Respondent Details

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Q1

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

Response

NuGen agrees that the UK Government should identify a final solution for long-term plutonium management for the reasons given in the consultation document:

1) It avoids the need for the continuous replacement of current plutonium storage facilities and significant security and other non-proliferation measures - a situation that would not deliver any progress towards a final solution and leaves a burden for future generations to manage.
2) It will formulate a national strategy on long term plutonium management, which will better mitigate the risks of proliferation, especially during storage before irradiation; and enhance the protection of the environment, workers and the public.
3) Finally, it would consider the possible resource value of the material.

The development and commercialisation of fast breeder reactors, which has focused worldwide mainly on sodium-cooled fast reactors, has not been as successful as expected. With nearly six decades of experience, there is clear evidence of a significant learning curve from a technical point of view, but this is still not sufficient to develop a new fleet of commercial fast reactors with the requisite operational performance. This said, it does not mean that commercial fast breeder reactors will not be a reality in the future (GEN-IV research and development programs) but there is little to support a firm view about the timescales for the emergence of commercial scale fast breeder reactors versus the timescales within which the UK Government may wish to come to a final decision regarding plutonium stocks.

Considering all the points made above, NuGen supports the UK Government's decision to consider the interests of future generations by analysing all the reasonable options for its future handling of the UK's plutonium stock taking account of all relevant issues regarding safety, security, non-proliferation, availability, technical maturity and cost.

NuGen also broadly agrees with the UK Government's position in the consultation that waiting for commercial fast breeder reactor technology to be available is not a realistic position to take because of the uncertainty over the period of time that this may take.

Q2

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

Response

The amount and scope of work that has already been undertaken by the Nuclear Decommissioning Authority (NDA), jointly with international experience, leads NuGen to consider that the current level of UK nuclear industry knowledge is appropriate to determine a preliminary view on the approach for plutonium long term management. The NDA has already published a credible options analysis (NDA Plutonium Topic Strategy) with a stated purpose of defining credible options and analysing these to allow focus on those that have the greatest chance of being achieved in a foreseeable timetable.
Taking into account all the work undertaken to date and the present state of knowledge, NuGen considers it appropriate for the Government to come to a preliminary policy view at this time.

Q3
Are the conditions that a preferred option must in due course meet, the right ones?

Response
NuGen considers, in general, that a progressive approach starting by adopting a preliminary view and developing understanding of this option in order to progress towards a preferred option is the right one.
For this purpose, further work needs to be done in order to suitably address the remaining uncertainties until reaching the point of taking a final decision that is widely acceptable.
The UK Government lists the conditions that a preferred option must meet, in a comprehensive manner, as follows:

- It must be achievable and deliverable; there is little point pursuing an option that has little guarantee of success.
- It must be shown to be capable of meeting health, safety and environmental requirements as well as meeting non-proliferation and security objectives.
- It must demonstrate that it provides value for money and is of overall benefit to the UK.

NuGen agrees with these criteria.
In addition, the UK Government should, alongside developing the preferred option, pursue further final disposal research work. The UK Government itself states that this further research work into final disposal will need to be worked up in any case, to deal with an unspecified proportion of plutonium from the existing inventory (may be only a small percentage) that would not be re-used (at least in an economic way) and to deal with the particular characteristics of spent fuel that would possibly be generated if the MOX option is retained.
NuGen also agrees with the UK Government’s view that a better understanding is required of how much the re-use as MOX option will cost to deliver and how those costs may vary over time.

Q4
Is the Government doing the right thing by taking a preliminary policy view and setting out a strategic direction in this area now?

Response

NuGen agrees that taking a preliminary view on long-term management of the plutonium stock at this time corresponds to a responsible attitude from the UK Government, taking into account the burden this would place on future generations to continue to manage security and proliferation risks.
NuGen agrees that continued long-term storage leaves the plutonium in a form which is potentially accessible to diversion or theft, and this situation would fail to satisfy key criteria.
NuGen believes that setting out a strategic direction is a practical way to increase knowledge and reduce uncertainty in the options and to move towards a definitive long-term management solution.
While we support the Government in pursuing a preliminary option and setting out a strategic direction, NuGen would be concerned if
this approach resulted in a delay to current nuclear new build projects or resulted in an adverse impact on project economics for current new build projects.

Q5
Is there any other evidence government should consider in coming to a preliminary view?

Response
NuGen has not, at this stage, identified any other evidence. However, the UK Government must consider whether an individual option represents a complete solution for management of the plutonium stock. If not, the strategic direction would need to move to encompass a combination of options.

Q6
Has the Government selected the right preliminary view?

Response
NuGen agrees with UK Government that continued plutonium storage offers a safe and secure interim management for the short and medium term, but only until a decision on long term management is taken.
NuGen agrees that there are, in principle, two possible options for long-term plutonium management, namely: (1) re-use and, (2) disposal as waste.
The consultation document outlines the probable complexity and cost of the waste route. The consultation document also outlines the very significant energy resource that the stock of plutonium represents. NuGen considers, given the potential energy yield from the plutonium inventory that it is appropriate to examine ways to benefit from this, and it is reasonable that the focus of policy will be on assessing the re-use option.
Nevertheless, much work is pending in both noted directions. From the disposal route point of view, more efficient ways than current mature technologies (eg un-irradiated low specification MOX pellets manufacturing, immobilisation in cement) need to be researched and developed in parallel for plutonium disposal. In addition, final disposal options for MOX spent fuel (eg interim storage, encapsulation, final disposal in GDF) need to be researched and developed, since the issue of spent MOX fuel disposal would be a consequence of the re-use option.

Many uncertainties in the re-use option need to be resolved, starting with the amount of plutonium stock that is suitable for MOX
manufacturing without the requirement for additional chemical treatment. Significant work in the regulatory area - including Justification and GDA - and also spent MOX fuel disposal arrangements need to be addressed as the next steps in the proposed process. Finally, the economics would need to be demonstrated - both for the owner of the plutonium itself and for the reactor owner who might recycle it - taking into account as much the front-end as back-end fuel cycle stages.
Finally, NuGen considers that it is vital for the continued progress of the current nuclear new build power projects that the existing facilitative framework for nuclear new build is not re-opened or distracted by the potential for MOX use. There are many areas of the MOX re-use option to be investigated further before the implications for use in nuclear new build can be suitably addressed and this will ultimately take some time. Such issues as changes to the legislative framework, design and physical changes to the reactors and fuel route, and the necessary commercial arrangements for a MOX re-use option in nuclear new build should all be able to be incorporated at a later stage avoiding any impact on the current progress of nuclear new build development plans.

Q7
Are there any other high level options that the Government should consider for long-term management of plutonium?

Response
NuGen considers that, regarding civil purposes, the options to be considered have been identified in the consultation.