Meeting:	NuLeAF Steering Group, 13 April 2011
Agenda Item:	5
Subject:	Draft Response to Government Consultation on Plutonium Management
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Purpose:	To propose a response to Government consultation on plutonium management

Introduction

This report covers:

- The current position on plutonium management
- Options for plutonium management
- The Government's preliminary policy view
- A draft response to the Government's consultation questions

Recommendation

That the Steering Group approves the proposed response to the Government's consultation on plutonium management.

Contribution to Achieving Strategic Objectives

NuLeAF does not have a strategic objective on the specific issue of plutonium management. The most relevant existing strategic objective is:

- If proposals for new nuclear build continue to move forward, promote debate and thinking about the ways in which this could be done to the benefit of nuclear legacy management and in accordance with the Polluter Pays Principle, including how a more coordinated 'across site' approach could be taken in locations that have or are proposed to have multiple licensed nuclear sites.

1 Background

The Government launched the consultation on 7 February with a deadline for comments of 10 May. The consultation document is available on the DECC website at Management of the UK's plutonium stocks.

Members will recall that DECC gave a presentation to the January 2010 Steering Group meeting on the background to Government thinking on plutonium management. A copy of the presentation is available on the NuLeAF website at SG 2010 papers. As a result of discussion, it was noted in the minutes "that although there will be a range of views on the best way forward amongst member authorities, there is likely to be agreement that a clear policy is needed".

2 Current Position on Plutonium Management

The UK is currently storing about 112 tonnes of civil separated plutonium in specialist facilities, mainly at Sellafield. This amount includes about 28 tonnes of material belonging to overseas customers. The plutonium stored in the UK has been derived largely from nuclear fuel reprocessing activities that have been ongoing at Sellafield since the 1950s. The bulk of the UK's material is owned by the Nuclear Decommissioning Authority (NDA) and a smaller amount by British Energy (a part of EdF Energy).

3 Plutonium Management Options

The Government does not favour continued long term storage because it would still require permanent disposal at a future date, and would leave a burden of security risks and proliferation sensitivities for future generations to manage on a continuing basis.

There are two main alternatives for managing plutonium in the long term: (a) through disposal as an immobilised waste or (b) through reuse in the form of mixed oxide nuclear fuel (MOX) which, after use as fuel in nuclear reactors, leaves spent fuel in a state where it can be prepared for permanent disposal. The disposal of immobilised plutonium or irradiated MOX fuel has yet to be demonstrated in practice.

There are various technologies that might be used to immobilise plutonium, prior to its disposal. However, the Government argues that there is currently no immobilisation technology that can reasonably and reliably be used to manage *all* of the plutonium. It adds that in general the immobilisation technologies that would realistically need to be pursued for the quantity of civil plutonium in the UK are less mature than that of a reuse option.

The Government points out that the reuse option is being pursued by the US and Russia as the method that will be used to manage their excess weapon grade plutonium. It notes that the manufacture of MOX fuel has been undertaken in France with reactors in France capable of using the fuel, and to a limited extent elsewhere in Europe and Japan. UK experience has, however, been much less successful: the Sellafield MOX plant has produced a small fraction of its original target with around 15 tonnes, as completed fuel assemblies, produced in its 9 years of operation against an original target of 560 tonnes over an expected 10 year operational life. Any new MOX plant would have to be developed in light of the design and operational lessons drawn from these differing experiences overseas and in the UK.

Government also points out that MOX fuel has some value. This can be used to offset the costs of converting the plutonium into MOX. However, the Government's current expectation is that, at current uranium prices, the value of the fuel generated is significantly less than the costs of its manufacture: in other words, for the foreseeable future, manufacture of MOX is primarily a route for consuming plutonium stocks rather than a commercial operation in its own right.

