Respondent Details	
Name:	J Chanay

Please select the category below which best describes who you are responding on behalf of.

☐	Business representative organisation/trade body
☐	Central Government
☐	Charity or social enterprise
X	Individual
☐	Large business (over 250 staff)
☐	Legal representative
☐	Local Government
☐	Medium business (50 to 250 staff)
☐	Micro business (up to 9 staff)
☐	Small business (10 to 49 staff)
☐	Trade union or staff association
☐	Other (please describe):

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	1.1 For practicable purposes, as signatory to the 1968 United Nations Treaty on the Non-Proliferation of Nuclear Weapons, the UK Government is bound under the envelope of effective measures in Article VI[1] to desist from continued amassing, or production of further, fissile materials (such as plutonium) capable of diversion into the manufacture of atomic weapons. 1.2 There can thus be no question of holding on to stocks of plutonium for use in any version of fast breeder reactor at any time. By definition, a fast breeder reactor (FBR), a. is inherently designed to yield net increase in quantities of plutonium under each fuel cycle loop (through the process of conversion of the abundant non-fissile uranium-238 into fissile plutonium-239 by neutron capture); b. effectively establishes a plutonium economy that serves to exacerbate proliferation and security risk. A plutonium economy would render increasingly efficient the availability (whether legitimate or otherwise) of fissile weapons material. Plutonium would effectively become established as strategic common currency; c. introduces a novel range of radiologically, and physico-chemically, potentially high consequence reactor accidents and leaks; and, d. warrants technically challenging radiological considerations for the biological and ecologically safe storage, immobilisation management and permanent disposal of the attendant fuel cycle radioactive waste products. 1.3 The only sensible approach to prevailing stocks of plutonium is to

[1] United Nations, 1968. The Treaty on the Non-Proliferation of Nuclear Weapons. Article VI of the Treaty states:

> Each of the Parties to the Treaty undertakes to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control.

	manage the plutonium as high level nuclear waste, by isotopically rendering the stocks practicably unfit for power generation (given the tangible risk of radiologically dirtier dirty spent MOX or FBR fuel bomb, and the significantly increased yield of new plutonium in spent fuel), as well as unfit for diversion into weapons production. 1.4 In other words, the Government is obliged to act sensibly to protect and uphold the inalienable rights of present and future generations under a set of principles, as follows: a. proactively reduce not increase all classes of stocks of plutonium in all sectors of the economy; and, b. discontinue and prohibit the use, development and trade in all plutonium production and separation technologies by all classes of actors, including state actors.
Q2	**Do you agree that the Government has got to the point where a strategic sift of the options can be taken?**
Response	2.1 The Government stands serially recalcitrant through denial that the UK had long reached this point. In fact, as long ago as 1994 when the Government woke up to the non-viability of fast breeder reactor technology. More recently in 2008, at the time of previous consultation by the Nuclear Decommissioning Authority (the Government's appointed agent). 2.2 The only sensible approach to prevailing stocks of plutonium would be to manage the plutonium as high level nuclear waste, by isotopically rendering the stocks practicably unfit for power generation (given the tangible risk of radiologically dirtier dirty spent MOX fuel bomb, and the significantly increased inventory of new plutonium in spent fuel), as well as unfit for diversion into weapons production. 2.3 Regarding Consultation para.7, the Government has failed to set out the respect in which the putative burden of security and proliferation risk for future generations, for storage of plutonium, differs materially in character and nature from the burden of security and proliferation risk presented by the proposed interim storage of spent nuclear fuel for periods of up to 130 to 165 years (pending geological disposal). Consider, for example, the risk in the event of Britain losing a land war over the course of that period. Would the stored spent nuclear fuel not comprise the spoils of war for a victor? What is to stop any victor reprocessing the stored spent fuel in order to separate and obtain weapons grade plutonium? 2.4 Regarding Consultation paras 12 and 13, the Government's preferred option on fabrication of Mixed Oxide (MOX) Fuel in order to use up the plutonium stores, manifestly fails to address entailing risk, including:

