of their review. • Recommended approach to design lives worded more clearly. • Not for this report. • Wording changed. • Text allows for this possibility. • Reasons for importance of having an exotic fuel strategy clarified. • Not for CoRWM. • Being considered in NDA work. • CoRWM will consider bringing in additional expertise as and when needed.
<p>4. Fred Barker, Executive Director, Nuclear Legacy Advisory Forum (NuLeAF)</p> <p>7 January 2009</p>	<ul style="list-style-type: none"> • The comment about the potential need for more than one GDF is timely. Local host communities need to be involved in decision on whether new build wastes should (& can) be disposed of in GDF. • Welcome comment about need for a 'storage system' approach. Linkage between storage and disposal systems must be considered: assessments of 'mini-store' concept 	<ul style="list-style-type: none"> • Noted. • Mention made of need to assess disposal aspects of larger packages.

Commentator and date	Issues (or numbered sections) commented on	CoRWM response - how comments acted on
	<p>must pay regard to requirements of disposal to a GDF.</p> <ul style="list-style-type: none"> • The call for a more strategic approach is welcome in principle but needs more detail e.g. on NDA's topical strategy review and interactions with MoD, BE and small users. • Would a more strategic approach involve a move towards consolidating treatment and/or storage at fewer sites? • Welcome plans to scrutinise transport in future programme. Substantive issues include transport modes & infrastructure, & need for more local engagement with councils & other stakeholders. • Be clearer what co-ordinated PSE could look like: might NDA take lead? how managed, funded? 	<ul style="list-style-type: none"> • Details of implementation of strategic approach deliberately left open. • No, consolidation is a separate issue. • Noted. • Details are for Government, NDA etc to work out.
<p>5. Peter Manning (reviewer commissioned by CoRWM:) 8 January 2009</p>	<p>Summary & recommendations</p> <ul style="list-style-type: none"> • Stress conflict between need for SLCs to keep responsibility for sites, and for NDA as Govt agent to direct work and get value for money. Say there will be hard decisions on what to fund. • Need for determined legacy wastes programme showing knowledge gaps & how they will be filled. <p>Sec.2</p> <ul style="list-style-type: none"> • Say what might impact be of more reprocessing. • Mention ground contamination, to encourage thought on whether structures need demolition, and how to stabilise residual ground contamination. • Record lack of progress with LoCs and how much left to do; poor condition of many of the wastes, limited progress in 	<ul style="list-style-type: none"> • Not for this report. (CoRWM is aware of the issues but is not required to advise Govt on them.) • Need for prioritisation emphasised. • For Govt and NDA (UK Inventory and inventory for disposal. • Not in CoRWM's remit (and covered elsewhere, eg SAFEGROUNDS project). • Our impression is that there has been much

Commentator and date	Issues (or numbered sections) commented on	CoRWM response - how comments acted on
	<p>recent years, and need to start with robust safety case.</p> <ul style="list-style-type: none"> Give examples of materials, e.g. oils, aluminium, residues, that need routes developed. TBuRDs should be systematic and show importance of each material, whether processing route available, what R&D needed to fill gaps, and timescale. Need this as a project so funding and skills needed can be identified & secured. <p>Sec.3</p> <ul style="list-style-type: none"> Stress problems in recovering historic legacy wastes (heterogeneity, transport &c) & need for robust safety case. There can be more public information, but mention the security limitations. More work needed on retrieving and treating high-volume materials e.g. concrete, steel, graphite. <p>Sec. 4</p> <ul style="list-style-type: none"> Some legacy facilities will remain active for many years, more technical solutions needed. Say something about where waste should be treated: some operators seem to think the GDF will do this. Risk that MOP8 can't be delivered; adding DFR increases the risks. <p>Sec.5</p> <ul style="list-style-type: none"> Clarify & quantify Dounreay inventory. mention energy value of Pu stockpile, potential for fast reactor use, and low cost of storage. Mention poor performance of SMP and need for a decision including how & where to make fuel. Even if re-used, significant eventual disposal problem for the 	<p>better progress in recent years.</p> <ul style="list-style-type: none"> Too detailed a level for this report. Some text included. Covered in section on security. We have no evidence that more work is needed (in fact the opposite seems to be the case). Not for this report. For NDA (but we believe they have made it clear that there will be no treatment at GDF). Noted but text not changed. Text is now from January 2009 NDA plutonium options documents. Details are not for this report. Noted.

Commentator and date	Issues (or numbered sections) commented on	CoRWM response - how comments acted on
	remaining U.	
6. AWE plc (Aldermaston & Burghfield) 14 January 2009	<ul style="list-style-type: none"> Conditioning & packaging: need for regulators to rationalise documentation and reduce overlap Storage & transport: Aldermaston ILW stores should last 100 years. Two, not one modern store. For various reasons including a volume reduction programme, should need no new ILW stores until at least 2030. 	<ul style="list-style-type: none"> We have no evidence this is a problem. Text drafted to make these points.
7. National Nuclear Laboratory 14 January 2009	<ul style="list-style-type: none"> Welcome report, endorse recommendation for UK wide strategies for managing a range of higher activity wastes & materials. They will be interdependent and linked to other strategies. <p>Sec. 2</p> <ul style="list-style-type: none"> Welcome CoRWM plan to study retrievability. Need for extended storage in a GDF could significantly increase cost of product longevity: understand drivers. In developing failure criteria, NDA should consider consequences of potential changes in waste package properties and determine which ones could result in failure. Review once site(s) located. <p>Sec.3</p> <ul style="list-style-type: none"> Public need assurances about safety of stored waste in a way that doesn't prejudice security. <p>Sec.4</p> <ul style="list-style-type: none"> Say what the basis is for any stakeholder concerns relating to storage of AGR fuel. No equivalent concerns are highlighted for the HLW, uranium and plutonium that would be generated by reprocessing. 	<ul style="list-style-type: none"> Noted. Noted. For NDA. Point made in text. Text added to explain basis.

Commentator and date	Issues (or numbered sections) commented on	CoRWM response - how comments acted on
	<p>Sec.5</p> <ul style="list-style-type: none"> Clarify whether storage is not considered a viable option in the long term for Pu in general, or the small amount stored at Dounreay. Consider security implication of making explicit statements and risk of effectively identifying targets. 	<ul style="list-style-type: none"> Reworded to clarify for Pu in general. All information in report is in public domain.
<p>8. Sellafeld Ltd</p> <p>14 January 2009</p>	<ul style="list-style-type: none"> Before embarking on an R&D programme for interim storage, underlying strategic drivers and principles must be clearly identified. This can be used to determine a pragmatic approach to interim storage systems e.g. covering store design life, transport, security, monitoring and inspection &c. There needs to be a clearer view on what Public Stakeholder Engagement is required for Interim Storage with a clear mechanism for publishing trustworthy, 'appropriate' information & contacts. Be clearer about what is current strategy & tactics (SLC baseline plans) and differentiate this from what is identified as 'aspirational' or opportunities (which therefore may drive R&D). e.g. identification of 'yellow boxes', 100 year store design life and packaging/disposal of unconditioned waste. <p>Sec.1 – a failure to implement geological disposal would need a different strategy to one of just interim storage as a fallback. An alternative strategy would be required, not just a contingent strategy.</p> <p>Sec.2 – while waste could <i>potentially</i> be packaged without conditioning, current guidance and LoC means that most/all would need to be conditioned to be accepted for disposal;</p>	<ul style="list-style-type: none"> Noted for CoRWM R&D report Agree but not for CoRWM to be prescriptive. Clarified where necessary. “Contingent” covers all scenarios, no need for separate “alternatives”. Not true of reactor decommissioning waste, which is what is being referred to here.

Commentator and date	Issues (or numbered sections) commented on	CoRWM response - how comments acted on
	<p>hence, very little waste could be packaged unconditioned if it is to be finally disposed of.</p> <p>Sec.3 – Identifying massive concrete structures as against ‘mini-store’ concepts, report may be mixing different issues, e.g. shielding, containment, security, etc.? All these issues need to be addressed when considering waste storage appropriate for each site.</p> <p>Sec.4 – On MOP contingencies, Sellafield’s remit is to identify a contingency that prepares the fuel for safe interim storage only. Subsequent decisions for the Magnox fuel to be reused, stored for a further period, or disposed of in a UK geological facility is not under consideration. But SLC is mindful not to create the circumstances that would lead to a future cliff edge problem that will force decision to be made in the future Magnox fuel.</p> <ul style="list-style-type: none"> • Not yet UK policy that Magnox fuel that is not reprocessible will be dealt with as waste. 	<ul style="list-style-type: none"> • Issues are not mixed. • Text is about NDA work as a whole, not only Sellafield work. • Noted but text is about NDA, not Govt policy.
<p>9. Health & Safety Executive</p> <p>14 January 2009</p>	<ul style="list-style-type: none"> • Agree with recommendation on better strategic co-ordination; consider how this might be achieved • More information for stakeholders needs to include clearer explanations <p>Sec.2 - over-emphasis on direct disposal. May need earlier decommissioning (e.g. on safety grounds) then buffer storage. Storing in raw form needs balancing against factors like passive safety & hazard reduction.</p> <p>Sec.3 – suggested rewording of various statements about regulatory system and standards</p> <p>Sec.4 - THORP not currently seen as limited from a design/operational viewpoint.</p>	<ul style="list-style-type: none"> • Noted, for Govt to implement. • Text drafted to include point. • Text worded more carefully. • Reworded to address concerns. • Text worded more carefully.