4 Government's Preliminary Policy View

Although there remain many practical issues to be resolved before any policy could be implemented, the Government believes that there is sufficient information available now to make a high level judgement as to the right strategic policy option for plutonium management. Rather than continuing to pursue all options with equal vigour, the Government proposes adopting a preferred solution, or preliminary policy view, and then taking forward work to progressively address the practical issues of implementation. This does not mean that work on alternative options will cease, only that the Government's focus would shift to the preferred option.

The UK Government's preliminary policy view is that proceeding on the basis that reusing plutonium either in the UK or overseas in the form of MOX fuel offers the best prospect to deliver a solution for long-term plutonium management.

The Government stresses that this preliminary view will be conditional in that it will have to be tested to show that it is affordable, deliverable and offers value for money, taking into account safety and security requirements, before it would be in any position to take a final view. Work is ongoing on both the reuse and immobilisation options in support of this. While the Government believes it has sufficient information to set out a direction and take a preliminary policy view, it is not yet sufficient to make a commitment to proceed with a new MOX plant. As well as being open to the prospect that other credible options develop and are more attractive, the UK Government would have to be sure that reusing the plutonium would continue to represent the best prospect for long-term plutonium management.

For those reasons, the Government takes the view that further ongoing work on the reuse option is necessary to be sure that such a direction can be taken forward. If the conditions above cannot be satisfied, it states that the option may need to be amended or abandoned. It also stresses that it is not closing off alternatives, particularly because immobilisation options will need to be worked up in any case, to deal with an expected small percentage of waste plutonium from the existing inventory that would not be re-usable.

5 Consultation Questions

The Government poses the following consultation questions:

1 Do you agree that it is not realistic for the UK Government to wait until fast breeder reactor technology is commercially available before taking a decision on how to manage plutonium stocks?

2 Do you agree that the UK Government has got to the point where a strategic sift of the options can be taken?

3 Are the conditions that a preferred option must in due course meet, the right ones?

4 Is the UK Government doing the right thing by taking a preliminary policy view and setting out a strategic direction in this area now?

5 Is there any other evidence government should consider in coming to a preliminary view?

6 Has the UK Government selected the right preliminary view?

7 Are there any other high level options that the UK Government should consider for long-term management of plutonium?

6 Proposed Response

1 Do you agree that it is not realistic for the UK Government to wait until fast breeder reactor technology is commercially available before taking a decision on how to manage plutonium stocks?

Yes, there are a number of significant drivers for change, including:

- the need for the ongoing refurbishment or replacement of specialist and costly plutonium storage facilities;
- uncertainties about the ageing processes that may affect plutonium in long-term storage;
- the finite life of packaging and the likely need for periodic re-packaging;
- the radioactive decay of plutonium to americium, which is more challenging from a dose and heat perspective, thereby making the plutonium more complex and costly to handle over time;
- the inherent un-sustainability of long-term storage with site clearance at Sellafield by 2120;
- the early need to more accurately characterise the inventory for eventual disposal to a geological disposal facility; and
- the responsibility of this generation not to defer difficult decisions and costs to the next generation.

These drivers provide significant reasons to implement options other than the continued storage of separated plutonium.

2 Do you agree that the UK Government has got to the point where a strategic sift of the options can be taken?

Yes, in principle, although we have comments on the actual strategic sift that is proposed.

As stated in our comments on the NDA's Plutonium Options paper in October 2008 (http://www.nuleaf.org.uk/nuleaf/documents/NDA_Plutonium_Options_Response_1_Oct_08.pdf), we agree that some of the specific approaches to immobilisation should be ruled out at this stage (namely immobilisation (a) with HLW in glass and (b) in cement).

We would also request that the Government clarify whether further consideration will be given to the potential use of Inert Matrix Fuel (IMF) in the on-going further work on the reuse option. We note the conclusions of the BNFL National Dialogue that IMF may offer significant advantages over MOX in terms of intrinsic proliferation resistance and enhanced disposability.

