

# Treatment of Plutonium Contaminated Material at Sellafield

## *Stakeholder Workshop Report*



Michael Egan

QRS-1372A-TN3

Version 2.0

June 2007

Quintessa

# Document History

---

**Title:** Treatment of Plutonium Contaminated Material at Sellafield  
**Subtitle:** Stakeholder Workshop Report  
**Client:** British Nuclear Group Sellafield Limited  
**Document Number:** QRS-1372A-TN3

---

**Version Number:** 1.0 (Draft for BNGSL Review)      **Date:** June 2007  
**Notes:** Contractor-approved draft for customer verification check  
(originally issued as QRS-1381A-TN2)  
**Prepared by:** Michael Egan  
**Reviewed by:** Ray Kemp

---

**Version Number:** 1.0      **Date:** June 2007  
**Notes:** Issued to BNGSL for wider distribution to stakeholders.  
BNGSL Document Reference added.  
**Prepared by:** Michael Egan  
**Reviewed by:** Alan Paulley

---

**Version Number:** 2.0      **Date:** July 2007  
**Notes:** Version for publication following comments from workshop  
participants.  
**Prepared by:** Michael Egan  
**Reviewed by:** Alan Paulley

---

**Approved by:** Michael Egan



# Preface

Following the recent renaming of the management company for the Sellafield site, and the accompanying rebranding of British Nuclear Group Sellafield as Sellafield Ltd, information within this document that refers to British Nuclear Group Sellafield should now be taken to apply to Sellafield Ltd.

Given that the work described in this report was initiated prior to the change of name, no attempt has been made here to alter names in order to reflect the rebranding. Despite the change of name, the information itself nevertheless remains relevant and correct.

July 2007



## Summary

BNGSL is carrying out a review of treatment options for plutonium contaminated material with the aim of defining and selecting a preferred long-term management strategy for such wastes at Sellafield. As part of that review, BNGSL organised a stakeholder workshop at the Ennerdale Country House Hotel, Cleator Moor on 16 May 2007.

In recognition of the value of external independent expertise to guide, facilitate, audit and provide assurance for BNGSL's options assessment activities, this meeting record for workshop has been independently prepared by Quintessa. The note summarises the broad themes and main issues identified by participants and the outcome of subsequent discussions. It also presents a summary of the key messages and strategic recommendations emerging from the workshop.



# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
<b>2</b>	<b>Agenda and Attendees</b>	<b>3</b>
<b>3</b>	<b>Overview and Feedback</b>	<b>5</b>
	3.1 Discussions on Presentation Materials	5
	3.2 Group Discussions	11
	3.3 Other Issues	13
<b>4</b>	<b>Workshop Closure</b>	<b>15</b>
<b>5</b>	<b>Key Messages and Strategic Recommendations</b>	<b>16</b>
<b>6</b>	<b>References</b>	<b>20</b>
	<b>Appendix A : Workshop Participants</b>	<b>21</b>



# 1 Introduction

In line with the Nuclear Decommissioning Authority's (NDA) expectations to achieve reductions in the hazards and risks posed by legacy facilities and wastes on the Sellafield site, British Nuclear Group Sellafield Ltd (BNGSL) has dedicated significant resources to all areas of waste management. One important area is the treatment of plutonium contaminated materials (PCM).

PCM is generated as a by-product of the reprocessing of spent nuclear fuel. Within the UK, PCM exists at three NDA sites (Sellafield, Harwell and Dounreay) and at one other site (AWE Aldermaston) that is not owned by the NDA. The Sellafield site currently hosts more than three-quarters of the PCM from the civil nuclear programme in the UK.

Past reviews of the management strategy for PCM at Sellafield have resulted in the decision to construct and commission the Waste Treatment Complex (WTC) and to recover PCM from stores at the Low Level Waste Repository. Whilst significant progress in PCM management has already been achieved using existing treatment processes, there is a need to identify possible improved treatment options for the longer-term.

Among the drivers for reviewing the current treatment strategy is a recognition that significant volumes of PCM at Sellafield are in an unsuitable form for treatment via the WTC. In addition, concerns have been raised about the suitability of the conditioned wasteform for very long-term storage (such as is now envisaged in contingency plans for possible delays to the availability of a deep geological repository for final disposal). Moreover, experience has shown that the WTC is unlikely to provide sufficient operational capacity to address a requirement placed on operations following a regulatory review by the HSE's Nuclear Installations Inspectorate (NII) in 1999, which requires:

*"In respect of the facilities within the Sellafield nuclear licensed site, at least 90% of the total volume of all Plutonium Contaminated Material originating from operation prior to 1 August 2000 and which has been accumulated as radioactive waste shall be stored in a safe passive form by 1 August 2020."*

Based on this requirement, and taking into account other identified concerns, BNGSL is carrying out a review of treatment options for PCM with the aim of defining and selecting a preferred strategy for the longer term. The scope of the review incorporates: (i) PCM that already exists at Sellafield; (ii) PCM that is arising from current site operations; and (iii) future PCM that is expected to arise from decommissioning (which

is expected to have different characteristics from the other two categories). The review is being carried out in the framework of a Best Practicable Environmental Option (BPEO) assessment.

