

Radioactive Substances Act 1993

# Summary Document

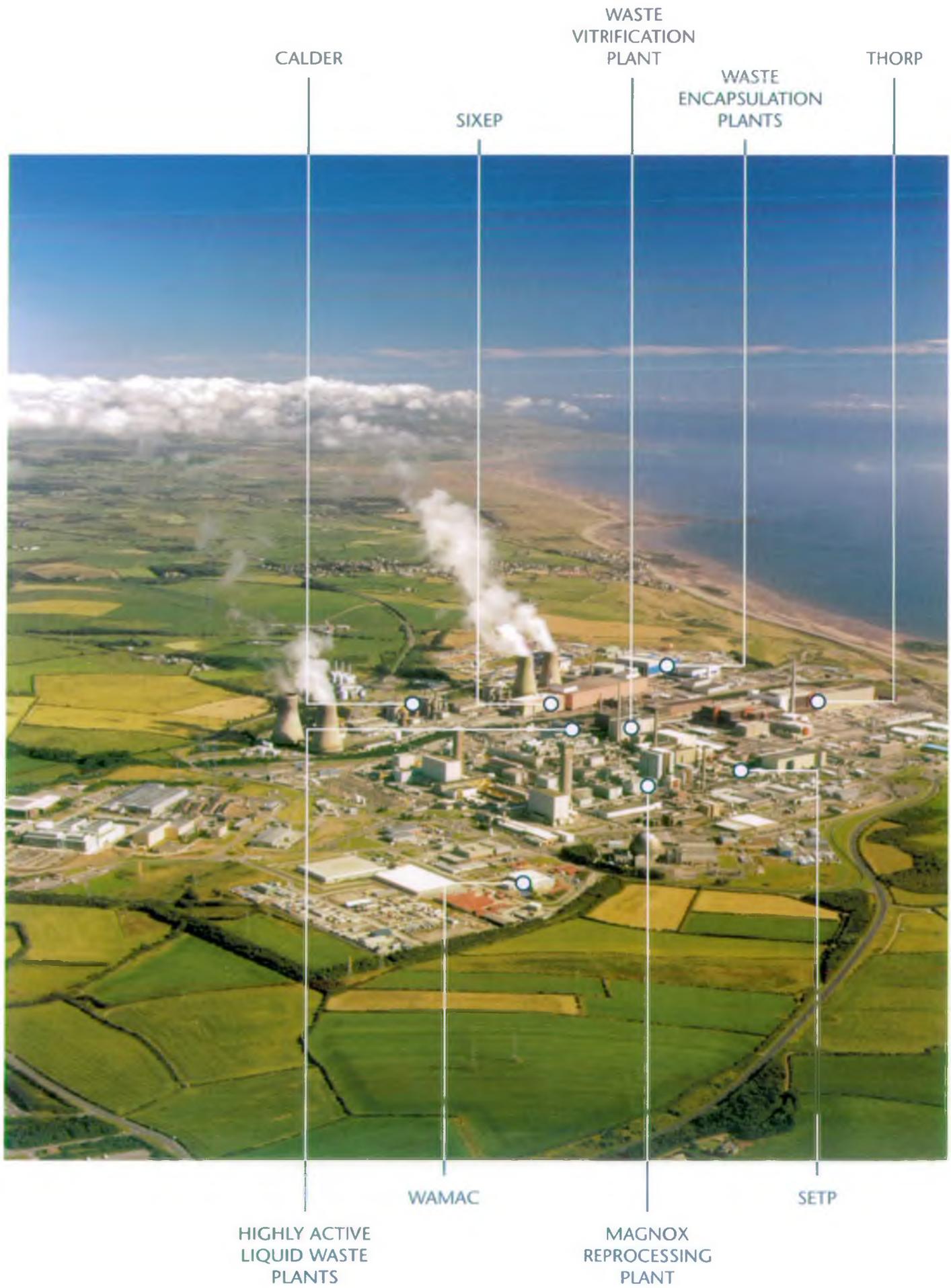


To assist public consultation on proposals  
for the future regulation of disposals of  
radioactive waste from

British Nuclear Fuels plc  
Sellafield



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The Environment Agency commenced a review of the six existing Authorisations for the BNFL operations at the Sellafield site in April 2000. A three stage process was developed for the review so as to ensure that the review and its findings were open, transparent and allowed for participation of a broad range of interested parties.