	a. the risk of radiologically dirtier “dirty bomb”, fashionable from stolen spent MOX fuel; b. the risk of potentially greater hazard from the spread of radiological contamination (by virtue of the greater radiotoxicity of the constituent radioisotopes), in the event of MOX spent nuclear fuel storage facilities becoming compromised under conventional high powered weapons attack; c. the risk of potentially greater radiological hazard from the long term contamination of the environment, as a result of discharge of reactor content, in the event of breach at a MOX-fuelled reactor, following a nuclear accident; d. the risk of unplanned emission of radiologically more hazardous isotope species, from the operation of MOX fuel handling and processing facilities; e. the risk of proliferation of plutonium handling and processing technologies, in the wake of MOX fuel fabrication on industrial scale; and, f. the financial risk attending full cost recovery of cradle to grave costs of MOX fuel cycle based nuclear electricity generation.
Q3	**Are the conditions that a preferred option must in due course meet, the right ones?**
Response	3.1 On the face of it, the criteria at Consultation para.5.3 may appear reasonable. 3.2 Nevertheless, the use of the criteria in justification of the Government’s preferred option (namely, reuse of plutonium in MOX fuel), is seemingly perverse and hints at a predetermined preferred option. 3.3 The perversity of the proposed preferred option may be gleamed from para.2.4, hereof.
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	4.1 The Government is not doing the right thing in the public interest, as regarding future generations in particular. The strategic direction under the Government’s preliminary policy view centres on the preferred use of plutonium stocks in MOX fuel. The proposed strategic direction locks future generations into delivering the Government’s preferred option. In that regard, the welfare of future

	generations is put at risk through a potent mix of: o radiologically more hazardous constituent species in MOX spent fuel and the risk of a dirtier "dirty bomb"; o long term contamination of the environment from the risk of reactor breach following a nuclear accident or following conventional high powered weapons attack on MOX spent fuel storage facilities or from unplanned emissions from the operation of MOX fuel processing facilities; and, o the risk of proliferation of plutonium handling and processing technologies in the wake of industrial scale use of MOX fuel. Taken together, these risks comprise substantial material detriment, violating the futurity principle at the heart of environmentally sustainable development[2].
Q5	**Is there any other evidence government should consider in coming to a preliminary view?**
Response	5.1 This is a loaded question for the general public, given the Government's privileged possession of asymmetric information and practicable resources. 5.2 To the extent the Government acknowledges the nature of risk bearing on production and storage of plutonium, it is neither sound public policy, nor defensible on public policy grounds, to put off to another day the immobilisation of plutonium pending the arrival of newer immobilisation technologies. It is incumbent on the Government to ensure continual protection of the public interest at all times, utilising the best available technology at the time to immobilise the prevailing stocks of plutonium contemporaneously and incrementally, for interim storage pending geological disposal. In that way, the Government could be seen to be making timely use of the continuum of technical innovation on plutonium immobilisation. It is irrational to incur avoidable risk through adopting an all or none approach to plutonium immobilisation. Having created high risk legacy, for the Government to wait wholly for the "right" technology to put in an appearance, amounts to an intolerable imposition on future generations. 5.3 Regarding Consultation paras 17 and 21, it cannot be acceptable for the Government to adopt a plutonium management strategy grounded in policy inertia. Locking taxpayers into potentially an open ended wait for newer technologies for the immobilisation of

[2] Brundtland Commission Report, 1987. Our Common Future. World Commission on Environment and Development. Oxford University Press. The Commission defined sustainable development as:

"development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

	plutonium, in the uncertain hope of reducing the volume for eventual disposal in a nuclear waste geological repository, is tantamount to abuse of public trust and political authority. In any case, the Government's inertia laden preferred strategic policy plainly exacerbates the burden on future generations. Future generations are already burdened with the ultimate responsibility for ensuring ecologically safe isolation from the environment, for over a quarter of a million years[3], of the legacy intermediate level and high level radioactive wastes accumulated in Britain since the 1950s. The creation of these legacy wastes has been, as it continues to be, expressly aided and abetted by successive Governments. 5.4 In view of the implication under Consultation para.22, why not mix the existing high grade plutonium stock with the un-reusable existing waste plutonium, to render unusable as much of the high grade stock as technically feasible? On what sound ground would that not timeously ameliorate the burden of proliferation risk?
Q6	**Has the Government selected the right preliminary view?**
Response	6.1 No. 6.2 Regarding Consultation para.20, the Government's preferred policy on reusing plutonium in the form of MOX fuel is wrongly formulated. The burning of MOX fuel in a nuclear reactor will by definition create significantly greater quantity of new plutonium than the quantity of legacy plutonium used up in fuel fabrication. The Government's current intention that the additional new plutonium would remain incorporated inside spent MOX fuel elements provides scant comfort from the point of view of proliferation risk. Such policy amounts to an unquantifiable open ended commitment for many decades into the future. What is to stop any sophisticated non-state actor from clandestinely reprocessing stolen MOX spent fuel to separate the plutonium? Or, for that matter, any other occupying force (after defeating British homeland defences) from commandeering and reprocessing the vastly enhanced legacy stores of MOX spent fuel? 6.3 Arguably, it remains highly questionable whether the Government's preferred reuse policy on plutonium, as per its preliminary view, is