As part of the assessment process, BNGSL organised a stakeholder workshop at the Ennerdale Country House Hotel, Cleator Moor, on 16 May 2007. The objective of the workshop was to ensure that the values and concerns of local stakeholders in respect of the management strategy for PCM were identified, so that they could be reflected in the BPEO study and taken into account in the technical appraisal of strategic options.

In recognition of the value of external independent expertise to guide, facilitate, audit and provide assurance for BNGSL's options assessment activities, this meeting record for the May workshop has been independently prepared by Quintessa. The note summarises the broad themes and main issues identified by participants and the outcome of subsequent discussions. It also presents a summary of the key messages and strategic recommendations emerging from the workshop. A draft version of the workshop report was made available to meeting participants for verification prior to being distributed more widely and being published on the BNGSL website.

In what follows, Section 2 outlines the agenda of the workshop and its participants. Section 3 then provides an overview of feedback from the presentations on PCM management by staff from BNGSL, as well as the outcome of the group discussions. Additional, more detailed points that arose from the discussions are also described. Summary points and reflections from the final session of the workshop are recorded in Section 4. Finally, in Section 5, the overall key messages and strategic recommendations from the workshop are collected together and summarised. These, coupled with some of the more detailed points arising from the day, will be taken forward in framing the more detailed technical options assessments to be undertaken by BNGSL.

Appendix 1 provides a list of workshop attendees.

A parallel strand of the consultation process has been the publication and distribution (primarily via BNGSL website<sup>1</sup>) of public information and briefing notes, together with a questionnaire, intended to provide the opportunity for written contributions from other stakeholders as feedback to the review process. A separate report [Ref: 1] summarises the outcome of feedback from the web-based consultation process.

---

<sup>1</sup> [http://www.britishnucleargroup.com/content\\_nm.php?pageID=2108](http://www.britishnucleargroup.com/content_nm.php?pageID=2108)

## 2 Agenda and Attendees

BNGSL hosted the event, which was independently chaired by Dr Ray Kemp (Ray Kemp Consulting Limited). The names and affiliations of participants are listed in Appendix 1. Organisations represented at the meeting are listed in Table 1. It is relevant to recognise that participants included three main groups:

- ▲ representatives from local organisations and related bodies whose views were particularly being sought by BNGSL;
- ▲ observers (regulators in particular) who were interested to see the proper and transparent involvement of stakeholders on PCM issues; and
- ▲ industry representatives, who were there to provide support and information to support the deliberations of other workshop participants, as required.

**Table 1: Organisations Represented at the Symposium**

Allerdale Borough Council	Environment Agency	Quintessa Limited
AWE Aldermaston	Gen II	Sellafield Churches Forum
BNGSL	HSE	Sellafield Staff Unions
Copeland Borough Council	Isle of Man Government	Sellafield Trade Unions
Cumbria County Council	NDA	UKAEA
Department for Transport	NuLeAF	

The format of the day was that much of the morning and a small portion of the afternoon session was taken up with presentations by BNGSL staff. These expanded upon material that was already included in the published stakeholder information documents, but the nature of the presentations were that they provided an opportunity for commentary, questions and discussion on matters that were raised. The Agenda for the workshop is given in Table 2. In practice, the meeting did not quite follow the defined timescales, but the overall flow of the meeting was broadly as reproduced here.

**Table 2: Workshop Agenda**

Time	Item	Speaker	Time	Item	Speaker
09.30 – 10.00	Arrivals & Refreshments		12.30 – 13.15	Lunch	
10.00 – 10.05	Welcome	Ray Kemp	13.15 – 14.15	Assessing the Options	B. Lotay (BNGSL)
10.05 – 10.25	Introduction	J. Storer (BNGSL)	14.15 – 15.15	Group Discussions	
10.25 – 11.25	Background to PCM Issues	B. Lotay and C. Smith (BNGSL)	15.15 – 15.30	Refreshment Break	
11.25 – 11.45	Refreshment Break		15.30 – 16.00	Feedback from Group Discussions	R. Kemp
11.45 – 12.30	Outline of Preliminary Options Assessment	B. Lotay (BNGSL)	16.00 – 16.30	Concluding Discussion and Comment	R. Kemp

At the start of the meeting, the facilitator asked participants to identify any specific themes that were of particular interest to them in terms of the development of PCM management strategy for Sellafield. Responses included the following:

- ▲ Security and potential terrorist attack;
- ▲ Overall strategy and final disposal of the conditioned wastes;
- ▲ Community issues and possible community benefits linked to PCM management;
- ▲ Transport;
- ▲ Relationship between Aldermaston and other site strategies for PCM;
- ▲ Responsibility for waste arisings.