Commentator and date	Issues (or numbered sections) commented on	CoRWM response - how comments acted on
<p>10. Environment Agency</p> <p>15 January 2009</p>	<ul style="list-style-type: none"> Will report cover locations that are not “stores” as such, but might used be to house (raw) wastes for some periods e.g. fuel element debris vaults? Highlight the need to evaluate disposability and avoid reworking of wastes. Various comments about EA and SEPA regulatory duties and guidance. 	<ul style="list-style-type: none"> Some text on legacy facilities added but CoRWM's focus is on long-term waste management. Taken into account in drafting. Reworded to address concerns.
<p>11. Greenpeace UK</p> <p>19 January 2009</p>	<ul style="list-style-type: none"> Continuing concern over disposal and environmental, financial, technical, social & other risks/issues involved. Welcome CoRWM's work on safe & secure storage, and inclusion of security as an issue for discussion. <p>Sec.1 - concerns over definition of storage v disposal</p> <p>Sec.2 - how much of each waste conditioned so far?</p> <p>Sec.3 - short-term stores: would new ones be on same site? Might BE's AGR waste be moved to NDA facilities?</p> <ul style="list-style-type: none"> Say more about how contingent strategies would be reviewed and with what public input. Transport to GDF must be planned well in advance with involvement of affected communities. NDA not appropriate to lead: conflict of interest. <p>Sec.4 - mention OSPAR commitments re Magnox & AGR spent fuel management.</p> <ul style="list-style-type: none"> AGR fuel at Sellafield: should still be conditioned not, for example, reprocessed. <p>Sec.5 - Concerns over the way the options on plutonium have been presented. Differentiate more clearly between Pu options. What is driving NDA's Pu work and its timing?</p> <ul style="list-style-type: none"> Where might U oxide be sent - would CoRWM be involved 	<ul style="list-style-type: none"> Noted. Noted but we do not agree with Greenpeace suggestions for changes. See UK Inventory. For NDA and BE future work, no decisions yet taken. Not for CoRWM to be prescriptive. Noted. Not for this report Noted. Text in draft report now reflects NDA January 2009 plutonium options documents.

Commentator and date	Issues (or numbered sections) commented on	CoRWM response - how comments acted on
	in (e.g. ethics) of any proposal to export?	<ul style="list-style-type: none"> • For UCL and regulators
<p>12. Nuclear Decommissioning Authority</p> <p>20 January 2009</p>	<p>Exec Summary</p> <ul style="list-style-type: none"> • Need to be clear on Govt role in strategy development. • Make appropriate information available, not more information. <p>Sec.3 - mini-store concept is actually a waste package, which should still require a waste store. Mini-stores may be only suitable for certain sites.</p> <ul style="list-style-type: none"> • Potential for regulations to change is common to other regulatory fields where planning needs to start well ahead of the eventual activity. <p>Sec.4 - additional AGR fuel pond storage capacity at Sellafield <i>may</i> be needed.</p> <p>Sec.5 - in 2008 NDA regarded any U above around 0.3% enrichment as a potential asset, but this figure may change with the international U market & user demands.</p>	<ul style="list-style-type: none"> • We are clear. about Govt role. • Both more and appropriate. • • Made clearer in text. • • Noted. • • Worded more carefully. • • Reworded to address point.

ANNEX A – RESPONSE FORMS

RESPONSE FORM

Personal Details

Name: Gerald Blackaller	Organisation: AWE plc (Aldermaston and Burghfield)
Email address: gerald.blackaller@awe.co.uk	Tel. no.: 0118 98 27156
Postal address: AWE, Aldermaston, Reading	
Are you responding as an individual or on behalf of an organisation or constituency? Responding on behalf of AWE	
Do you wish your name (or that of your organisation) to be omitted when responses or summaries of responses are published? Please don't give my full address. AWE Aldermaston, Reading – is fine but not building number please.	

Comments on Interim Storage Outline Report (CoRWM document 2500)

General Comments on the Outline Report

<p><i>Please enter here your general comments on the outline report.</i></p> <p>The report seems good.</p>
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Specific Comments on the Outline Report

Section	Comments
Executive Summary	Scope of the report – not sure I understand the second main bullet point – “for R&D only -----“. I assume your main finding are in this report except for R&D. Am I correct?
1. Introduction and Background	
2. Conditioning and Packaging of Higher Activity Wastes Section 2.4	There is a need for the regulators to rationalise the documentation required as there is overlap between safety cases, Periodic Reviews of Safety, Quinquennial Reviews of Liabilities, Waste management Plans and Strategies and probably other documents.
3. Storage and Transport of	

Section	Comments
Higher Activity Wastes	
Section 3.1.2	Aldermaston ILW stores were designed based on a relatively short life but provided a good maintenance regime is undertaken, which has been identified, the stores can be expected to last for 100 years.
Section 3.1.2	Aldermaston has two large independent modern purpose-built ILW stores (<i>not one as quoted</i>).
Section 3.2	Aldermaston has no plans to build new ILW stores since there is a major programme to volume reduce by high force compaction waste presently stored and future arisings. In parallel there is a programme to re-assay existing wastes and remove that which is LLW. Provided forecasts of volume generation are not low and the volume reduction programme is successful AWE should have no need for new ILW stores until 2030.

Other Comments

Please enter here any other comments on CoRWM's work on interim storage, including the process being followed to prepare the report.

RESPONSE FORM

Personal Details

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Email address: dave.m.nichols@sellafieldsites.com	Tel. no.: 01925 836314
Postal address: Sellafield Site Sellafield, Seascale Cumbria CA20 1PG	
Are you responding as an individual or on behalf of an organisation or constituency? On behalf of an organisation	
Do you wish your name (or that of your organisation) to be omitted when responses or summaries of responses are published? No	

Comments on Interim Storage Outline Report (CoRWM document 2500)

General Comments on the Outline Report

Please enter here your general comments on the outline report.

1. The document should identify that, before embarking on an R&D programme for interim storage, it will be essential that the underlying strategic drivers and principles are established and clearly identified. This needs to be established at appropriate levels, i.e. Government determining Policy, NDA determining Strategy and SLCs determining Tactics and Implementation Plans. This can then be used to determine a pragmatic approach to interim storage systems covering areas that include:
 - store design life
 - transportation
 - security
 - monitoring and inspection
 - store environments, etc
2. We believe there needs to be a clearer view on what Public Stakeholder Engagement is required for Interim Storage with a clear mechanism for getting trustworthy, 'appropriate' documentation into the consultation process. The information for PSE needs to be relevant (not always detailed specific technical information which is sometimes inferred in the document and which is not always helpful for PSE) and it should be clear who stakeholders need to contact for further information/advice/clarification. An example of this would be security of stores but equally applies to other areas of interim storage.

3. We believe the document needs to be clearer and identify what is current strategy and tactics (SLC baseline plans) and differentiate this from what is identified as 'aspirational' or opportunities (and which therefore may drive R&D). Examples of this include the identification of 'yellow boxes', 100 year store design life and packaging/disposal of unconditioned waste.