3 Are the conditions that a preferred option must in due course meet, the right ones?

We note the proposed conditions, that the preferred option:

- must be achievable and deliverable
- must be shown to be capable of meeting health, safety and environmental requirements as well as meeting non-proliferation and security objectives
- must demonstrate that it provides value for money and is of overall benefit to the UK.

We propose that a further condition be adopted by Government. This is that the preferred option be "capable of inspiring public confidence". The Government will note that this was the formulation set in CoRWM's original terms of reference for consideration of long-term management options for higher activity wastes.

As the long-term management of plutonium also raises substantive societal issues, we consider that such a condition would be appropriate. Note that we not intend this to mean that the Government should run a similar scale of public and stakeholder engagement to CoRWM in the period 2003-6. However, we do think that Government should consider how judgements might be reached about whether a "capable of inspiring public confidence" condition has been met.

Subject to this additional proposed condition, we consider that, at a very high level, the proposed conditions appear to be the right ones. However, we would welcome further clarification of: (a) what factors the Government intends to take into account to make judgements that conditions can be met (particularly on achievability and deliverability, and value for money and overall benefit to the UK); and (b) how judgements will be reached (including what assessments will be undertaken).

4 Is the UK Government doing the right thing by taking a preliminary policy view and setting out a strategic direction in this area now?

In principle, we think it appropriate that the Government takes a preliminary policy view and sets a strategic direction.

Nonetheless, we would also like to stress the importance of giving continued support to on-going work on alternatives, so that realistic contingencies can be developed should a preferred option ultimately not meet the conditions outlined above.

5 Is there any other evidence government should consider in coming to a preliminary view?

There is a need for Government to carefully consider how and when to seek the views of potential host communities and their local authorities with regard to:

- the siting process for a Geological Disposal Facility (GDF); and
- the potential use of MOX fuel in proposed new nuclear power stations.

On the siting of a GDF, as a starting point, potential host communities and their local authorities will wish to understand the implications of reuse and immobilisation options for (i) the design of a GDF and surface facilities, (ii) the size of the underground footprint, (iii) the period of operation of the GDF, (iv) the developing GDF safety case, (v) the number of required GDFs and (vi) the use of alternative disposal methods.

On the potential use of MOX fuel in proposed new nuclear power stations, as a stating point, potential host communities and their local authorities will wish to understand the implications

for (i) safety case development and licensing of a new nuclear power station, (ii) security arrangements for the transport, receipt and storage of fresh MOX fuel and for the interim storage and transport of spent MOX fuel, and (iii) the duration of the interim storage of spent MOX fuel at the nuclear power station site.

We note that consuming the bulk of the plutonium stockpile 'in situ' – in one or more dedicated MOX burning reactors on available land beside the Sellafield and NuGeneration Ltd sites in West Cumbria – could provide significant safety and security benefits compared to use in other new nuclear power stations that may be built in other parts of the country.

It will be important for Government to give careful consideration to the impacts that potential approaches to plutonium management are likely to have on local confidence in GDF siting and/or construction of new nuclear power stations.

6 Has the UK Government selected the right preliminary view?

There are a range of views amongst NuLeAF member local authorities about whether the Government has selected the right preliminary view.

Notwithstanding this, we wish to propose that Government give closer consideration to the pros and cons of moving forward more promptly with the immobilisation of that proportion of the plutonium stockpile that is unlikely to be reusable as a reactor fuel. We suggest that this consideration focus on the potential for producing a 'low specification MOX' waste form using the existing Sellafield MOX plant (SMP). We would encourage the Government to publish the results of this further consideration.

This proposal takes account of the Government's view that:

- the technology to make 'low specification MOX' pellets is well developed (para 3.25);
- it may be possible to adapt the existing SMP to produce some 'low specification MOX', but there would not be enough remaining design life for it to be used to convert the *entire* UK stockpile (para 3.32).

7 Are there any other high level options that the UK Government should consider for long-term management of plutonium?

See the comments above about IMF (response to Q2) and a 'low specification MOX' waste form (response to Q6).