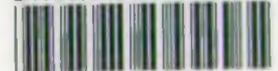
Stage 1 of the process involved the production of what is termed the Scope and Methodology Document. This document which was subject to public consultation sets out the issues that would be addressed by the review.

Stage 2 of the process was a detailed technical review of the operations at the Sellafield site using historical information and information provided by BNFL. This stage was completed at the end of July 2001. The output from Stage 2 is the Sellafield Review Explanatory Document. This document sets out in considerable detail the Agency's proposals for the future regulation of disposal of radioactive wastes and effluents to air, sea and land from the premises of BNFL at the Sellafield site. The document is accompanied by a substantial package of supporting information provided in the course of the review. The supporting information contains some additional information from BNFL which was submitted too late to be assessed fully prior to the start of the public consultation. The Agency will be examining the additional information closely and will take it into account in formulating its final proposals. The two documents constitute the "Consultation Package" which is now available to statutory consultees and other interested parties as part of the consultation exercise on the Agency's proposals for the regulation of the site. The consultation period, which has been extended on account of the holiday period, finishes on 3 December 2001.

The consultation package is a very large and detailed set of documents. To assist those who may not wish to read all the documents but may still want to participate in the consultation process we have produced this smaller document "The Main Review Summary". This document

## About this document

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summarise the principal proposals being made for the future regulation of the BNFL activities at the Sellafield site.

We hope that, having read the smaller document readers will be encouraged to read the more detailed proposals set out in the consultation package.

Copies of the "Explanatory Document" can be accessed via the Agency's web site

[www.environment-agency.gov.uk/consultations](http://www.environment-agency.gov.uk/consultations)

or is available from the Agency's office at Penrith. The full consultation package is available on CD-ROM or is available for inspection at the public registers listed in Annex 2 of the Explanatory Document.

The third stage of the review process will be the preparation and issue of the Agency's decision document scheduled for the first quarter of 2002 after the Stage 2 consultation.

A handwritten signature in black ink, appearing to read 'John Marshall', with a horizontal line underneath it.

**John Marshall**  
**Sellafield Review Project Manager**  
**(July 2001)**

## Integrated Certificate of Authorisation

- The Agency proposes to introduce a single certificate of authorisation for regulating waste disposals to air, sea and land from Sellafield. This will replace the six authorisations currently in place.

## No Increases in Limits

- The Agency proposes that there should be no increase in discharge limits above the current limits.
- The Agency proposes to decrease discharge limits for a number of radionuclides (see Table 1). *(Note: Where a detailed case is made in the future, the Agency is clear that allowances may need to be made for some increases in discharges and limits to ensure that the historic waste legacy remains safe for future generations.)*

## Site Disposal Limits

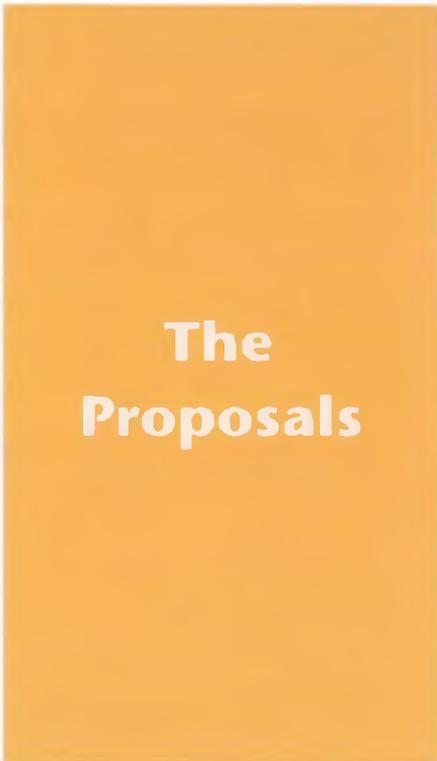
- The Agency proposes to introduce new site limits for the principal radionuclides disposed of to air and sea from the site (see Table 1 at the end of this document). The proposed site limits apply to any period of 12 consecutive calendar months and, in some cases, are less than the aggregate of individual plant limits.
- The Agency proposes to introduce, for the first time, site limits for liquid discharges of Antimony-125, Neptunium-237 and Curium-243+244 to sea.

## Longer-term Limits to Meet OSPAR Objectives

- The Agency invites comments on the suitability of year on year progressive reductions in discharge limits and upon the scale of any progressive reductions.

