Respondent Details	
Name:	Brendan McNamara, Bruno Comby, Stephen Stretton, John McCone, Robin Smith, Elizabeth Cary, Mark Boules,
Organisation:	*EfN-UK is the UK branch of a world wide organization, Environmentalists for Nuclear Energy, (www.ecolo.org) with over 10,000 members in over 60 countries. Members include scientists, engineers, economists, environmentalists, politicians, and members of the public with interests in their energy future. Here we have drawn on expert sources on nuclear energy and the handling of radioactive materials. Members and participants in EfN activities do not represent their own organizations, except when they supply approved documents or official materials or references from them.*

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The consultation document sets out the Government's proposed approach to the longer term management of the UK's plutonium stocks for public scrutiny and consultation. Comments on any aspect of this issue are welcome, but the key questions posed in this consultation are:

No	Question
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	**EfN-UK disagrees with the terms of this question:** Fast Breeders will take a long time to mature. Current designs have a very low excess breeding rate so fleet sizes would grow slowly. It is clearly not realistic to wait for something which may be a very long time coming. The question really means, 'Should one continue the previous policy of prevarication in the hope that something will turn up?' **EfN-UK understands that there are many valuable options for the use of this Plutonium now and in the immediate future. What is realistic for the UK Government is to declare the Plutonium stocks to be a valuable national resource which must be managed as such. The NDA/SLC should be instructed not to treat, manage or describe the stocks as a 'Zero Value Asset'.** **This should also apply to various stocks of recovered and Depleted Uraniums.**
Q2	Do you agree that the Government has got to the point where a strategic sift of the options can be taken?
Response	**EfN-UK absolutely disagrees that the UK Government or its advisors have gotten to this point:** All options discussed by the NDA lead to deep disposal in a Geological Disposal Facility (GDF), including the favoured one time use as MOX and burial in the GDF. The strategic shift indicated in the Consultation documents and advised by the NDA takes no account of existing or emerging technologies, especially Fusion which opens up many new uses. A shift from these Disposal options is indeed essential but the next step has to be a wider technical review of smarter options. This may require an international panel to provide a step back from entrenched UK views. The Gen-IV/GIF panels on future reactors is far more limited in scope than the IAEA INPRO group (International Project on Innovative Reactors and Fuel Cycles) which should be a primary source of information on nuclear futures. The Royal Society has also supported the Once-Through-Then-Out (OTTO) fuel cycle of one burn and geological disposal of Spent Fuel, which is rejected by the rest of the world as a total waste of most of the available nuclear energy. The Royal Society also ignored any predictions of the scale of nuclear power which is needed and is now emerging. In addition, all reactors breed Plutonium as the fuel burns,

	giving a smaller net reduction in MOX Plutonium to be buried. The idea that Spent MOX is a secure form for disposal is misplaced since here, or anywhere else, it could still be diverted to make very nasty radiation bombs. The cost estimates for diluting the stored Plutonium Oxide with Uranium Oxide into useable MOX reactor fuel make assumptions which distort the result. MOX is currently more expensive than reactor fuel made from enriched Uranium because the Spent Fuel from which the Plutonium is extracted has to be chemically processed first. For the UK stocks this has already been done, at considerable expense. We are therefore only looking at the back end, or post separation part, of the MOX production process for these UK stocks. However, the NDA cost estimates of a plant to do just this part are all assigned to the processing of these Plutonium stocks rather than the trivial fraction of the costs of a modern plant with a 50 year working life. This is consistent with the underlying assumption that no recycling will ever be done in the UK again. The Thermal Oxide Reprocessing Plant, THORP, has been an engineering failure. A similar failure by complexity occurred with a highly roboticised US plant. Areva has been successful in France, helped design the new Japanese plant at Rokkasho, is advising the US and collaborating on the build of new recycling plants, and is in discussions with the reprocessing teams at Sellafield. A cost effective plant can and should be built in the UK. **EfN-UK would suggest that the much simpler, post separation part of a MOX plant be built first if this Plutonium were to be used as MOX.** The brief consultation statements on how MOX may be used provide a slanted view of the value of the fuel in this form. The UK needs many more reactors than the few planned at present and all of them can use MOX fuel even to the 100% level. The rate at which the Plutonium stocks could be entered into the reactor fuel cycle could be much faster than stated and would continue for many years. There are many scientific papers on recycling, up to 17 times in PWR reactors, to get very high final usage of the fissile materials. **The value to consumers of the electricity generated, at 10p/kWh, is about £60Bn. The Plutonium stock is very far from worthless.** A strategic shift is needed towards a coherent plan for many centuries of nuclear power in the UK will include our own recycling. Decisions on the small Plutonium stocks cannot be taken in isolation. In a properly run regime, Plutonium may not actually be separated from Spent Fuel but recycled with the recovered reactor Uraniums and an addition of some fresh fissile materials. In the light of events in Japan, Libya, and the Middle East, the safety and security of the Plutonium stocks should be re-examined with more scenarios tested in detail so that all paths to a nasty result are included. United Arab Emirates has ordered 4 reactors from S. Korea and leads the way for all the Gulf states to sell their oil at much higher prices than their own nuclear energy. Decisions based on a continued low price for Uranium will meet the same fate as those surrounding oil, natural gas, and even coal prices. Long term planning for Plutonium stocks must be put in a long term framework of global energy development. **EfN-UK would agree that a well informed strategic shift of policy on Plutonium stocks is needed but that the Consultation shows that the UK is not ready yet.**
Q3	Are the conditions that a preferred option must in due course meet, the right ones?
Response	**EfN-UK says 'NO': We do not accept that the conditions of the Consultation are**