Specific Comments on the Outline Report

Section	Comments
<p>1. Introduction and Background</p>	<p>Section 1.2: Clarification of the definitions for Higher Activity Waste required; should perhaps include separate definitions for HLW and ILW (or include in the Glossary). It should also identify that it does include a small fraction of LLW that does not exceed the limits defined in the recently updated LLW policy statement, (i.e. doesn't meet the CfA for the LLW Repository) due principally to the concentration of specific radionuclides, and so will need to be disposed of in a geological disposal facility.</p> <p>Section 1.2: Should include definitions for 'disposal', 'retrieval', and perhaps it would be beneficial to include definitions for 'waste form', 'container' and 'package'.</p> <p>Section 1.2: Definition of 'conditioning' needs to be looked at. It may not just be 'converting it into a stable form' but could include 'cutting, preparing and packing', e.g. decommissioning waste such as concrete and masonry</p> <p>Section 1.4 first paragraph, second bullet: A failure to implement geological disposal would require a different strategy to one of just interim storage as a fallback. An alternative strategy would be required, not just a contingent strategy</p>
<p>2. Conditioning and Packaging of Higher Activity Wastes</p>	<p>Section 2.1, third bullet: A clear explanation of what 'ILW arisings' really means would be beneficial, i.e. future arisings effectively exists now as the waste is in the form of legacy ILW and decommissioning ILW of structures that currently exist;</p> <p>Section 2.3, first bullet: We would be cautious about making this statement as we believe it needs to be placed in context. There is the opportunity to decay store but in reality this may only apply to a small proportion of the waste, voidage would be expected to preclude a lot.</p> <p>Section 2.3, third bullet: This could be misleading. Although waste could <i>potentially</i> be packaged without conditioning, current guidance and LoC</p>

Section	Comments
	<p>requirements means that the majority of this waste, if not all of it, would need to be conditioned in order to be accepted for disposal; therefore, very little waste could be packaged without conditioning if it is to be finally disposed of. At Sellafield, 'raw' waste is packaged for temporary interim storage only.</p> <p>Section 2.4: It would be useful to include the IAEA Safety Fundamentals as the first bullet, as these form the fundamental principles for radioactive waste management. They would also set the scene for the overall UK regulatory framework.</p> <p>Section 2.7: For this section, a key area is Alternative Conditioning Options and Containers with the key message that generic programmes are required.</p>
<p>3. Storage and Transport of Higher Activity Wastes</p>	<p>Section 3.1.1, first bullet: We would state that the original legacy facilities to store waste were intended for medium term use. This was the original strategy before long term waste management routes were available.</p> <p>Section 3.1.1, fourth bullet: This urgency <i>may</i> prevent optimum 'best' waste conditioning solutions and/or necessitate buffer storage before conditioning can take place and be implemented.</p> <p>Section 3.2, second bullet: At Sellafield, all the current stores, and those under construction (i.e. EPS3), have a 50 year design life as a baseline. An initial assessment has indicated that the design life can be extended to up to 100 years, but only subject to the usual safety reviews, etc. This is why we have used the 50+50 terminology.</p> <p>Section 3.2, general. Suggest that this section identifies the baseline plans for future stores and that a separate section identifies 'other options' as these invariably have fundamental issues of principle involved which have yet to be addressed or resolved.</p> <p>Section 3.3.1, third paragraph: We're not sure what the statement is addressing. By directly identifying massive concrete structures as against 'mini-store' concepts, we believe you are potentially mixing different issues, e.g. shielding, containment, security, etc? All these issues need to be addressed when considering the waste storage appropriate for each site. Another point is that mini-stores would only suit small waste volumes, they would be inappropriate for the waste volumes we have at Sellafield. However, we are looking at alternative containers to optimise waste treatment and packaging.</p>

<i>Section</i>	<i>Comments</i>
	<p>Section 3.3.2, general point: It would be useful to identify that the time to empty stores and emplace waste in the GDF is also considerable; for Sellafield it is currently of the order of 60-70 years. This also needs to be taken into account in the storage strategy adopted.</p> <p>Section 3.3.2, bullets 4, 5, 6: At Sellafield, we have undertaken this approach where, for different Repository scenarios, we worked up contingent and alternative storage strategies. This was a key element in the production of the Integrated Strategy for the Sellafield Site (we can illustrate and discuss this further with you and show the work we did for different Repository scenarios)</p> <p>Section 3.4, seventh bullet: Clarification: do EA and SEPA actually 'regulate' storage facilities? - is this strictly the correct terminology? The EA may regulate the disposal facility which could impact on consignors via any future Waste Acceptance Criteria.</p> <p>Section 3.5, general comment: Is there just a perception of a problem regarding stores security and public confidence or is there a real issue here - this isn't really clear and could be misleading. Suggest this needs to be clarified.</p> <p>Section 3.5, last bullet: There is a perception that the UK and US government have a different approach to releasing security information into the public domain. The UK government do not release protectively marked information into the public domain; generally all security reviews carry a protective marking. The US government have the same policy, but sanitise information specifically for release into the public domain, which in reality tells you nothing that you could not read in a daily paper. Hence the perception of differing approaches. In summary, assessments and reviews are carried out by operators in conjunction with competent authorities and peer reviewed within government. The information rests within government security agencies due to its protective marking. In reality the same applies to the US.</p> <p>Section 3.7: Key Area - see General comments</p>
4. Management of Spent Fuels	<p>Section 4.1, fifth bullet: MOP contingencies. Sellafield's remit is to identify a contingency that prepares the fuel for safe Interim Storage only. The subsequent decisions for the Magnox fuel to be either reused, stored for a further period, or disposed</p>

Section	Comments
	<p>of in a UK geological facility is not under consideration. However the SLC is mindful not to create the circumstances that would lead to a future cliff edge problem that will force decision to be made in the future Magnox fuel.</p> <p>Section 4.1, last bullet: Strictly, we believe it is not yet UK policy that Magnox fuel that is not reprocessable will be dealt with as waste.</p> <p>Section 4.2, sixth bullet: Believe that this should read “dry storage of AGR fuel at Sellafield is being considered as an alternative strategy to the reference strategy of wet storage”</p> <p>Section 4.4, general: There are policy issues still to be established for dealing with some of these exotic fuels, e.g. DFR fuel, Chapelcross fuel/zeolite skips, MOD fuel, etc. Until these are established, then strategies for managing them and the R&D to support this will be very difficult to determine.</p>
5. Management of Plutonium, Uranium and Thorium	No comments at this stage
6. Overall Conclusions and Recommendations	No comments at this stage
7. References	No comments
8. Glossary and Acronyms	See comments on Section 1

Other Comments

Please enter here any other comments on CoRWM's work on interim storage, including the process being followed to prepare the report.

No further comments at this stage

RESPONSE FORM

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Are you responding as an individual or on behalf of an organisation or constituency? On behalf of the National Nuclear Laboratory	
Do you wish your name (or that of your organisation) to be omitted when responses or summaries of responses are published? No	

Comments on Interim Storage Outline Report (CoRWM document 2500)

General Comments on the Outline Report

Please enter here your general comments on the outline report.

The National Nuclear Laboratory welcomes this interim storage report. In particular we endorse the recommendation that UK wide strategies should be developed for the management of a range of higher activity wastes and materials. It should be recognised that these strategies will be interdependent and will also be strongly linked to other strategies. This fact will need to be taken into account when the strategies are developed and maintained.

Specific Comments on the Outline Report

<i>Section</i>	<i>Comments</i>
1. Introduction and Background	
2. Conditioning and Packaging of Higher Activity Wastes	We welcome the CoRWM proposal to examine the topic of retrievability. The requirement for extended periods of storage in a geological disposal facility prior to closure will be crucial in determining the

Section	Comments
	<p>characteristics required of waste packages. Requirements for long periods of underground storage could have a significant impact on the cost of ensuring product longevity. It would therefore be appropriate to have a clear understanding of the driver for this requirement.</p> <p>Reference is made in the third bullet of paragraph 2.6 to the fact that NDA is developing package failure criteria. We welcome this. In developing these criteria it will be important to consider the consequences of any potential changes in the properties of the waste packages that could occur and to determine which have the potential to result in failure. In the first instance the criteria will necessarily be generic. It will be important to review these criteria once a specific site (or sites) has been identified to determine whether site specific considerations would result in any changes.</p>
3. Storage and Transport of Higher Activity Wastes	The last bullet of 3.9.4 notes that more information should be made public about the security of waste stores. It is certainly the case that the public should be assured of the safety of stores. As stated, this is the responsibility of OCNS. Care will need to be taken to ensure that the publication of information does not itself prejudice security.
4. Management of Spent Fuels	The penultimate bullet in section 4.2 refers to potential stakeholder concerns relating to storage of AGR fuel. When the report is written this should make clear what the basis for these concerns is. This is especially the case as no equivalent concerns are highlighted for the HLW, uranium and plutonium that would be generated by reprocessing the fuel.
5. Management of Plutonium, Uranium and Thorium	<p>The last sentence of the first bullet in section 5.1 is ambiguous. It is not clear whether CoRWM believe that "storage is not a viable option in the long term..." for Pu in general, or the small amount stored at Dounreay.</p> <p>The final sentence of bullet 5 in section 5.2 is true. However the security implication of making explicit statements should be considered. This could be useful to terrorists as it could effectively identify targets.</p>
6. Overall Conclusions and Recommendations	We welcome the recommendation that a variety of UK-wide strategies should be developed. Consideration will need to be given to who should

<i>Section</i>	<i>Comments</i>
	contribute to the development of these strategies
7. References	
8. Glossary and Acronyms	

Other Comments

Please enter here any other comments on CoRWM's work on interim storage, including the process being followed to prepare the report.