For BNGSL, John Storer welcomed the participants and noted the importance of addressing the PCM issue as part of the long-term strategy for the site, recognising the importance of Sellafield to the regional economy, and within BNGSL’s overall commitment to working openly with its key stakeholders and members of the public.

## 3 Overview and Feedback

This section provides an overview of the day's proceedings and the main issues and concerns that were identified in discussions. These include matters that arose following the presentations on PCM management by staff from BNGSL. Additional, more detailed points that arose from the discussions are also described.

### 3.1 Discussions on Presentation Materials

The opening presentations were intended to set the scene, by providing background information on the management of PCM at Sellafield, together with BNGSL's approach to the options assessment. It was underlined that the main purpose of the day was to provide a formal opportunity for stakeholders to contribute to the framing of the more technical option studies that would follow, by identifying important strategic principles and goals.

Key areas of discussion, prompted by the presentation materials, included:

- The relationship between management of Sellafield PCM and that from other sites;
- The current management of PCM at Sellafield;
- Regulatory and NDA positions on PCM management at Sellafield; and
- Approach to options assessment

The main points raised under each of these headings are summarised below.

#### *Sellafield's and Other Sites' PCM*

The following points were raised concerning the relationship between the management of PCM at Sellafield and at other UK nuclear sites.

- ▲ It is intended as part of the current options study to make a technical evaluation of the extent to which processes developed for Sellafield PCM might be sensitive to treatment of PCM waste streams from Harwell and Dounreay. In general, the diversity of waste materials at Sellafield (and the corresponding processes required for treatment) is greater than elsewhere and is anticipated to encompass the characteristics of other sites' wastes. However, BNGSL is aware that the issue of potential waste transports opens up much wider questions than those associated with technology alone.

- ▲ It was noted that AWE Aldermaston had recently undertaken an options study and defined a site strategy for the management of its PCM. The strategy assumes that all wastes will be treated and packaged for final disposal on site. Options at the Dounreay and Harwell sites remain open, and NDA is seeking to achieve an overall national perspective across its sites. The recently-established PCM working group of NDA is intended to assist with such co-ordination.
- ▲ UKAEA Harwell has not explored in depth the possible treatment of its PCM at the AWE site, owing to the desire to maintain a separation between civil and military PCM.
- ▲ It was generally recognised that the possible transfer of wastes from other sites to Cumbria is a sensitive issue, and is not solely a question for West Cumbria. Whilst the argument of economies of scale may point in one direction, the general objective of minimising waste transport (especially for unconditioned wastes) tends to have a contrary effect.
- ▲ From a safety regulator perspective, HSE does not exclude the possibility of treating other sites' PCM wastes at Sellafield. However, no additional waste should be brought to Sellafield unless it can be shown that Sellafield waste will be safely and appropriately managed.
- ▲ From a planning perspective, the policy of Copeland Borough Council<sup>2</sup> is currently only to allow for waste arisings from the Sellafield site. Cumbria County Council is generally supportive of industry operations at Sellafield, but questions whether the movement of other waste materials into the county brings appropriate benefit, commensurate with the scale of development and the intergenerational effects. Further discussion would need to take place on such issues; as yet, discussions on the question of compensatory benefits, or off-sets, have not commenced in any detail.
- ▲ More generally, it was agreed that waste management options that have the flexibility to address broader strategic goals, beyond the Sellafield site itself, should not necessarily be foreclosed. A national decision on the siting of a

---

<sup>2</sup> Following the workshop, and subsequent to legal advice on a separate planning decision, it was announced that Copeland Borough Council will no longer act as the principal authority for deciding new planning applications for Sellafield. However, it is expected that Copeland will continue to be entitled to pass comments on waste handling applications submitted to Cumbria County Council (*Whitehaven News*, 7 June 2007).

geological repository for higher activity wastes could also have an influence on decisions on the centralisation of waste treatment and storage.