## Individual Plant Limits

- The Agency proposes to remove annual discharge limits for groups of plants, where practicable, and to introduce additional annual limits for individual plants.



# The Proposals

## **Plant Throughput Limits**

- The Agency proposes to retain throughput related discharge limits for the Thermal Oxide Reprocessing Plant (THORP) and to introduce throughput related aerial discharge limits to the Magnox Reprocessing Plant.
- The Agency proposes to cap annual discharge limits relative to the annual fuel throughput for Magnox reprocessing and THORP of 1600 tonnes uranium and 1200 tonnes uranium, respectively.

## **Segregation of Discharges**

- The Agency proposes to introduce liquid waste discharge limits for Calder Hall nuclear power station.
- The Agency proposes to require BNFL to develop a methodology to estimate the discharges from the major activities on the Sellafield site and to report estimated discharges on a calendar year basis.
- The Agency proposes to require BNFL to consider the segregation of discharges, either by physical separation and/or separate sampling/monitoring arrangements, when undertaking modifications to existing plant and in the design of new facilities.

## **Reporting of Minor Discharge Sources**

- The Agency proposes to require BNFL to report discharges from a number of individual minor discharge sources.

## **Short-term Limits and Advisory Levels**

- The Agency proposes to unify the regulation of short-term discharges by replacing daily and monthly limits with weekly limits for some principal radionuclides.
- The Agency proposes to introduce weekly advisory levels for some principal radionuclides in situations where enhanced discharges may occur and weekly limits are inappropriate for plant safety reasons.

## Changes to Quarterly Notification Levels

- The Agency proposes to standardise and strengthen quarterly notification levels for aerial and liquid discharges by setting them all at a quarter of the relevant annual site or plant limit and applying them to any rolling period of three consecutive calendar months.

## Removal of Additional Components to Limits

- The Agency proposes to remove the additional components to existing limits for the Salt Evaporator Plant and the Waste Monitoring and Compaction Plant (WAMAC).
- The Agency considers there is scope to reduce the additional components to annual radionuclide discharge limits for the Site Ion Exchange Plant (SIXEP) and proposes to reduce the limits accordingly.

## Changes in Regulation of Solid Waste Disposals

- The Agency proposes to introduce new calendar year limits and radionuclide concentration limits for all solid waste disposals and disposals by transfer to other nuclear sites.
- The Agency proposes to no longer authorise the disposal of waste by burial in-situ.
- By agreement, HSE will assume primary responsibility for the future regulation of contaminated earth that is buried in-situ on site and will consult with the Agency on such matters.
- The Agency proposes to revoke the generic inter-site authorisation that permits BNFL to transfer radioactive solid waste from Sellafield to any of its other sites and to any UKAEA site, and, instead, to authorise transfers to two named sites.

### Quarterly notification level (QNL):

Quarterly discharge or disposal levels that the Environment Agency specifies in an operator's authorisation. The operator must inform the Environment Agency if these are exceeded.

### Additional Components to Limits:

The existing liquid discharge authorisation contains additional components to specific annual radionuclide discharge limits to sea, which can be invoked only in the event of reporting malfunctions of the Salt Evaporator Plant and SIXEP. Similarly, the authorisation for transfer of waste to Drigg permits an additional volume of waste to be disposed of if a prolonged outage of WAMAC occurs.

- The Agency proposes to authorise contaminated concrete and rubble arising from decommissioning work to be disposed of on the site at specific designated locations, subject to conditions and within annual limits related to volume and radioactivity concentration, and to allow BNFL a limited extension to the existing landfill area.
- The Agency proposes to retain the existing activity concentration limits which relate to the disposal of contaminated earth and low level solid waste at Sellafield and Drigg, respectively.
- The Agency proposes to retain and in some cases reduce the calendar year limits relating to the transfer of low Level solid waste to Drigg for disposal.
- The Agency proposes to require BNFL to provide a post closure radiological and environmental safety assessment for the disposal of waste on the South Landfill and the Calder Flood Plain Landfill (including the extension).

### **New BPM Conditions**

#### **Best Practicable Means (BPM):**

Within a particular waste management option, the BPM is that level of management and engineering control that minimises, as far as practicable, the release of radioactivity to the environment whilst taking account of a wider range of factors, including cost-effectiveness, operational safety, and social and environmental factors.

