



Department
of Energy &
Climate Change

MANAGEMENT OF THE UK'S PLUTONIUM STOCKS

Guidance for Applicants on the
justification process for the reuse of
plutonium

May 2013



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1. Introduction

Justification

1. The Government has previously produced guidance on the Justification Regulations¹, and more recently, guidance specifically relating to justifying nuclear power².
2. This Guidance is aimed specifically at applicants wishing to seek a decision to justify **the reuse of plutonium** and sets out the process for submitting applications and outlines the decision-making process. The purpose of this guidance is to supplement the existing Regulations and provide clarity on the information that will most likely be required for all end-to-end reuse scenarios.
3. The Government's preferred option for managing the UK's civil plutonium stockpile – reuse as Mixed Oxide fuel (MOX) – was set out in the government response to the consultation on the long-term management of civil plutonium, published on 1st December 2011³. However, the Government recognises that it is possible that other technologies may be found to be credible in appropriate timescales.
4. The Government believes it is therefore prudent to produce generic guidance to applicants which will cover applications from a wide range of reuse technologies. In doing so, we are keeping open the option of alternative technologies that may offer better value for the taxpayer.
5. Generic guidance does not mean that the process for considering applications will be any less stringent. Applications will still need to contain a sufficient level of information to enable the Justifying Authority to assess the benefits and health detriment of the practice for which the applicants are seeking a justification decision to determine whether benefits outweigh the health detriment. Such an approach will enable applicants to make use of the guidance to bring forward applications for technologies other than the preferred option.

¹The Justification of Practices Involving Ionising Radiation Regulations 2004 (SI 2004 No 1769) – Guidance on their application and administration
http://webarchive.nationalarchives.gov.uk/20121217150421/http://decc.gov.uk/assets/decc/what%20we%20do/uk%20energy%20supply/energy%20mix/nuclear/whitepaper08/actions/regjust/1_20090817172537_e_@@_justificationguidance.pdf

²The Justification of Practices Involving Ionising Radiation Regulations 2004 - Guidance for applications relating to new nuclear power
<http://webarchive.nationalarchives.gov.uk/20121217150421/http://decc.gov.uk/assets/decc/what%20we%20do/uk%20energy%20supply/energy%20mix/nuclear/whitepaper08/actions/regjust/file45384.pdf>

³Management of the UK's plutonium stocks: A consultation response on the long-term management of UK-owned separated civil plutonium
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/42773/3694-govt-resp-mgmt-of-uk-plutonium-stocks.pdf

Justifying Authorities

6. There are four Justifying Authorities in the UK, namely, the relevant Secretary of State and the three Devolved Administrations to the extent that they have competence in respect of the subject matter of a particular Justification application. However, it should be noted that both nuclear energy and nuclear security are reserved matters and it is anticipated that the Secretary of State for DECC will be the Justifying Authority for any application to justify the reuse of plutonium.
7. Where the Secretary of State for DECC is the sole Justifying Authority, then any Justification decision will be UK-wide but before the Secretary of State makes a decision they will, in accordance with Regulation 18(2) of the Justification Regulations, consult the Devolved Administrations. There is a Concordat between the Government and the Devolved Administrations which sets out the working relations in a way that respects the devolution settlements.

What is a practice?

8. The Directive defines “practice” as “a human activity that can increase the exposure of individuals to radiation from an artificial source or from natural radiation sources where use is being made of its radioactive, fissile or fertile properties”.
9. The term ‘practice’ includes a wide range of activities including nuclear power generation and supporting activities, the use of radioactive materials or radiation sources for industrial and medical applications and the use of radioactive materials in various types of products, research and educational activities.
10. An important issue is defining the scope of the practice. As an example, nuclear reactors need to be supported by facilities for fuel manufacture and for managing spent fuel and various categories of radioactive waste. The International Commission on Radiological Protection (ICRP) who developed the International System of Radiological Protection - used world-wide as the common basis for radiological protection standards, legislation, guidelines, programmes, and practice - emphasise that waste management and disposal operations are an integral part of the practice generating the waste and that it is wrong to regard them as a free-standing practice that requires its own Justification.
11. In order to ensure protection of workers and the public from the effects of radiation it may be necessary, depending on the circumstances, to consider transport either as part of a practice or as a practice in its own right. It is likely that the transportation of radioactive materials will be a required part of the practice of reuse of plutonium.

Health detriment

12. A key feature of justification is the requirement for an assessment of the health detriment which may be caused by a class or type of practice. Under Regulation 4(2) of the Justification regulations, “Justified” in relation to a new class or type of practice means Justified by its economic, social or other benefits in relation to the health detriment it may cause. The Directive defines health detriment as an estimate of the

risk of reduction in length and quality of life occurring in a population following exposure to ionising radiations.