RESPONSE FORM

Personal Details

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Email address: ddewi@btinternet.com	Tel. no.: 01697349751
Postal address: Low Church Hill Farm, Westward, Wigton, Cumbria CA7 8LZ	
Are you responding as an individual or on behalf of an organisation or constituency? I was asked to review the report as a member of NuSAC until it was disbanded in October 2008	
Do you wish your name (or that of your organisation) to be omitted when responses or summaries of responses are published? No	

Comments on Interim Storage Outline Report (CoRWM document 2500)

General Comments on the Outline Report

Please enter here your general comments on the outline report.

The report is a very good overall summary of the current nuclear waste management position in the UK. It is clear from the breadth and depth of the report that a great deal of time has been spent to ensure that all aspects are fully understood and accurately described.

Specific Comments on the Outline Report

Section	Comments
1. Introduction and Background	No comments: A very comprehensive, understandable and informative introduction
2. Conditioning and Packaging of Higher Activity Wastes	Section 2.3: It would be wrong to give the impression that radioactive decay will reduce all but a few specific ILW waste streams to LLW over a reasonable time period. For some ex-reactor ILW wastes, this is true but not for most Sellafield and Dounreay ILW streams.

Section	Comments
	<p>I don't accept that challenging legacy wastes cannot be adequately immobilised on a reasonable timescale. I am concerned that a "modern" buffer store for storage of raw retrieved legacy wastes will too easily become tomorrow's legacy facility, repeating the errors of the past.</p> <p>Sections 2.4 and 2.5: I am concerned that the regulatory process has developed to ensure that wastes generated by new processes are suitably conditioned and safely stored (no bad thing as it should prevent a repetition of past mistakes). Neither of the principal Regulators, nor the licence instruments under which they set requirements can easily allow the degree of flexibility / compromise wrt to waste conditioning, waste package and waste definition that will be required if some of the most challenging legacy wastes are to be retrieved, conditioned and packaged in a safe timely manner at a cost that is sustainable.</p> <p>Section 2.6: It is to be hoped that these "failure" specifications recognise that a small percentage of out of specification waste is of little consequence in the overall performance of a disposal facility and will therefore set a realistic acceptable percentage failure rate for waste packages.</p> <p>Section 2.8: I wholly agree that an overall UK strategy is required but who will develop this strategy and who will keep it live? Will another Agency akin to the NDA be set up? Where will the expertise come from? To be robust a national strategy will have to be comprehensively underpinned with science and a detailed technical understanding of the problems and their practicable solutions. The NDA already struggles to obtain such expertise with many of its staff transferring from the sites or the NNL, thereby reducing capability in these organisations. A further demand on this limited resource might render all organisations "sub-critical".</p>
3. Storage and Transport of Higher Activity Wastes	<p>Section 3.1.1: Once material has been retrieved and the facility cleaned out, the risks of failure and of activity release are very much reduced and decommissioning of legacy facilities could then safely be deferred.</p> <p>Section 3.1.3: Sellafield stores: The stores are modern and purpose built but the designs of the ILW stores and the stored packages were developed in</p>

<i>Section</i>	<i>Comments</i>
	<p>the expectation of relatively early (within a few decades) disposal whilst the design of the HLW store envisaged 50 year storage followed by progressive disposal. This does not necessarily mean that the Sellafield stores will not remain sound for 100 years (or more) it is simply a cautionary reminder that store designs were not detailed for a life of 100years.</p> <p>In claiming a life of 100years for a reinforced concrete structure it is prudent to note that there is not much data on reinforced concrete performance up to 100years. Its performance to 100 years and more may well be acceptable but the failure mechanisms of composite materials such as reinforced concrete are complex and difficult to evaluate as the structure ages. In addition, whilst it is true that installed mechanical items such as cranes and shield door drives are designed for repair / replacement there are installed components such as the crane rails and their fixings that cannot be replaced (without emptying the stores) and these could be susceptible to failure. The claim of 50years design life extendible by a further 50 years, is in my opinion, to a degree aspirational and I would recommend an independent review to assess failure modes / mechanisms to determine whether there is some "cliff edge" failure mechanism as the modern store structures age. Such an understanding is particularly important if contingency storage beyond 100 years becomes a serious possibility.</p> <p>Section 3.3: I wholly agree that the storage system overall must be considered when evaluating the robustness of the system.</p> <p>With the exception of the HLW store at Sellafield stores generally have active ventilation systems with inlet air "conditioning" and extract air filtration. These installed mechanical systems require regular maintenance and periodic upgrade / replacement. Passive ventilation (usually achieved by including heat generating waste packages in the store inventory) is clearly attractive if long-term storage is probable.</p> <p>Section 3.3.2: My comments under 2.8 apply here. Given the experience of previous planned operational dates for a disposal facility, I would not recommend shortening store design lives until the GDF is licensed to receive wastes.</p> <p>Section 3.4: The earlier comment in the report that</p>

<i>Section</i>	<i>Comments</i>
	<p>the overall storage regime must be taken into account when assessing the robustness of a storage system is highly relevant when assessing safety. The design safety provisions required depend very much upon the inherent passivity of the waste being stored.</p> <p>Clearly the waste package design did not foresee a reaction leading to local distortion of the waste drum. However if the reaction has now “run its course” and no further swelling can occur, the drum integrity does not appear to have been greatly compromised by the event. If further investigation shows this to be the case, there will be no requirement to make significant changes to FHP operations or the take urgent action to overpack MEP waste drums.</p> <p>Section 3.5: Information on even the outline principles of how security is achieved must, to some extent, compromise the delivery of that security. Providing information on security provisions will drive demands for more information and the risk of the inadvertent release of key security facts.</p> <p>Section 3.8: PSE as a sound concept cannot be challenged. However, to date, the engagement of the public (i.e. people with no vested interests or agenda) has been variable (and often minimal). CORWM1 worked very hard to ensure that everyone had their say but, in general, the public was not very proactive. The NGO groups (and the Industry) have established views that are well known and can be obtained without the expense and complexity of a formal PSE process. When CORWM1 presented its report, some NGOs were very critical of the report, presumably because it did not accept their arguments, claiming that the consultation had been inadequate (although it is hard to see what more could have been done). It seems that however hard one tries to engage through a PSE process, some opinions are so entrenched that no compromise leading to agreement can be achieved. Perhaps it is time to consider a different approach to PSE? The approach in France of an examining advocate enquiry does seem to have its merits although it would represent a major departure from current UK practice.</p> <p>Section 3.9.3: Each component contributes to robustness and lifetime cost</p> <p>Section 3.9.4: See comment under section 3.5</p> <p>Section 3.9.5: See comment under section 3.8</p>

<i>Section</i>	<i>Comments</i>
4. Management of Spent Fuels	<p>Section 4.2: It might be possible to sustain Thorp and its necessary ancillaries through to the end of the AGR programme (about 2030) but there is not enough AGR fuel to provide a workable constant throughput for Thorp and unless additional overseas business were obtained, reprocessing all AGR arisings would be wholly uneconomic as operations would have to be suspended for long periods to allow spent fuel stocks to build up to that required for a campaign.</p> <p>AGR fuel drying is much easier if fuel is dismantled. Quantifying the drying effectiveness if the graphite sleeves are not removed is very challenging.</p> <p>Section 4.3: There is an overseas reprocessing option for Sizewell B fuel and possibly EDF may opt to send the fuel to La Hague?</p> <p>Section 4.4: Exotic fuels comprise a large number of individual items but a small amount of U and Pu when compared to the spent Magnox or AGR fuel stocks. It is important that this perspective is retained and that the exotics fuels “tail” does not wag the spent fuel strategy “dog”.</p>
5. Management of Plutonium, Uranium and Thorium	<p>Section 5.1: It is not wholly clear to me why the NDA have excluded from their options the possibility of their constructing one or more reactors to burn the UK Pu stock, funding the capital cost through subsequent electricity sales.</p> <p>Section 5.2: There is no specific reference here to Uranium recovered in reprocessing. Whilst a dedicated enrichment plant would probably be preferred for re-enriching this uranium, at current uranium prices, re-enrichment of “repU” could be attractive.</p>
6. Overall Conclusions and Recommendations	<p>Section 6.1: See comment under section 2.8</p> <p>Section 6.2: see comments under section 3.8</p>
7. References	Very comprehensive
8. Glossary and Acronyms	

Other Comments

Please enter here any other comments on CoRWM's work on interim storage, including the process being followed to prepare the report.

I am very impressed by the process that has been followed, by the quality of the research carried out and the hours that must have been devoted by CORWM members to produce this interim report.

It might be helpful if CORWM considered ways in which it could strengthen its ability to challenge the claims made for engineering designs and design concepts in the presentations made to it.