- The Agency proposes to introduce a revised BPM condition to require best practicable means to be used to minimise the activity of radioactive waste produced that will require disposal under the authorisation.
- The Agency proposes to introduce a new condition to require best practicable means to be used to dispose of radioactive waste at times, in a form and in a manner so as to minimise the radiological effects on the environment and members of the public.
- The Agency proposes to introduce a new condition to require BNFL to have a management system, organisational structure and resources sufficient to achieve compliance with the limitations and conditions of the authorisation.

## Regulation Under Other Legislation

- The Agency proposes to remove the conditions in the current authorisation for the discharges of tributylphosphate and other organic solvents. The Agency proposes to regulate such discharges in future under the current authorisations for integrated pollution control issued to BNFL for Magnox and oxide fuel reprocessing under EPA 90.

## Improvement Requirements

- The Agency proposes to require BNFL to introduce appropriate management arrangements and written procedures that require BPEO/BPM assessments to be carried out for all future new waste streams requiring disposal.
- The Agency proposes to require BNFL to undertake a programme of improvements to its monitoring arrangements in the environment around the Sellafield site.
- The Agency proposes to require BNFL to install sampling/monitoring equipment to enable aerial discharges from the Magnox Reprocessing Plant to be independently monitored.
- The Agency proposes to require BNFL to implement the use of an ion exchange material to abate discharges of cobalt-60 from THORP fuel ponds, if plant trials are proven to be successful.
- The Agency proposes to require BNFL to ensure, where reasonably practicable, that purge water from B27 Fuel Pond is transferred to SIXEP for removal of strontium-90 and caesium-137, rather than discharged to sea via the Segregated Effluent Treatment Plant (SETP).

- The Agency proposes to require BNFL to re-route, where reasonably practicable, purge water from B29 Fuel Pond from SETP to SIXEP for removal of strontium-90 and caesium-137 before discharge to sea, if the pond water is confirmed to be compatible with the ion exchange process in SIXEP.
- The Agency proposes to require BNFL to report to the Agency the results of plant trials on the addition of iodic acid to the fuel dissolution process in THORP. If the trials are successful in reducing aerial discharges of iodine-129, to implement this abatement technique in routine operations or justify why it is inappropriate to do so.

### **Information Requirements**

- The Agency proposes to require BNFL to monitor its environmental performance and to submit an annual environmental management report.
- The Agency proposes to require BNFL to provide an annual report which details the measures taken to reduce discharges over the past 12 months.
- The Agency proposes to continue to require BNFL to undertake regular reviews of developments worldwide in best practice for minimising all waste disposals, and to provide a strategy for achieving reductions in discharges based on the findings of the reviews.
- The Agency proposes to require BNFL to provide an annual report which includes detailed findings of research on the behaviour in the environment of radionuclides discharged from Sellafield, with the objective of improving understanding of the effect on the sustainability of ecosystems and communities of wildlife species.
- The Agency proposes to require BNFL to provide a report of a comprehensive review of whether current disposal routes continue to represent the best practicable environmental option. The report shall include a

programme for carrying out any necessary changes identified by the review.

- The Agency proposes to require BNFL to provide a report of a comprehensive review of the means used to assess the activity of radionuclides in waste disposals and in the environment. This should include:
  - a review of aerial and liquid waste sampling/monitoring systems and associated procedures to ensure both consistency across the Sellafield site and the use of the best techniques available worldwide; and
  - an investigation into whether the accuracy, precision and limits of detection of the radiochemical analysis methods used can be improved.
- The Agency proposes to require BNFL to provide a report of an investigation to determine whether it is practicable to minimise the carbon-14 content of spent Magnox fuel by reducing the nitrogen impurity level in the fuel during manufacture.
- The Agency proposes to require BNFL to provide a report of an investigation to determine whether it is practicable to transfer groundwater from Borehole 68 to SIXEP for abatement of caesium-137 rather than discharging it to sea via SETP.
- The Agency proposes to require BNFL to submit a report describing current work and any future proposals for the reprocessing of spent Magnox fuel in THORP.
- The Agency proposes to require BNFL to provide a detailed breakdown of the alpha discharges resulting from individual decommissioning projects and a justification that the proposed disposal represents BPM.

### **Technetium-99 Review**

In addition to the Main Sellafield review we have also conducted a 'fast track' review of the discharges of technetium-99 (Tc-99) from Sellafield. This Tc-99 review was carried out in accordance with the established scope and methodology.