13. Applicants seeking justification in relation to the reuse of plutonium will need to demonstrate that any health detriment from ionising radiation across all stages of the process is outweighed by the overall benefits associated with the practice. Benefits can cover environmental, economic, social or other benefits.

2. Making an application for justification

What Information Should an Applicant Provide?

14. In accordance with the Justification Regulations, an applicant should provide sufficient information to allow the Justifying Authority to undertake a high-level assessment of the net environmental, economic, social or other benefits against the health detriment of introducing technology or technologies for the reuse of plutonium into the UK. It is up to the applicant to determine whether they consider it most appropriate to proceed with technology specific applications or group a number of different technologies in a single application.
15. The Justification team in DECC may provide advice on the format of an application, and/or whether the application is consistent with this guidance. It cannot provide advice on the merits of an application.
16. Table 1 provides a list of information that applicants might be expected to provide. It is not intended to be exhaustive or prescriptive, but rather indicates the main information likely to be necessary to enable a clear, high-level assessment of the application. Applicants are encouraged to exercise their own judgement on what may be relevant to their application, but should also consider the guidance set out below. The Justifying Authority has powers under the Regulations to seek additional information as necessary in order to make a Justification Decision.
17. To facilitate the justification decision, the Justifying Authority will require information on both the anticipated benefits and health detriment (e.g. routine, controlled radiological discharges) and the benefits and health detriment brought about by the materialisation of risks (e.g. radiological exposures due to accidents) at each applicable stage of the process. For potential detriment, the applicant should explain how the risks of their occurrence are adequately controlled or mitigated.
18. Applicants may also wish to provide additional information which they consider will help substantiate their application, including expert reports and work commissioned by the applicant.
19. Since the majority of the benefits associated with the reuse of plutonium will only be realised across the whole plutonium lifecycle, it is envisaged that such an end-to-end process would constitute a new class or type of practice. Therefore whilst such a process does not of itself preclude applications being made under regulations 12 (determination whether a practice is new or existing) or 10 (for a review of an existing class or type of practice) of the Justification Regulations this guidance is geared towards applicants making an application under regulation 9.
20. The method by which the application compares the net benefits and radiological health detriment of the class or type of practice for which a justification decision is being sought is proposed to be at the discretion of the applicant. The Justifying Authority, though, is not bound to use this as a basis for its own assessment. Since the reuse process is likely to consist of a number of distinct phases (as shown in table 3), each with their own specific benefits and detriment, and a number of overarching benefits and detriment that apply to the process as a whole, we recommend that applicants apply the information in table 1 below to each phase of the process, and separately to

the class or type of practice as a whole. This should allow for all of the benefits and detriment associated with the class or type of practice to be captured, and will thus allow for the Justifying Authority to make a fair and fully informed justification decision.

Table 1 – List of Indicative Information

Information Requirement	Guidance
Introductory information on the proposed class or type of practice	
Description of the proposed class or type of practice	<p>Applicants should provide information in the following areas:</p> <ul style="list-style-type: none"> • A summary of the class or type of practice (or phase of the class or type of practice). • The main technical characteristics of the class or type of practice (and of the phases within the class or type of practice). • Confirmation of whether or not the application is being made under Regulation 9 of the 2004 Regulations (for a decision in relation to a new class or type of practice).
Radiological health detriment	
Radiological Health detriment	<p>Applicants should provide information in the following areas:</p> <ul style="list-style-type: none"> • How the proposed class or type of practice may cause a radiological detriment to human health (including the general public, plant workers, other specific population groups). • Radiological health detriment associated with normal operation and accident conditions. • How design, operation and mitigation strategies will reduce the risk and magnitude of accidental radiological exposures to below regulatory limit. • Any other potential radiological health detriment.
Economic, societal or other benefits and detriment	
Radioactive waste and decommissioning	<p>Applicants may provide information in the following areas:</p> <ul style="list-style-type: none"> • How decommissioning, waste management, spent fuel management and disposal would be dealt with.

	<ul style="list-style-type: none"> • The nature and volume of radioactive waste and spent fuel that could be expected to be produced at each stage. • The features of the design that will facilitate decommissioning. • Mitigation strategies, regulatory arrangements and related assurance to address detriment and risks. • Any other potential benefits and detriment associated with radioactive waste and decommissioning.
<p>Environmental</p>	<p>Applicants may provide information in the following areas:</p> <ul style="list-style-type: none"> • The total carbon emissions across the full lifecycle of the proposed class or type of practice • How will the Class or Type of Practice contribute to reducing the UK's overall carbon emissions? • Non-radiological effects on people and the environment (water, air, chemicals, light, thermal, noise, landscape animal health, flora, fauna etc.) Throughout construction, operation and decommissioning. • Radiological effects on animal health, flora and fauna. • Management and disposal of waste (radioactive and non-radioactive). • Accident and terrorism mitigation strategies. • Any other potential environmental benefits and detriment.
<p>Non-proliferation and physical protection (security)</p>	<p>Applicants may provide information in the following areas:</p> <ul style="list-style-type: none"> • How the proposed class or type of practice will mitigate the security and non-proliferation sensitivities associated with separated plutonium. • Any other potential benefits and detriment from a security perspective.