	<u>the right ones or the relevant ones:</u> The conditions quoted are the obvious ones of feasibility, safety, and value and should of course be included in considering any options. However, as shown above, their implementation is already compromised by the narrow vision presented in the Consultation and other conditions are more relevant. A great global shift in energy supply and usage is underway. The UK cannot afford to stand by as a client for all the new technologies and resources but must engage its own industry, intellect and innovation in the changes. The UK must also demonstrate a higher level of control of the Security of these Plutonium stocks and the security implications for each option. **EfN-UK has identified many such opportunities for the UK to use the reactor grade Plutonium stocks, so options should be evaluated by these more productive standards of overall benefits to Britain in jobs, investment, creativity, and skills and capabilities in this commercial world.**
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	EfN**<u>-UK says, 'NO': The Government is not doing the right thing NOW:</u>** All the options described in the Consultation lead to a requirement for a lot more research and development on techniques for handling the material on its way to a GDF. **EfN-UK observes that scarce R&D money and University training would be used on a distant project whose design and scale are due to change dramatically before it is completed. Other immobilization strategies for radioactive materials will be required.** **EfN-UK assesses that the Government does not yet have a sufficiently broad list of options on which to take a preliminary view. The analysis is too weak to pick a strategic direction.**
Q5	Is there any other evidence government should consider in coming to a preliminary view?
Response	**<u>EfN-UK says 'Yes'. We have substantial evidence of new and better alternative uses of this Plutonium:</u>** We have made much of the impact of Fusion on possible uses of the Plutonium stocks. The international Fusion programme achieved breakeven energy generation in experimental facilities in the 1990s, lead by the JET experiments at UKAEA Culham Laboratory. The international programme has narrowed to one 500MW reactor facility, ITER, which could develop and exercise all the needed technologies for electricity generation by 2050. However, Small Fusion reactors are now possible using the existing technologies and materials. These are based on another world leading experiment at Culham, MAST, which is a compact, or more Spherical version of the JET Tokamak. By virtue of it's tighter magnetic curvature it performs better than JET results would predict for such a small device. This is an important development which has generated over 100 papers in 3 years, from over 20 related devices, at Fusion meetings around the world. A new UK company, Tokamak Solutions, has been established to design and build a range of Spherical Tokamak Neutron Sources which are useful to a wide set of possible commercial applications. Substantial technical investments in these

	prospects are being made in Russia, China, and even Brazil. Many recent media articles outline the goals of the company. The details are of course proprietary or awaiting Patent approval. Useful Fusion is no longer 40 years away. Laser Fusion is also an early candidate for Fusion applications. **EfN-UK understands that there are many ways in which reactor grade Plutonium, including the Pu-240 component, can be used with Fusion Neutron Sources. This implies that the whole activity on Plutonium stocks should enter another level of technical review.**
Q6	Has the Government selected the right preliminary view?
Response	**<u>EfN-UK has to give a definite 'No':</u>** Putting re-use at the top of the list is a step away from the unacceptable plans to designate it as dangerous waste to be put beyond use in a GDF. The use of this Plutonium as MOX fuel has been described with great reluctance, so the likely 'preliminary view' is already in doubt and must leave Ministers and MPs in an uncertain position. The UK will be accepting and licencing reactors from EdF/Areva and Toshiba/Westinghouse whose views and expertise on nuclear fuels are different from those in this Consultation. Although they are vendors with a vested interest in selling reactors their views should be sought on this issue, in substantial technical detail. As the issues are rather long term they may not wish to be drawn in at this time.
Q7	Are there any other high level options that the Government should consider for long-term management of plutonium?
Response	**<u>EfN-UK says 'Yes': There are many high level options to be considered:</u>** The emergence of small Fusion reactors brings completely safe, sub-critical Hybrid Fission-Fusion breeder reactors much closer to reality. **EfN-UK suggests that some Plutonium stocks, or even weapons grade Plutonium, be reserved to start these machines rather than Fast Fission Breeder Reactors.** **EfN-UK believes that a well prepared UK plan for Plutonium stocks could be an important contributor to negotiations on Nuclear Security. The IAEA Nuclear Proliferation Treaty is no longer suited to a world wide use of Nuclear power by assorted types of government. Following the confluence of disasters at Fukushima, the global safety and security of all plants in the nuclear fuel and energy cycle will be revisited, with special attention to the human factors. Fusion must be brought in to any new agreements on Nuclear Energy and all Fusion plants used for Transmutation of Elements would operate under these agreed safeguards. <u>Our Plutonium stocks have considerable political as well as commercial value.</u>** **Our internal list of options for beneficial uses of the UK Plutonium stocks remains incomplete but the possibilities we have raised should be sufficient to show that the UK is not ready for any firm decisions based on the evidence presented so far for the Consultation**