### *Current Management of PCM at Sellafield*

A number of questions were raised following the presentation by BNGSL of the current management arrangements for PCM at Sellafield. These led to the following observations and clarifications:

- ▲ It was confirmed that the current throughput at WTC is just over 2000 drums per year, which would imply a period of some 20 years in order to process current drums in stock at the site<sup>3</sup>. BNGSL is seeking to increase the rate, but it nevertheless remains less than the original planned plant capacity. Limitations to operational capacity are linked to issues associated with reliability, secondary waste handling (principally the liquor in 'squeezate' from the compactor, and the lack of redundancy in the WTC's design (one processing train only).
- ▲ One participant raised the question of whether the operating philosophy of the stores and WTC was part of the problem in relation to reliability of the waste processing. For example, drums are typically handled manually within stores, but are then transferred to control under (potentially less reliable) remote handling systems within WTC. It was suggested that unnecessary design constraints should be avoided in future technology choices, in order to ensure greater reliability in the risk reduction measures they are designed to implement.
- ▲ The Letter of Compliance process that was undertaken by Nirex for the WTC product includes an evaluation of wasteform performance in relation to the safety case for transport of the packaged wastes to a repository. Long-term integrity of the product is an essential component of the overall evaluation process, within the aim of ensuring that it will be suitable for handling and transport prior to final disposal.

---

<sup>3</sup> Not all existing drummed wastes are treatable via the current process, owing to limitations associated with the Letter of Compliance from Nirex (now integrated into NDA's Radioactive Waste Management Directorate), which place limits on a number of parameters, including plutonium isotopic ratio and fissionable mass. Moreover, questions regarding the long-term stability of PVC (which can degrade to form corrosive liquids) in the treated waste form have led to some concerns about its suitability for very long-term storage.

- ▲ BNGSL staff reported that corrosion is observable on a number of older PCM drums. Whilst most of the observed corrosion appears to have started on the drum external surface, 'a handful' of drums exhibit corrosion that appears to have started from within the drum. These have been re-bagged and over-drummed.
- ▲ There are uncertainties associated with the degree of physical containment provided for PCM stored in crates, as well as in their plutonium content (and that of a number of oversized drums).
- ▲ It was underlined that there are no current plans for how filters and crates would be prepared for treatment using the WTC process.
- ▲ AWE Aldermaston is able to take advantage of operating experience from WTC in developing its own site solution for PCM processing and treatment.

### *Regulatory and NDA Positions on PCM at Sellafield*

The presence of representatives from regulatory bodies and NDA enabled a number of issues raised in the presentation by BNGSL to be explored more broadly. In particular, this gave an opportunity for local stakeholder representatives to seek feedback from regulators and NDA on the nature of constraints that are faced in determining a preferred management strategy for PCM at Sellafield. Key points raised in this discussion were:

- ▲ The planning authority (Cumbria County Council) plays a formal role, alongside the regulatory authorities, in the process of defining and developing necessary facilities to implement a preferred management strategy. The importance of this role was not particularly well highlighted in the original consultation document.
- ▲ HSE is supportive of actions taken to date by British Nuclear Group to respond to the Licence Instruments from 2000. In particular, it was noted that the most problematic PCM stores at the time of the 1999 review had now been cleared and the wastes now stored in modern standards facilities. The focus is now on the goal for 2020 – the reduction of hazard through converting existing PCM in store to a passive wasteform. Nevertheless, it is acknowledged that the process of achieving this may involve a number of steps and iterations – an appropriate strategy does not necessarily have to mean moving directly from 'raw waste' to 'complete passivity' in a single step.
- ▲ The requirement to retrieve PCM from the former 'magazines' that has been used as PCM stores at the site of the Low Level Waste Repository near Drigg

was not included as part of the 2000 licence instrument; nevertheless, this process is also now close to completion.

- ▲ Environment Agency expectations for PCM management relate not only to the generation of a passive wasteform, but to achieving an appropriate overall strategy, consistent with wider goals including long-term management. There is a dynamic tension between the requirements for short-term hazard reduction and long-term passivity. In avoiding unnecessary future burdens, as well as reducing present-day hazards, it is important that risk-informed priorities are identified. A joint statement on this issue has been prepared by the regulators and this was reflected in BNGSL's presentation.
- ▲ NDA understands that storage arrangements for treated wastes will probably need to be consistent with planning for up to 100 years' storage (consistent with CoRWM advice), even if the repository programme is planned to take a considerably shorter time to implement. The overall objective is disposability, albeit with allowance made for possible delays in the process.
- ▲ The Department for Transport representative emphasised that 'disposability' of the final waste form involves considering not only the behaviour of the package in the repository but requirements for transport to the disposal facility. The NDA Radioactive Waste Management Directorate recognises this, and seeks to encompass such considerations in the Letter of Compliance process.
- ▲ Participants noted that the discussions had indicated a need for BNGSL's study to consider options in terms of the overall PCM waste management strategy – not just a technical comparison of waste treatment processes. It was therefore important to be clear about what are the key elements of such a strategy.