<p>Other benefits and detriment</p>	<p>Applicants may provide information in the following areas:</p> <ul style="list-style-type: none"> • Non-radiological health detriment in normal/accident conditions (including to the general public, plant workers, other specific population groups). • Contribution to security of supply. • Economic benefits and detriment. • Benefits and detriment to UK jobs and skills. • Benefits and detriment to UK's long-term objectives
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3. Considering an application for justification

21. Whilst the justification process is a high level consideration, to reach a decision the Justifying Authority will need to evaluate a significant amount of information, some of which may be technical in nature.
22. Where necessary, the Justifying Authority may seek advice from technical and other experts. Before the Justifying Authority reaches a decision, it is proposed that the justification process should follow a series of steps, in a way that should be helpful to applicants, regulators, statutory consultees and all other interested parties. We have set out the steps below in table 2.
23. It is proposed that the Justifying Authority publishes applications as they are received. If additional information is requested from the applicant, the request and that information will also be published.
24. It may be necessary to publish applications in redacted form where it contains sensitive information, although it is the Government's intention to limit the need for this.
25. Having considered the application and any relevant advice commissioned, the Justifying Authority will produce a draft decision document, setting out its assessment of the benefits and detriment of the class or type of practice. The Authority will consult the statutory consultees, the Devolved Administrations, relevant Government Departments, the public, and other interested parties as appropriate (e.g. overseas Governments, non-Governmental organisations). The Justifying Authority will then consider all comments made during the consultation period before producing a final decision document.
26. If the class or type of practice is found to be justified by the Justifying Authority, a justification decision in the form of a Statutory Instrument will be laid before Parliament. If the class or type of practice is not found to be justified, a decision notice will be

published in accordance with regulation 14 of the Justification Regulations.

27. If multiple applications are made for technologically similar classes or types of practice and have a similar benefits and detriment then they may be assessed together and determined under a single decision document.

Table 2: Stages of the application and decision-making process

Stage	Description
1	Receive and publish application.
2	<p>Consider applications and determine whether proposed Class or Type of Practice is a new or existing (consulting in accordance with the Concordat and statutory consultees, a list of which can be found at:[insert web address]).</p> <p>If the class or type of practice is found to be 'new' the Justifying Authority will carry out a justification assessment. (Stages 4-9)</p> <p>If it is found to be existing, the Justifying Authority will consider whether to review the justification of that class or type of practice. It may do so if new and important evidence about the efficacy or consequences of the class or type of practice has been acquired.</p>
3	Assess whether sufficient information has been provided by applicants to make a justification decision. Request any additional information from the applicants (or others as necessary) and publish any additional information received.
4	Assess applications, gathering additional information from other sources where appropriate and specialist advice where necessary.
5	Prepare draft decision document.
6	Consult statutory consultees and the public on the draft decision document.
7	Consider consultation responses on the draft decision document.
8	Depending on the outcome of this consultation, publish the final decision.
9	<p>If new class or type of practice is found to be justified make justification decision in the form of secondary legislation (a Statutory Instrument) and publish in accordance with the Justification Regulations.</p> <p>If new class or type of practice is not found to be justified publish decision notice to that effect in accordance with regulation 14 of the Justification</p>

	Regulations.
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Table 3: Stages of the reuse process

Stage	Description
Plutonium Retrieval	<p>The retrieval of separated plutonium from stores.</p> <p>To include internal transport of separated plutonium from its point of storage to its point of pre-treatment.</p>
Preparation of Separated Plutonium	<p>Any preparatory activities required to make ready the inventory of separated plutonium for fabrication into fuel.</p> <p>To include internal transport of UK-owned separated plutonium from its point of preparation to its point of fabrication into fuel and the decommissioning of facilities associated with preparatory activities.</p>
Fuel Fabrication	<p>The process of taking the prepared separated plutonium and fabricating fuel assemblies.</p> <p>To include internal transport of fuel assemblies from their point of manufacture to their point of irradiation and the decommissioning of fabrication facilities.</p>
Fuel Irradiation	<p>The generation of electricity through the irradiation of plutonium bearing fuel assemblies in nuclear fission reactors.</p> <p>This includes the internal transport, storage and management of spent plutonium-bearing fuel and decommissioning of reactors.</p> <p>The Government's response to its consultation on the long-term management of UK owned separated civil plutonium identified that "it would be preferable to have the plutonium put permanently beyond reach via its final disposal in a geological disposal facility (GDF)...", and as such applicants are advised to consider whether spent fuel could be disposed of in a GDF, should one become available.</p>

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