RESPONSE FORM

Personal Details

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Are you responding as an individual or on behalf of an organisation or constituency? Individual/NuSAC	
Do you wish your name (or that of your organisation) to be omitted when responses or summaries of responses are published? No	

Comments on Interim Storage Outline Report (CoRWM document 2500)

General Comments on the Outline Report

Please enter here your general comments on the outline report.

Apart from a couple of queries, I thought it was factually correct.

I liked the order.

I have tried to indicate where more material might be beneficial to give the report more substance.

You need to give more thought about clarifying where you are just giving factual data; and where you are discussing, so have reservations about things. Hence, the conclusions and recommendations could flow better.

For the executive summary, I have 2 comments.

- 1- NDA has to avoid becoming the “controlling mind”, and hence take on legal accountability for the sites. NDA cannot be seen to tell the SLCs what to do, yet as the Government’s agent ought to be directing work, value for money, etc. This conflict needs to be brought out under strategy.
- 2- The last bullet point in strategy coordination is so vital that it should be in bold. You could expand it to point out that there will always be hard decisions on where necessarily limited funding will be spent.

Specific Comments on the Outline Report

<i>Section</i>	<i>Comments</i>
1. Introduction and Background	OK
2. Conditioning and Packaging of Higher Activity Wastes	<p>2.1 Need to expand to show that these are the current expectations- to say when reprocessing is expected to end. Hence, what could be the approximate impact of more reprocessing? I don't think the quantities quoted include ground contamination. Need to at least mention it. Whilst action in this area may be a long way off, it could help to shape thinking on whether structures need to be fully demolished. Would also drive R&D into what should be done to stabilise the residual ground contamination.</p> <p>2.3 Could mention that the problem of the "controlling mind" comes out strongly here. Also, next to last bullet: Point out that we understand cement grouting- the lead time to 'work up' alternatives, given all that has to be demonstrated, is huge.</p> <p>2.5 Should indicate rate of progress (or otherwise) with LoCs- hence an indication of how much still needs to be done.</p> <p>2.6 Point out that last new process for waste treatment at Sellafield was introduced in 1994. Since then, several false starts, and nothing imminent. Shows how really difficult is the problem, and how it needs a determination to fix it. It should start with the construction of a robust safety case.</p> <p>Other sites have made some progress, but there is still much to do. Could give examples of materials that need routes to be developed</p> <ul style="list-style-type: none"> • Fuels • Uranium and plutonium residues • Oils • Aluminium • Resins • Ion exchange materials • Higher Pu packages

Section	Comments
	<ul style="list-style-type: none"> • Pond sludges <p>NDA has just started to develop a new aspect of the TBUrDs. There needs to be a systematic display of each material, the relative importance, whether a processing route is available, what is needed to fill any gaps, the R & D necessary, and the timescales to deliver. This would allow an overall programme to be delivered, and assist with decisions on the allocation of funds.</p> <p>You could stress the importance of completing this work.</p> <p>2.8 Must say something about funding. R&D has to compete with day-to-day demands, and struggles to make a case against more imminently-seen benefits. Crying need to set up a (dispersed) 'big project'; listing all future work, the programme, the unknowns to be solved, the underpinning R&D needed, how it will be resourced, etc. The skill availability needs to be addressed. Another one for the "controlling mind"!</p>
3. Storage and Transport of Higher Activity Wastes	<p>3.1.1 Point out that recovery of historic legacy wastes is particularly problematic. Stress the importance of a robust safety case. Issues include</p> <ul style="list-style-type: none"> • Heterogeneous nature of the materials • Difficulty of mobilising it • Difficulty of transport • Safety issues such as hydrogen evolution, radiation dose, etc • State of the facilities <p>3.2 A replacement VPS at Sellafield is news to me. Please check- may be right!</p> <p>3.3 and 3.4 seem to talk only of the decent stores in use or planned. Much of the waste is currently in poor conditions, and very limited progress has been made in recent years at Sellafield to improve the position. Dounreay has been addressing the problems, but there is a lot to be resolved. This is unacceptable, and must receive the effort/funds that are necessary, both from the SLCs and the regulators. It is no good the regulators "giving advice" if it does not help to</p>

Section	Comments
	<p>solve the problem!! You should refer to this, and follow it into the recommendations.</p> <p>3.5 This section seems a bit too demanding about what should be said publicly about security. I agree that there could be more transparency, but please acknowledge the proper limitations. We can talk separately.</p> <p>3.7 Refer to the comments on R&D to support treatments. Also ground contamination. There is still outstanding work on big-volume materials like concrete, steel and graphite. This then feeds into the argument about how quickly the work ought to be done. Need more serious work on retrieval methods, cleaning of structures (and whether it is actually appropriate), response to deterioration of old facilities, etc</p> <p>3.9.1 First bullet point is an assertion. The evidence could be challenged. Need to change the wording.</p>
4. Management of Spent Fuels	<p>4.1 Point out that the outcome of the last bullet point will be a long time off- so poor facilities will remain active for many years to come. Little practical technical work is being funded to address it.</p> <p>4.2 Need to indicate how much AGR fuel will not currently be reprocessed.</p> <p>4.3 Likewise, how much PWR is currently committed?</p> <p>Should bring out that the strategy is turning the repository into a treatment and disposal system. I believe that UKAEA sees some of its problems also being dealt with at the repository. The issue of where waste should be treated is missing from the report.</p> <p>4.4. 4th bullet. Already substantial risk that MOP 8 cannot be delivered due to low throughput in recent years. Adding DFR increases this risk.</p> <p>5th and 6th bullets. Again little real R&D being done on this area with a long lead time.</p> <p>4.5 5th bullet. "NDA is starting to develop....." Next to last bullet needs real expansion with some detail.</p>

Section	Comments
5. Management of Plutonium, Uranium and Thorium	<p>5.1 Dounreay inventory needs clarification. Much Pu is mixed with U, and some is radiologically dirty. So you need to quote a quantity, and be clear whether it is Pu or HM weight.</p> <p>Last sentence of first bullet is not really correct, even if there is a lobby to that effect. Japan and France are still keeping the Fast Reactor option open, and are actually operating such power plants. The energy locked up in the Pu stock is enormous, and could be economically extracted if the price of electricity rose sufficiently. The cost of Pu storage in case we need it is very low against this scenario. You need to be clear about what was said at a meeting, as opposed to the underpinning science.</p> <p>Second bullet is OK, although could mention the long timescale to deliver, and that the fast reactor option might enter consideration by then.</p> <p>You should refer to the poor performance of SMP at Sellafield, so a strategic decision is needed about how to proceed. The route is operating well in France.</p> <p>5.2 Needs a bit more detail. Tails depleted U; Magnox depleted U and THORP depleted U should be shown separately as there are different issues.</p> <p>UCL can sensibly build a deconversion plant as the U235 of their tails tends to be low- around 0.25%.</p> <p>Even if you extract more U235 from these materials, there is ultimately a large disposal question for the remaining uranium, which needs attention on a timely basis. (see 'big project' above)</p> <p>5.4 If 5.2 (in particular) is expanded, then the conclusions and recommendations will be better presented. Needs some work here.</p>
6. Overall Conclusions and Recommendations	<p>6.1 Needs recommendations covering</p> <ul style="list-style-type: none"> • Controlling mind

Section	Comments
	<ul style="list-style-type: none"> • Funding • Establishment of issues and programme, showing the gaps in knowledge and how they will be addressed, etc • Determination to progress legacy wastes
7. References	
8. Glossary and Acronyms	

Other Comments

Please enter here any other comments on CoRWM's work on interim storage, including the process being followed to prepare the report.

I think that the supplementary comments that I have made will lend themselves to conclusions and further recommendations.

NuSAC REVIEWER COMMENTS ON CoRWM DOCUMENT 2500 OUTLINE REPORT

The following comments are to be read in conjunction with the tracked text supplied (not included in this log).

1. Indications that something else is expected (marked in green)
2. Queries (marked in yellow)
 - PSE – see later
 - Packaging – sometimes (not here) the term is used for the totality (Noun) rather than the process (verb)
 - 30% etc of what?
 - Could also mention Trawsfynydd sea disposal packages specifically?
 - Will you define ‘mobile and potentially mobile’ in the glossary?
 - For a longer period – longer than what?
 - The *recent* NWAT report will time expire
 - Proposed Conclusions and recommendations – see note below
 - 3.1.1 If you mean the Berkeley Magnox vaults they certainly were meant for long term use. Have other ILW facilities been built?
 - 3.1.2 mention Trawsfynydd?
 - 3.13 This refers to a new store at Trawsfynydd (not the sea dump drum store)?
 - 3.3.1 I feel this is perhaps a ‘conclusion’?
 - 3.3.2 My time logic would put the sequence as earlier, delayed, never.
 - 3.4 If there an N in WENRA –is it Western European *Nuclear* Regulators Association?
 - Is the www address correct with a – rather than .?
 - 3.6 Why mention LLW in this section on HAW?
 - OCNS – sentence seems garbled.
 - 3.9.2 add ‘earlier’ to be consistent with previous script.
 - DECC to be defined
 - 5.2 Can you be more specific than ‘Section 2’?
 - 6.2 PSE See note below
 - Reference style needs to be consistent e.g. 2009/2012 or 2009 – 2012?
 - I will admit having to look up ‘redacted’ in a dictionary!