An *Explanatory Document* detailing our proposals regarding Tc-99 was open to consultation until 5 March 2001. We are now carefully considering all the comments received and will publish our *Decision Document* in respect of Technetium discharges in due course. The Tc-99 *Explanatory Document* is also available from the Agency should you wish to read it.

## The Benefits

### Benefits of the Proposals

The Agency considers that its proposals (as detailed overleaf) for the future regulation of waste disposals from Sellafield, if implemented, would:

- reduce the permitted radioactive discharges and consequently the potential radiological and environmental impact of the Sellafield site;
- provide a more transparent approach to the regulation of the site;
- impose stricter regulation by extending the current system of discharge limits to individual plants;
- strengthen the BPM conditions by requiring waste minimisation at source, which would maintain downward pressure on waste disposals below the limits imposed by the authorisation and will minimise the environmental and radiological impact;
- not constrain BNFL's ability to meet the target closure date of 2012 for Magnox reprocessing;
- not constrain BNFL's ability to retrieve and process backlog wastes into a safer form suitable for long-term storage and ultimate disposal; and
- not constrain BNFL's ability to meet decommissioning programmes for redundant plants.

**Table 1: Comparison of the Current and Proposed site liquid and aerial annual discharge limits**

Radionuclide	Liquid Limits			Aerial Limits		
	Current Limit/ Effective Limit (TBq/year)	Proposed Limit (TBq/year)	Proposed Percentage Reduction in Limit	Current Limit/ Effective Limit (GBq/year)	Modified Proposed Limit (GBq/year)	Proposed Percentage Reduction in Limit
H-3	30,000	20,000	33	1,500,000	1,100,000	27
C-14	21.0	21.0	0	7,300	3,300	55
S-35	Not specified	Not specified	n/a	210	210	0
Ar-41	Not specified	Not specified	n/a	3,700,000	3,200,000	14
Co-60	13.0	5.8	55	0.92	0.17	82
Kr-85	Not specified	Not specified	n/a	590,000,000	440,000,000	25
Sr-90	48.0	48.0	0	9.4	0.68	93
Zr/Nb	9.0	2.2	76	Not specified	Not specified	n/a
Tc-99	90.0	90.0	0	Not specified	Not specified	n/a
Ru-106	63.0	63.0	0	56.0	14.0	75
Sb-125	Not specified	15.0	New limit	5.0	1.4	72
I-129	2.0	2.0	0	70.0	70.0	0
I-131	Not specified	Not specified	n/a	55.0	55.0	0
Cs-134	6.6	1.3	80	Not specified	Not specified	n/a
Cs-137	75.0	34.0	55	18.0	5.6	69
Ce-144	8.0	2.7	66	Not specified	Not specified	n/a
Np-237	Not specified	1.0	New limit	Not specified	Not specified	n/a
Pu-239	0.7	0.7	0	1.2	0.16	87
Pu-241	27.0	18.0	33	17.0	2.9	83
Am-241	0.3	0.3	0	Not specified	Not specified	n/a
Cm-243+244	Not specified	0.069	New limit	Not specified	Not specified	n/a
Am/Cm	Not specified	Not specified	n/a	0.74	0.11	85
Total alpha	1.0	1.0	0	2.5	0.50	80
Total beta	400	220	45	340	25.0	93
Uranium (kg)	2000	2000	0	Not specified	Not specified	n/a

**Key:**  
 Not specified – radionuclides that, in accordance with the limit setting criteria used by the Agency do not require limits  
 n/a = not applicable

## Further Information Sources

As stated earlier our proposals are outlined in **summary** only in this booklet. They are detailed in full in the Sellafield Review *Explanatory Document*, which forms part of the consultation package, consisting of:

- an *Explanatory Document* – outlining our proposals in full
- a *Supporting Information* volume – material compiled in support of the Review.

All the information is available on a CD-ROM (MAC and PC format) and the Explanatory Document can be accessed via our web site [www.environment-agency.gov.uk/consultations](http://www.environment-agency.gov.uk/consultations) and is available in hard copy.

We would encourage you to look at the Main Review Explanatory Document for a more comprehensive understanding of our proposals before submitting your comments. Within the Explanatory document (section 7) there is guidance on submitting your response.

You can send your comments in writing to the following address:

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