### *Approach to Options Assessment*

Feedback was invited on the preliminary options assessment that had been outlined by BNGSL in the presentation materials. Comments from participants ranged from detailed suggestions regarding the evaluation attributes used in comparing options, to the overall structure of the comparison exercise. These included:

- ▲ It was noted that several of the techniques identified by BNGSL in its review of waste treatment processes could not act as complete solutions on their own, and should not therefore be directly compared one against another. It might be necessary to consider treatment options for particular types of PCM, and to determine the most effective way of combining these within an overall strategy for achieving a common desired endpoint.

- ▲ In addition, it was recognised that a comprehensive strategy might involve several steps in operations – not just a single step from raw waste to a conditioned final wasteform. It was therefore necessary to decide whether the most efficient approach would be to compare overall strategies or to examine and compare their component parts.
- ▲ It was suggested that a ‘do nothing’ option (essentially based on the existing WTC and storage arrangements) would fail to meet regulatory requirements; nevertheless, it may be valuable to include in the analysis because it would help to demonstrate the extent of possible benefits from alternative strategies.
- ▲ BNGSL should consider whether the feasibility and success of particular treatment options might be dependent on additional factors (such as improved characterisation of the wastes). If this were the case, then those factors should be built into the relevant option as part of the overall management strategy.
- ▲ Suggestions for possible additional evaluation attributes to be considered in the analysis included:
  - Enhancement of security;
  - Hazard reduction;
  - Timeframe for implementation;
  - Burden on future generations;
  - Non-active (as well as active) effluents from the treatment process;
  - Lifetime Costs;
  - Flexibility to accommodate different types of waste;
  - Contingency against failures;
  - Hazards from possible malfunctions of the process; and
  - ‘Strategic Fit’ (i.e. extent to which a process or technology provides a comprehensive treatment from raw waste to final wasteform)
- ▲ It was suggested that there should be a comprehensive initial screening of options – based on feasibility considerations – to reduce the number taken into account in the more detailed analysis. It was also recognised that the current WTC wasteform provides a benchmark for final wasteform quality – it was difficult to think of circumstances in which an alternative would be accepted if the disposability of final wasteform was not as good as the current situation.
- ▲ It was noted the waste management hierarchy – reduce, reuse, recycle, dispose – is relevant in developing an integrated approach to waste management.

However, it was considered that the hierarchy is perhaps more directly applicable to the lifecycle management of future waste arisings than to BNGSL's management of 'legacy' PCM wastes. Moreover, it was pointed out that to demonstrate that wastes formerly classified as PCM would meet criteria for free release to enable their re-use or recycling may be very challenging. Nevertheless, there may be some possibilities for recycling or re-use of certain materials (e.g. lead) elsewhere on the site, and such possibilities should be taken into account.

- ▲ The possible desirability of thermal treatment options was discussed. BNGSL noted that its principal advantages are a significant reduction in volume for certain waste streams and the degradation of PVC to a form where it was much less likely to release aggressive chemical residues. Even though advanced thermal treatment techniques are very different from standard incinerator technology and these could potentially offer worthwhile benefits, it has to be recognised that there are public concerns regarding the location of any facility using these technologies.

## 3.2 Group Discussions

Following the presentations by BNGSL on the current status of PCM management at Sellafield, and the associated discussions on issues raised by the material made available, the stakeholder representatives broke into three discussion groups, with the aim of tackling specific questions posed by the facilitator. These were:

1. From your perspective, what key aspects should an overall PCM management strategy account for?
2. How should alternative possible strategies be assessed?
3. Which criteria/attributes are important to the assessment of options?
4. What should be the ongoing process for engagement?

The different groups worked independently, and the discussions progressed along different paths in each case. Each group presented a summary of its discussions in a final plenary session. Rather than presenting the outcomes from each group separately here, the aim in what follows is simply to summarise the major themes that arose.

### *Framework for Planning PCM Management*

- ▲ There needs to be a 'joined up' national framework for exploring PCM management options at different sites, so that it is not simply left for BNGSL to define what might ultimately become the UK strategy from the 'bottom up'

through local solutions. The national strategy should take into account a comprehensive range of drivers, including hazard reduction, long-term safety and integrated environmental impacts. The work of the NDA's working group on PCM management in determining a national strategy needs to be made open and transparent.

- ▲ In the light of the NDA's national remit, there should be a fair and transparent apportionment of the social, environmental and possible economic impacts associated with waste handling across the country. This demands a sophisticated approach to determining the balance between costs and benefits, recognising social costs and the need to achieve local acceptability. A clear understanding of the relevance and implications of the proximity principle needs to be developed, coupled with development of principles for compensatory benefits, or off-set measures.