There were two areas where I would do things slightly differently.

In my reports I quite rigorously finish (in reverse order) with Recommendations, drawn out Conclusions, which arise from any Discussion, of the facts included in the body of the report. You have chosen to combine Conclusions and recommendations within the body of the text at the end of each section (2.8, 3.9, 4.5 and 5.4) and again summarised them (combined) at the end of the report -6.1 and 6.2- (although you do differentiate here by a font change). You are of course entitled to use your preferred ‘style’ but I thought it worth mentioning.

The other related area is the introduction of new material within the Conclusions. The first reference to CoRWM’s own PSE exercise is (I think) in 6.2 9 (and repeated in the Exec Summary). I would have preferred some mention in the body of the report.

3. Errors to be corrected (marked in red)

- 2.3 why the 'so'?
- 2.5 from not form
- 4.2 bracket missing
- Ref 2464 insert 2008?
- RSA and 1502 to be added.

4. Queries on references (all marked in purple)

I have not done a full verification, as this would require sight of all the references used, but where I feel there is a possibility of a mistaken reference I have flagged this up for you to check.

- Just curious. Will the full report be Ref 2500 – if so an 'issue number' would help.
- RSA 1993 not listed
- CoRWM 2006. (Several times in the report) This is the main report – but it could be mistaken for CoRWM document 2006 (I wonder what that is!). Can you use a different style – perhaps CoRWM report to Government 2006?
- Why has 'strategy' appeared in the title here?
- Is there 'National' in the title (Not in refs)
- Identifying this as '2007 UK Inventory' causes listing problem. Why not change to 'UK Inventory 2007'? (Several times)
- 2459 Please check that this is correct – 2459 is listed as relating to LOC (Could very well be correct)
- 3.1.3 and 3.2 Insert reference?
- Is there an 's' in the title (see listing)
- 1502 not listed
- Can you insert a reference to the Hanford work?
- 4.4 ref to be inserted
- 5.2 Ref?
- Ref list. Three items (2007, BNG and CORWM 2006) are out of place
- EA2008a Please check the '06'
- HSE are parts IIA and B relevant?
- NDA 2009 The word 'national' is included where referenced in the text. Which is correct? (see above)

5th January 2009

ANNEX B – E-MAILED COMMENTS

NuLeAF (Fred Barker)

Thanks for opportunity to comment on the outline report. The comments below are officer comments, as your deadline for comments does not allow time to take a report through the NuLeAF Steering Group. Our comments are as follows:

1. CONTEXT

The comment about the potential need for more than one GDF is timely (p7). Government's preference for a single GDF is becoming embedded as a firm assumption in the industry's forward planning (see for example use of the assumption in the NIA application to justify new nuclear power stations, Ch 5).

Specifically with regard to potential new build wastes it should be remembered that there is a decision process to be gone through with local host communities about whether new build wastes should be disposed of in the GDF. There may, for example, be spatial constraints on the potential size of a repository in the volunteer area that militate against the disposal of new build spent fuel to a GDF in that location.

2. STORAGE SYSTEM APPROACH

The comment about the need for a 'storage system' approach is welcome (p12). The linkage between storage and disposal systems must also be considered. It is important, for example, that assessments of the 'mini-store' concept pay due regard to the requirements of disposal to a GDF.

3. STRATEGIC APPROACH

The call for a more strategic approach is welcome in principle (p12), but would benefit from further elaboration, taking into account the latest thinking in the NDA's topical strategy review on development of a strategy to manage interactions with the MoD, British Energy and small users. We understand that NDA wishes to develop a more integrated approach to avoid programme risks and optimise scheduling and costs.

It would be helpful if CoRWM could clarify whether it envisages that a more strategic approach would necessarily involve a move towards consolidating treatment and/or storage at a smaller number of sites.

4. TRANSPORT

The commitment to examine transport issues in CoRWM's 09/10 work programme is welcome (p14). Issues around transport modes, infrastructure, regulation and scheduling will be of considerable interest to NuLeAF and its member authorities.

5. PSE ON STORAGE AND TRANSPORT

There is no doubt that engagement through the NSG and SSGs will need to be supplemented to ensure adequate engagement with local authorities when proposals are being developed to move wastes for processing, storage or disposal (p15).

6. PSE

The call for a coordinated PSE approach may be welcome in principle (p22), but would benefit from further elaboration about what this might mean in practice. For example, does CoRWM think that NDA should assume a greater coordination role, covering its own PSE initiatives and those by SLCs, MoD and BE? If so, how might this work in practice, and how might it be adequately managed and resourced?

Nuclear Directorate of HSE (Joyce Rutherford and Neil Blundell)

1. Executive Summary. We agree with the recommendation concerned with the need for better strategic co-ordination and suggest that the final report could consider the means by which this could be achieved.
2. Executive Summary and section 3.9.4. The recommendation concerned with the provision of more information to stakeholders could be extended to include the need for more focussed and clearer explanations of the issues. In addition it is important that this section recognises that the disclosure of information will be subject to security considerations (see OCNS guidance on disclosure on the ND website).
3. Page 6 Definitions. We suggest that the definitions for "conditioning" and "packaging" should be brought more in line with IAEA definitions in which conditioning encompasses immobilisation and packaging (i.e. containment).
4. Page 8 Section 2.1 4th bullet. This section puts too much emphasis on direct disposal. There may be a need for early decommissioning (for example due to safety considerations) and therefore there may be a need for buffer storage of the resultant waste.
5. Page 9 Section 2.3 2nd bullet. Storing in raw form needs to be balanced against additional factors, in particular passive safety and progressive hazard reduction.
6. Page 9 Section 2.4. This section should be reworded to reflect the fact that the joint guidance on RWMCs is neither mandatory nor prescriptive, but sets down the regulators view of relevant good practice.
7. Page 13 Section 3.4 3rd Bullet. "Safety standards" should be replaced by "relevant good practice for the management of radioactive waste...."
8. Page 13. Section 3.4 6th bullet. This should be reworded as follows: "The UK regulatory system for regulating the storage of radioactive waste has been benchmarked against the WENRA Safety Reference Levels (SRLs) and the results subject to international peer review by regulators from other WENRA countries. The degree of compliance with the SRLs has also been benchmarked for three UK radioactive waste stores and the results also peer reviewed."
9. Page 13 Section 3.4 8th bullet. This should read: "the regulatory process for radioactive waste is described in the joint guidance on the management of higher activity waste." Also the next bullet should read: "an example of how this process works in practice..."
10. The recommendations concerned with contingent storage strategies could be usefully included in the executive summary.
11. Page 17 Section 4.2 5th bullet. This statement could be subject to misinterpretation; THORP is not considered at present to be limited from a design/operational viewpoint.

Environment Agency (Clive Williams)

The Environment Agency's suggestions at this stage are as follows:

- Para 2.4, 2nd bullet should clarify that RWMCs relate specifically to management of radioactive waste during the pre-disposal period - including considerations about eventual disposability.

- Link the areas in Paras 2.4 and 2.5 e.g. along the lines, "Where appropriate, information from LoCs are expected to form part of the RWMC" and emphasise that the RWMC (rather than the LoC) is the basis for a regulatory decision.

- Section 3 should clarify whether the report will cover waste locations that are not "stores" as such, but may be or are being suggested to house (raw) wastes for some periods e.g. fuel element debris vaults, reactor voids.

- Section 3.2 or 3.3.1 of the final report should highlight the need to evaluate disposability and avoid reworking of wastes.

- Para 3.4, 7th bullet should say that the environment agencies contribute to HSE's statutory regulation of storage facilities (rather than "EA and SEPA also regulate..."- as represented in the HSE/EA/SEPA Joint Guidance referred to in the 8th bullet. EA and SEPA regulate disposals and discharges of radioactive waste (including any releases from stores). Final sentence of the 7th bullet should indicate that the EA's Radioactive Substances Regulation Environmental Principles (REPs) are currently being finalised following consultation, to set down a framework for all of the Environment Agency's activities involving radioactive substances regulation.

-Amend Para 3.4, 9th bullet, 2nd sentence (MEP issue) to read, "Localised and slight protrusions can be seen...". Next sentence delete "swelling" insert "protrusions".

- Para 3.4, 10th bullet should say, "...the regulators recognise that more attention **might need** to be paid to controlling the atmosphere in some stores..."