[3] Consider, for example, ceramic Zircon (a class of mineral based ceramics) which has long been considered the most robust crystalline structure developed to date for immobilising plutonium and other actinides (such as americium and curium) present in nuclear wastes. The structural durability of zircon ceramics has been discovered to be extremely short lived, compared with the hazardous half-life of the radionuclides. Under constant bombardment of alpha-particles, zircon crystals have been found to turn leaky and are prone to disintegration. According to Farnan, Cho & Weber (in *Nature* 445, 11.01.2007, pp190-193: Quantification of actinide alpha-radiation damage in minerals and ceramics), alpha particles from the decaying radionuclides can cause such severe damage to the crystalline structure of the zircon ceramic that plutonium starts leaching out after only 210 years and the entire plutonium-zircon ceramic:

> "would be amorphous after only 1,400 years in a geological repository (desired immobilization timescales are of the order of 250,000 years)."

	capable of achieving meaningful risk reduction from loss or theft of MOX spent fuel. In any case, it is clear the Government's preferred strategy is manifestly incapable of delivering effective reduction (let alone, elimination) of proliferation risk.
Q7	**Are there any other high level options that the Government should consider for long-term management of plutonium?**
Response	7.1 The Government should render all plutonium materials isotopically unfit for weaponisation and weapon deployment, and close down with immediate effect, decommission and dismantle all existing as well as potential plutonium production facilities, processes, products, routes, stores and technologies. The Government could sensibly use the opportunity to work out detailed strategic steps and develop model policy tools for facilitating effective measures under Article VI of the Nuclear Non-Proliferation Treaty[4]. 7.2 The Government should jettison forthwith the preliminary view on preferred policy for reuse of plutonium in mixed oxide nuclear fuel. Reuse will result in disproportionate increase in the total quantity of plutonium (separated and unseparated), with consequential knock on impact on volumetric requirements for eventual permanent geological disposal. Reuse necessarily also extends the plutonium fuel cycle and the inherent associated risks, including long term contamination of the environment from accidents at nuclear facilities. 7.3 The Government should act immediately to safeguard the social welfare of future generations by utilising the best available contemporary technology for incrementally immobilising stocks of plutonium (for interim storage, pending geological disposal), while allowing for future upgrade in line with technological innovation on increased density of immobilised plutonium. 7.4 The Government should commence immediately the process of mixing the existing high grade plutonium stock with the existing un-usable inventory of plutonium, to render as much of the high grade stock as technically feasible unfit for weaponisation. 7.5 The Government should act sensibly to protect and uphold the inalienable rights of present and future generations under a set of principles, as follows: a. proactively reduce not increase all classes of stocks of plutonium in all sectors of the economy; and, b. discontinue and prohibit the use, development and trade in all plutonium production and separation technologies by all classes of actors, including state actors. 7.6 Regarding Consultation para.4, the Government should make full

[4] see footnote 1, hereof.

	disclosure on the Plutonium Credit agreement, dating back to 1968, with the private sector conglomerate Rio Tinto Zinc. The agreement involved unique arrangements for preferential cut-price nuclear electricity supply contract for the new aluminium smelter at Holyhead (Anglesey)[5]. At the time, the contract was tied to future output from the Advanced Gas cooled Reactor then proposed at Dungeness (the English Channel, Kent). Specifically, a. what was the total quantity of plutonium involved, by the end of the supply contract; b. what was the gross profit and loss account on the processing, separation, acquisition and maintenance in storage of the plutonium in question, up to the expiry date of the contract and subsequently thence to date; c. what would be the cost of geological disposal of that quantity of plutonium, say, in 2135; d. what residual rights or obligations accrue to RTZ and the taxpayers (HM Treasury), respectively, relating to that quantity of plutonium, and through what mechanism, subsequent to the expiry of the term of the associated nuclear electricity supply; e. what provision was included in the special nuclear electricity supply contract for the cost of and for the recovery (by the Treasury) of any deficit under outcome charges for eventual permanent geological disposal of plutonium and of associated radioactive waste streams; and, f. what was the final balance sheet on the cost of supply and production of nuclear electricity under the full term of the contract in question?

dated: 10.05.2011

[5] Jones C, 1977. The £200,000 Job! Centre for Policy Studies. p14.