### *Themes for Strategy Development and Options Comparison*

- ▲ The management strategy that is developed for Sellafield PCM should identify potential problems associated with short-term constraints, with explicit recognition that urgent actions may foreclose options at a later stage. The 2020 deadline associated with the NII's 1999 review and subsequent requirement is recognised as being very challenging. This could be taken to imply a bias towards more technically mature treatment processes in order to provide a desired level of robustness. Moreover, meeting the deadline may mean that it is not possible on the same timescale to achieve a final wasteform (for all raw wastes) capable of meeting requirements for disposability. Safety and environmental regulators are now providing a clearer account of their positions on such matters, but further exploration of and clarification of the implications of NII's Licence Instrument may well prove beneficial.
- ▲ Recognising the factors that influence the determination of an 'optimum' strategy does not necessarily mean that it will necessarily become the preferred strategy. Issues such as (for example) public perceptions of safety and transport, and the need for public acceptance, will have a role to play in decision making, even if not explicitly incorporated into the options appraisal itself.
- ▲ Consistency with the overall site decommissioning strategy is particularly important at Sellafield, for example in terms of ensuring that necessary facilities, and the area of land that they require, can be accommodated. Early discussions with planning authorities and regulators on proposals for land use will be important.

- ▲ The cost of waste processing should not be relegated as a side issue. From a national perspective, for example, cost factors may lead to the conclusion that treatment on site is not the most effective option for sites other than Sellafield. However, 'transport costs' associated with the movement of untreated wastes may also be significant.
- ▲ Key technical criteria identified in the group discussions were:
  - Technical feasibility;
  - Proof of technology;
  - History of operation at scale required for Sellafield PCM;

New, untried technologies would need additional Government support. It is not clear whether seed funding would be available for such developments, but the possibility should be explored.

- ▲ Consideration should be given to providing a capability for good quality assay and waste minimisation at source, at the time of initial handling of the raw waste, rather than at the point of entry into the waste treatment process.

### *Feedback on Engagement*

- ▲ The workshop was recognised as being a useful idea – providing opportunities for early engagement. The quality of the consultation documents was also seen as being good. However, such engagement needs to have clearly specified objectives and should ideally take place more than once in order to provide effective contributions to the overall decision process.
- ▲ Key strategic issues need to be drawn out for presentation to, and discussion by, local stakeholders and members of public. The focus needs to be on issues that are relevant to the audience's interests. In this respect, it was felt by some that the presence of a relatively large number of industry representatives at the meeting meant that the focus of discussion was sometimes at too complex a technical level, rather than on higher-level strategic concerns.

## 3.3 Other Issues

In addition to the broader comments summarised above, a number of other issues were identified during the course of the day's discussions.

- ▲ The possibility of using **portable waste treatment facilities**, which could be moved between sites, was raised. In response, staff from BNGSL acknowledged

that concepts for such facilities exist, but there are currently no practical examples in terms of the technology that might be applicable for treatment of PCM.

- ▲ Accepting wastes (including PCM) from other NDA sites for treatment at Sellafield would have implications for **assumptions regarding site End States**. As far as the current NDA exercise on site End States is concerned, the initial aim is to take a broad brush perspective on overall goals – detailed specification of transfers between sites will happen over time. However, from a local community perspective, taking wastes from other sites involves the inevitable consequence of pushing back the date when NDA’s programme of site restoration work is complete. This, in turn, is a source of local authority concerns relating to local community benefits.
- ▲ As part of the site’s overall waste strategy, and important consideration can be the development of **improved ‘upstream’ processes**, re-visiting existing current operating methods in order to reduce the volumes of future raw waste arisings and to enhance their suitability for processing into a final waste form. For example, the contents of the 200 litre drums are currently un-sorted PCM; management opportunities may exist for segregation and minimising future wastes (and perhaps even for existing drummed wastes).
- ▲ One participant suggested that BNGSL’s public literature relating to **risks from radiation exposure** (including possible exposure to PCM) should emphasise that estimates of harm from low-levels of exposure are typically based on precautionary assumptions, which are adopted for the purposes of radiological protection.

## 4 Workshop Closure

The workshop itself ended with some brief reflections on the day by the facilitator, Ray Kemp. He noted that:

- The presence of so many industry representatives was perhaps understandable in so far as it may be an indication of a certain level of nervousness within some circles about public processes such as these. It had inevitably made a difference to the nature of the workshop, as noted by one of the discussion groups, but there was also a very positive side in so far as it had enabled a broad cross section of industry employees to have the opportunity to listen to what stakeholders are saying.
- In deliberative processes, it is important not to prejudge the views of others, and to recognise that certain constituencies (perhaps especially pressure groups) might have taken a different perspective from the others who were able to take part on the day. This should not be forgotten in moving forward with the process in this particular case.