Thanks for the opportunity to comment. We look forward to reviewing the full draft report.

Greenpeace (covering email from Jean McSorley)

In general these are brief comments. On issues which may be contentious (but on which we await more detail from CoRWM) we may not have made comments, but this does not signal agreement. In particular, we would like CoRWM to note Greenpeace's ongoing concern over disposal and the environmental, financial, technical and social risks/issues (among others) - which attach to disposal. However, as part of the very important debate on safe and secure interim storage we welcome CoRWM's work on this matter.

Comments have been made as tracked changes. Greenpeace welcomes the inclusion of security as an issue for discussion in this paper. However, we have concerns over the way the options on plutonium have been presented. We make comments on this.

ANNEX C – NDA TRACK CHANGE EXTRACTS

EXECUTIVE SUMMARY

Strategic Co-ordination

- in all the areas considered in this report (waste conditioning and packaging, waste storage, waste transport, the management of spent fuels, plutonium and uranium) there is a need for better strategic co-ordination across all the UK nuclear industry organisations, civil and defence.
- the NDA has made a good start for its sites, with its “strategy management system”, and its increasing co-ordination with the Ministry of Defence is welcomed. However, the NDA is necessarily focused on its own strategies.
- *CoRWM recommends to Government that UK-wide strategies be developed for:*
 - *the management of higher activity wastes (including, their conditioning, packaging, storage and transport)*
 - *the management of all spent fuels*
 - *the management of plutonium*
 - *the management of uranium*
 - *R&D on all the above topics.*
- *we also recommend to Government that priorities be established for strategy development and implementation, so that UK resources can be targeted where they will do most to improve safety, security and the protection of the environment, in the short term and the long term.*

Comment [P1]: Need to be clear on the role of Government in setting policy and agreeing public sector strategy, but influencing private sector strategy.

Public and Stakeholder Engagement

- CoRWM has found from its own PSE activities that the issues covered in this report are not well-understood outside the technical community that deals with them on a day-to-day basis. Both lay people and technical people who are not expert in these areas have difficulties in finding information in accessible forms, and thus are not well-equipped to become involved in consultations and decision-making.
- there have also been instances where the past PSE activities of other organisations have been unsatisfactory, and there are gaps in future plans.
- *CoRWM recommends to Government that more information be made publicly available on the management of higher activity wastes, spent fuels, plutonium and uranium, and on R&D, and that a co-ordinated PSE approach be developed to ensure that there is sufficient stakeholder participation in decisions on these topics, at national, regional and local levels.*
- *There is a particular need to explore the potential for making information available to the public about how the security of stores for radioactive wastes, spent fuels, plutonium and uranium is assured.*

Comment [P2]: Is “appropriate” rather than “more” a better description?

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1.3 Context

- CoRWM 2006 recommendation 2: robust interim storage must play a part in the long-term management strategy for higher activity wastes; due regard should be paid to reviewing and ensuring the security of stores, store longevity, prompt immobilisation of wastes, minimising the need to repackage wastes, implications for waste transport [CoRWM, 2006].

- Government response: accepted recommendation 2, required the Nuclear Decommissioning Authority (NDA) to take the recommendation into account in the review of interim storage of wastes it was conducting to fulfil a commitment in its Strategy [Defra et al, 2006; NDA Strategy, 2006].
- NDA National Radioactive Waste Storage Review: scope, relationship to this report, conclusions as to immediate actions required [NDA, 2008a; NDA, 2009].
- Context for spent fuels, plutonium and uranium: NDA strategy development work and December 2008 paper to Government on plutonium management options [NDA, 2008b-h].
- Geological disposal: CoRWM understands the Government's preference for a single geological disposal facility (GDF) for all legacy and committed wastes, including any spent fuels, plutonium and uranium that are declared to be waste. However, until potentially suitable sites have been identified, we think that it is too soon to determine whether a single GDF is the safest and most cost-effective solution, and that the NDA should be flexible in its approach. When we refer to a single GDF in this report it is only for simplicity of wording.

Comment [P3]: Scottish Government policy?

2.3 Future Conditioning and Packaging

- our understanding from waste producers is that not all the "raw" (ie unconditioned) wastes in store now will require conditioning; subject to obtaining a Letter of Compliance (see Section 2.5), some could be placed in drums or boxes, with or without compaction, in order to make a stable, solid waste form for storage and subsequent disposal.
- there is an advantage in storing some ILW in raw form: it allows radioactive decay so that at least a portion of the waste can be dealt with as LLW. This advantage needs to be balanced against the disadvantages of additional waste handling, and the best option chosen for each type of ILW.
- much of the ILW arising in future, especially from reactor decommissioning, is inert and stable and could probably be packaged without conditioning.
- for mobile or potentially mobile wastes there should be prompt immobilisation, ie conditioning should take place as soon as reasonably practicable after waste arises [CoRWM, 2006]. There is also a need to condition reactive wastes promptly, to put them in more chemically inert form.
- there are a few legacy wastes for which it is not possible to carry out immobilisation as soon as they have been retrieved from their current locations. This is because it is urgent to retrieve the wastes but further R&D is needed before a suitable conditioning method can be identified. In such cases there is no option but to place the wastes in raw form in a buffer store, pending conditioning for longer term storage and disposal [CoRWM docs 2436, 2459].
- for all legacy wastes the approach adopted is to condition and package them in ways that are "fit or purpose", rather than delaying their retrieval and treatment indefinitely while the best possible method is sought [CoRWM doc 2436].
- cement-based matrices have been used for so much of the ILW conditioned to date because of their advantages (ease of use, compatibility with potential backfilling materials for a geological disposal facility, porosity to gas, cost etc) [CoRWM doc 2459].
- other conditioning materials and methods are being considered for the future for some wastes, eg vitrification for sludges and other "wet" ILW; hot pressing

Comment [J4]: Suggest that this position is described as an opportunity. Unlikely to apply to all ILW.

of ion exchange resins, dewatering ion exchange resins and packaging them without further conditioning [CoRWM docs 2459, 2419].

- role of the NDA Higher Activity Wastes Strategy Working Group in co-ordinating future work on conditioning and packaging issues across NDA and other nuclear sites (and mention other and previous co-ordination mechanisms).

Comment [j5]: R&D work will be co-ordinated via the Nuclear Waste Research Forum

2.5 The NDA Letter of Compliance Process

- role of NDA waste package specifications and LoC process as a risk management method and precursor to the setting of waste acceptance criteria for geological disposal [CoRWM docs 2459 & 2464; NDA, 2008k].
- how the LoC process works [NDA, 2008i, j & k; Nirex, 2007].
- how specifications have changed with time [CoRWM docs 2397, 2386; NDA, 2007a].
- questions have been raised about the target container life of 500 years in the current waste package specifications. This is based on the potential for, a geological disposal facility being kept open for a significant period (up to 300 years), in such a way that waste packages could be easily retrieved. We plan to examine the whole topic of “retrievability” in 2009/10 [CoRWM doc. 2515].
- progress in issuing LoCs: 14% ILW has final LoC, 29% is within the LoC process and 57% has yet to be addressed (conditioned waste volumes from 2007 UK Inventory) [CoRWM doc 2459; NDA, 2008j & l].
- NDA reviews of LoCs issued to date [CoRWM doc 2459; NDA, 2008j].

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2.8 Proposed Conclusions and Recommendations on Waste Conditioning and Packaging

- we welcome the moves to improve co-ordination of waste conditioning and packaging and related R&D throughout the UK (for example via the NDA Higher Activity Wastes Strategy Working Group and the Nuclear Waste Research Forum (NWRF)).
- however, these moves are relatively recent and current approaches are still fragmented. There is a need for greater coordination at a strategic level, involving not only the NDA but also the other major waste producers (British Energy and MoD), and all the relevant regulators. Although current NDA led groups involve other organisations, their focus is NDA strategy. What is needed is a strategic approach for all UK waste conditioning and packaging, so that each organisation makes the best use of its resources.
- the joint regulatory guidance is valuable, and will become more so as more technical guidance is added.
- the LoC process is a good one but improvements are needed in a number of areas, most of which the NDA has in hand.
- conclusions and recommendations on R&D to be added.

Comment [j6]: This Group is mostly focussed on developing NDA Strategy but members of this Group also attend the NWRF.

3.2 Plans for Future Storage Arrangements

- refer to NDA national waste storage review for full information, summary is as follows.
- Sellafield – have plans for 5 new stores, one of which is a replacement for the Vitrified Product Store, and two of which are, or soon will be under construction. In general, Sellafield adopts a 50+50 approach for new stores (ie the structure

Comment [j7]: Sellafield Ltd have confidence that the stores operational lifetimes could be extended to 100 years (subject to safety reviews).

has a 100 year design life and the equipment a 50 year life, extendable for another 50 years with refurbishment or replacement). Some of the existing stores would require refurbishment or replacement to achieve a life of 100 years from the time at which they began operating.

3.3.1 Storage System Approach

- recent developments have highlighted the need for a “storage system” (or “whole store”) approach, in which the contributions of various components and operations to the robustness, safety and security of storage arrangements are considered.
- the waste form, its container, the building structure, the ventilation system, the handling equipment, the monitoring and inspection regime and the maintenance and refurbishment regime all have roles to play and “safety functions” to fulfil.
- different storage concepts place different degrees of reliance on the various components. For example, most existing modern stores in the UK have massive concrete structures, but the newer “mini-store” concepts rely on massive containers and these are used in some other EU countries.
- not every component need last for the whole design life of a storage system. It is acceptable to plan to replace or refurbish various components (eg cranes, the outer cladding on buildings or even whole buildings).

Comment [j8]: The mini-store concept is actually a waste package, which should still require a waste store. Ministores may be only suitable for certain sites.

3.6 Transport of Higher Activity Wastes

- at present there is almost no transport of higher activity wastes in the UK. Unused fuel is transported from Springfields to the power stations and spent fuel is transported from the power stations to Sellafield. There is also transport of LLW from various sites to the LLW Repository.
- implementation of geological disposal would entail the transport of over 200,000 packages of higher activity waste from existing nuclear sites to wherever the GDF or GDFs are located. NDA estimates that the number of annual movements involved could be ten times the number of movements of spent fuel to Sellafield. It has work in hand on potential transport modes and scheduling, in preparation for discussions with communities that express an interest in hosting a GDF [CoRWM doc. 2397]. We will be looking at this work as part of our 2009/10 work programme.
- the transport regulator is the Department for Transport (DfT), but OCNS regulates the security of [radioactive materials](#) transport. Our discussions with DfT showed that there are issues to be resolved about the appropriateness of current transport regulations for bulk waste transport, the need to maintain and improve transport infrastructure, and the choice of modes of transport [CoRWM 2406]. We will be examining these in our 2009/10 work programme.
- DfT and their counterparts in other countries have recognised that the current international and national regulatory frameworks for the transport of radioactive materials are based on assessment of proposed transport packages and arrangements a short time before transport will occur. In the case of radioactive wastes destined for geological disposal, transport will take place decades after the wastes have been conditioned and packaged. There can be no guarantee [without adequate management](#) that a waste package designed

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for transport now will be suitable after decades in store. Not only could the package deteriorate but also regulations may **change**. These are also issues we will examine in our 2009/10 work programme.

Comment [P9]: This comment applies to all regulatory fields where planning needs to start well ahead of the eventual activity. Care needs to be taken not to imply the way ahead is therefore to do nothing, other than to react to adverse events.

4.1 Magnox Fuel

- the long-term management of Magnox fuel is the responsibility of the NDA. It is addressing it via a “topic strategy” in its strategy management system [CoRWM doc 2418].
- the current reference strategy is to reprocess all Magnox fuel. Details are given in the current, eighth, edition of the Magnox Operating Plan (MOP8) [NDA, 2007b]. This involves storing some Magnox fuel in some shutdown reactors for several years, and completing reprocessing of Magnox fuel by early 2017. About 5,000 tonnes (heavy metal) of Magnox fuel will be reprocessed in the future.
- all of the Sellafield plant used for Magnox reprocessing is old. Considerable effort is expended on maintaining this plant and keeping it running for as long as is practicable.
- NDA is reviewing alternative management strategies for Magnox fuel, with the aim of producing one or more viable contingent strategies for use should MOP8 fail for any reason [CoRWM doc 2418].
- three management methods have been identified as potential contingencies for the failure of MOP8 [CoRWM docs 2520 & 2533]:
 - encapsulation of the fuel in a suitable matrix (eg a polymer or a type of cement), then geological disposal
 - reprocessing through THORP, with geological disposal of the ILW and HLW, and management of plutonium and uranium products
 - drying the fuel, placing it in canisters for **dry** storage, then **appropriate treatment, e.g. overpacking followed by** geological disposal.

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4.2 AGR Fuel

- there are two tranches of AGR fuel, one which was loaded into reactors prior to the restructuring of British Energy (ie prior to midnight on 14 January 2005) and one afterwards. These are known as the “historic AGR fuel” and the “new AGR fuel” [CoRWM doc. 2419].
- about 75% of the historic AGR is contracted to be reprocessed at Sellafield, either as part of the THORP baseload or subsequently. The remainder is contracted to the NDA to store or reprocess, **as is appropriate**.
- all the historic AGR fuel and the wastes and products of reprocessing it (HLW, ILW, plutonium and uranium) are owned by British Energy and are its liability. British Energy has contracts with the NDA to store the wastes and products but has no contracts covering their disposal. These remaining “uncontracted liabilities” are to be paid for out of British Energy’s Nuclear Liabilities Fund [CoRWM doc. 2419]. These arrangements are unaffected by the takeover of British Energy by EDF [CoRWM doc. 2489].
- British Energy has a contract with the NDA to manage all the new AGR fuel, including that arising from any extensions to the lifetime of AGRs. The new AGR fuel becomes the property of the NDA when it arrives at Sellafield and

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there is no residual liability for British Energy after this time. [Subject to appropriate agreement](#), it is at the NDA's discretion whether to reprocess the new AGR fuel [CoRWM doc 2419]. However, any use of THORP beyond its baseload would require the agreement of the Government, who are committed to a public consultation on the issue.

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- the limited lives of THORP and related plant mean that it will not be possible to reprocess all AGR fuel. The NDA is developing an oxide fuels reference strategy, which will set out how much is to be reprocessed and what is to be done with the rest. The [NDA aims to have](#) one or more contingent strategies [available over the next few years](#).
- dry storage of AGR fuel at Sellafield is being considered as part of a contingency. R&D is required on drying of AGR fuel, and on its geological disposal [CoRWM doc 2389, 2520 & 2533]. For dry storage there are a number of options that could be used, all of which are used in other countries for oxide fuel [CoRWM doc 2418].
- there may be stakeholder [concerns](#) about storage of large quantities (several thousand tonnes) of AGR fuel at Sellafield for long periods.
- there are short-term issues for management of AGR fuel that may affect what can be done in the long term. In particular, [optimising pond storage needs to be reviewed](#) at Sellafield, with pond water chemistry to minimise corrosion of AGR fuel awaiting reprocessing or drying. This [may entail](#) changes in the operating regime in the THORP Receipt and Storage Pond [CoRWM doc 2520].

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Comment [P10]: Not evidence based, suggest turn round to a general statement about engaging stakeholders in plans and options.

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4.3 Sizewell B PWR Fuel

- spent fuel from the Sizewell B PWR is British Energy's responsibility. It is currently stored in the pond but the plan is for dry storage on site to begin [in](#) 2015. There are no plans to reprocess this fuel but neither will it be declared to be waste in the near future [CoRWM doc 2419].
- British Energy has a major project in hand to assess dry storage options. The front runner is cask storage in a simple building, with passive ventilation. If it were decided to declare the fuel waste and to dispose of it, the casks [may](#) be used to transport the fuel to a geological disposal facility, where [it is proposed](#) the fuel would be removed and placed in canisters (eg of copper) for emplacement, without any special conditioning. The option of exploring dry storage of Sizewell B fuel at Sellafield has not been ruled out but there are likely to be difficulties with capacity and timing [CoRWM doc 2419].
- there is considerable international experience of dry storage of PWR fuel to draw on, particularly in the US, and there has been R&D in a number of countries on geological disposal of PWR fuel.
- there are stakeholder concerns about the security of [long-term](#) storage of spent fuel at Sizewell B.

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5.2 Uranium

- total UK civil holdings of uranium were 96,400 tonnes at the end of 2007. Almost all of this is depleted, natural and low enriched uranium. Less than 1.5 tonnes is highly enriched uranium (ie with 20% or more uranium-235). Uranium is held at various NDA sites, including Sellafield, Dounreay, Capenhurst and Springfields. Future arisings are estimated to be about 90,000 tonnes of depleted, natural and low enriched uranium [Defra & NDA, 2008].

- the NDA is exploring a range of strategies for managing the various forms of uranium. This follows a “macroeconomic study” published in 2007 [NDA, 2007c]. One strategy involves selling as much uranic material as possible for potential re-use, and minimising the quantity of uranium that is declared to be waste and has to be conditioned and placed in a geological disposal facility. The price of uranium is a major factor in strategy development for uranic materials and there is a close link with NDA’s work on the future of its Springfields and Capenhurst sites. In 2008 NDA regarded ~~ed~~ any uranium above around 0.3% enrichment as a potential asset, although this figure may change with the international uranium market and user demands [CoRWM doc 2418].

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