A final round of remarks was then invited from participants, eliciting the following comments:

- It is important for BNGSL and NDA to take people along with them. This demands careful leadership, because no-one is going to be rail-roaded into decisions that are simply seen as being 'best' for the industry.
- BNGSL were urged to ensure that the technical implications of future management decisions on waste management strategies are fully explored and understood before commitments are made. Some participants felt that the experience with WTC is an example of this – the plant had been 'shoe-horned' into an existing building, with ambitious automated remote-handling capabilities, and (apparently) insufficient redundancy to assure sufficient reliability in its operation.
- From BNGSL's side, there is a recognition that the transition to a more open form of decision making and sharing information with stakeholders is an important process that has only recently been embraced by the industry. There is, however, a will to 'do the right thing' and to learn from these processes. An independent evaluation of the process surrounding the work on PCM strategy development is taking place and the lessons learned will be fed back into company learning.

## 5 Key Messages and Strategic Recommendations

The primary objective of the workshop was to identify key messages and strategic recommendations that need to be taken into account as the options assessment work is carried forward by BNGSL. In particular, any reflections that could have an influence on the framing of the options appraisal, when viewed from a strategic perspective, would be particularly relevant to how the next stage of the work is undertaken. The recommendations that follow are drawn by the author from the records of the workshop and, following review by workshop attendees, represent an agreed outcome of discussions on the day.

In what follows, the outcomes are divided into two main categories: (a) broad recommendations that are relevant to the overall framing of the strategic review being undertaken by BNGSL; and (b) other key messages that can influence how the review is carried out.

### *Framing the Assessment of Strategic Options*

1. There was substantial consensus regarding the need for BNGSL to carry out its **site-based decision processes in the context of a well-defined and understood national framework**. It is not BNGSL's role to determine whether or not it is appropriate to consolidate PCM processing from all the NDA sites at a single location, nor to negotiate appropriate levels of community benefit commensurate with the scale of development and the intergenerational effects. These (and related decisions on national strategy for integrated waste management) need to be coordinated by NDA a higher level, and on the basis of a fair and transparent apportionment of the social, environmental and possible economic impacts associated with waste handling across the country.
2. As far as the current exercise led by BNGSL is concerned, **the focus is necessarily on management options for Sellafield PCM**, but there is an opportunity to consider whether the choices that are made for Sellafield might be sensitive to alternative national strategies for similar wastes from Dounreay and Harwell. Strategic options that have the flexibility to address broader goals, beyond the Sellafield site itself, should not necessarily be foreclosed. However, accepting wastes (including PCM) from other NDA sites for treatment at Sellafield is recognised as having implications for the completion of the NDA's programme of site restoration work; i.e. achieving the site End State. This, in turn, is a source of concerns relating to local community benefits.

3. It would appear that benefit to the process would be obtained if further **clarification of the requirements of the NII's 2000 Licence Instrument** could be provided, particularly in the light of the latest joint statement from HSE and the Environment Agencies concerning the management of legacy wastes. This is central to the overall objectives of the strategy development process, since it establishes a major constraint on the available options. A key issue at stake is the **extent to which achieving a "safe passive form"** for the wastes by the 2020 deadline should be taken as being equivalent to achieving a final wasteform, capable of meeting requirements for disposability, or whether an alternative objective for demonstrating hazard reduction might be contemplated. In this respect, there should be an explicit recognition that urgent actions could foreclose options at a later stage.
4. Against this background, it needs to be recognised that **a comprehensive PCM management strategy can involve several operational steps** – not just a single processing step from raw waste to a conditioned final wasteform. It is therefore likely to be important for BNGSL to conduct its strategic review on the basis of **an identified and agreed prioritisation of hazard reduction objectives** for existing wastes in store. At the time of the original (1999) regulatory review, there was a particular emphasis on poor records (and therefore uncertainty) regarding the some of the older drums and crates, and a recognition of hazards associated with package deterioration. The Environment Agency has noted that improved characterisation is a key issue, particularly from the viewpoint of making informed risk decisions. In addition, BNGSL has identified the current storage arrangements for filters and crates, as well as high liquor content drums, as **potentially justifying (temporary) short-term action to mitigate immediate hazards and risks**.
5. Linked to the above, a number of participants commented that the options comparison undertaken by BNGSL needs to be more than simply a parallel comparison of a number of different treatment processes and technologies. Several of the techniques identified by BNGSL in its review of waste treatment processes are not capable of acting as complete solutions on their own, and should not therefore be directly compared one against another. It might be necessary to **consider treatment options for particular types of PCM, and to determine the most effective way of combining these within an overall strategy for achieving a common desired endpoint**. Key dimensions of the options analysis may therefore prove to be the classification of waste streams capable of being processed by technologies, the extent of pre-treatment that may be required in order to achieve such processing, and the development of the overall strategy over time, ahead of achieving a final disposable wasteform.

6. In defining a management strategy, it was noted that BNGSL would need to consider whether the feasibility and success of particular treatment options might be dependent on **additional or improved 'upstream' processes** (such as improved characterisation of the wastes). If this were the case, then those factors should be built into the relevant option as part of the overall management strategy. In addition, there may be scope for re-visiting existing current operating methods in order to reduce the volumes of future raw waste arisings. Consideration should be given to providing a capability for good quality assay and waste minimisation at source, at the time of initial handling of the raw waste, rather than at the point of entry into the waste treatment process.

Notwithstanding the above, the workshop participants did not identify any major strategic constraints on the options assessment process. There are perhaps a number of reasons for this, not least that processing of Sellafield PCM is essentially an on-site activity, which has important implications for safety and security but limited direct impact on the local community or environment. In addition, a major constraint on the overall process is the 2000 Licence Instrument from HSE, which has potentially significant implications on the choices that need to be made.

### *Other Key Messages*

- Consistency with overall site strategy is an important consideration at Sellafield, not least because of constraints on space and infrastructure to develop facilities. However, in order to ensure reliability in the chosen strategy, unnecessary design constraints should be avoided in relation to future technology choices, as this might hinder the overall achievement of risk and hazard reduction.
- Storage arrangements for treated wastes will probably need to be consistent with planning for up to 100 years' storage (consistent with CoRWM advice). This is consistent with assuming that a geological repository will become available, but not necessarily within the strategic planning assumption of 2040.
- In conducting the options assessment, there should be a comprehensive initial screening of options – based on feasibility considerations – to reduce the number taken into account in the more detailed analysis. There was a strong steer from the group to consider proven technologies that are achievable at the operational scale required for Sellafield PCM within acceptable timescales.
- Possible evaluation attributes to be used in conducting the options assessment (beyond those described by BNGSL in their preliminary evaluation) include:
  - Enhancement of security;

- Hazard reduction;
  - Timeframe for implementation;
  - Burden on future generations;
  - Non-active (as well as active) effluents from the treatment process;
  - Lifetime Costs;
  - Flexibility to accommodate different types of waste;
  - Contingency against failures;
  - Hazards from possible malfunctions of the process; and
  - Extent to which a process or technology provides a comprehensive treatment from raw waste to final wasteform
- In terms of process, participants appeared to value the opportunity of engaging with BNGSL and other industry representatives on the issue of PCM, but would like to have had more discussion and less presentation material. In order to do this, BNGSL needs to progress its evaluation further before re-engaging with the participants. As noted above, the extent of industry interest in the issue may also be better accommodated with a separate workshop or dialogue session in the next round of engagement on the issue.

## 6 References

- [1] Paulley A (2007). *Treatment of Plutonium Contaminated Material at Sellafield: Assessment of Feedback from Stakeholder Questionnaire Responses*. Quintessa report for BNGSL, QRS-1372A-TN4 Version 1.0 (BNGSL Document Reference: RP\_LP SERP-000\_PROJ\_00139\_V1).

## Appendix A: Workshop Participants

### Local Stakeholders and Related Bodies

F. Barker	NuLeAF
P. Croft	Gen II
F. Duffy	Copeland Borough Council
S. Gorman	Cumbria County Council
P. Kane	Sellafield Trade Unions
P. McKenna	Isle of Man Government
H. Rooms	Sellafield Trade Unions
L. Shepherd	Allerdale Borough Council
T. Stoddard	Cumbria County Council
M. Swift	Prospect (Sellafield Staff Union)
P. Wilson	Sellafield Churches Forum

### Industry / Regulators

M. Beaman	HSE (UK Safeguards Office)
D. Brazier	Environment Agency
P. Burrows	HSE (Nuclear Safety Directorate)
M. Calloway	NDA
K. Dickens	NDA
R. Griffin	NDA
R. Guppy	NDA
S. Harrison	AWE Aldermaston
A. Jackson	NDA
A. Mowat	UKAEA Dounreay
C. Nixon	NDA
P. Orr	Environment Agency
D. Varley	UKAEA Harwell
S. Whittingham	Department for Transport

### BNGSL

S. Burns
P. Clark
L. Cook
J. Davies
B. Lotay
I. Marr
A. Pearson

C. Smith

J. Storer

R. Thied

S. Williams

**Facilitation Team**

D. Collier, Quintessa Associate

M. Egan, Quintessa

R. Kemp, RKCL