

A NEW AUTHORISATION TEMPLATE FOR THE DISPOSAL OF RADIOACTIVE WASTE FROM NUCLEAR SITES IN ENGLAND & WALES

K. Brown, A. McGoff, R. Smith, C. Weedon
Environment Agency, England & Wales

ABSTRACT

In England and Wales the regulation of the disposal of radioactive waste, including discharges to atmosphere and to bodies of water, is the responsibility of the Environment Agency. A thorough review of the Agency's regulatory approach has resulted in a step change in its authorisations notably with the introduction of a single integrated authorisation for each nuclear site and the inclusion of new requirements relating to the operator's management system.

Previously each site was granted a number of authorisations with each authorisation document covering a different disposal route. The new template authorisation covers disposals by all approved routes for the site within a single document.

The authorisation requirements have been strengthened in a number of areas with new conditions requiring:

- written arrangements for how the operator will comply with each condition of the authorisation;
- written operating and maintenance instructions;
- an environmental maintenance schedule; and
- internal audit and review of the effectiveness of operator's management system for complying with the conditions of the authorisation.

The objective of these improvements is that each site operator should know what is being required of it by its authorisation, know how it is complying with each requirement, and be able to demonstrate that it is complying.

Experience is being gained from the introduction of these authorisations at several sites including some of those operated by British Nuclear Fuels plc and Magnox Electric plc. The Agency's aim is to introduce the new authorisation template at all the nuclear sites it regulates within the next three years.

INTRODUCTION

Since 1996 the Environment Agency has been responsible for the regulation of radioactive waste in England and Wales. It is a non-departmental public body with wide responsibilities for protection of the environment.

The Agency and its predecessor bodies have granted disposal authorisations to operators of nuclear sites subject to limitations and conditions. Regulatory powers under the Radioactive Substances Act (the Act) are used to grant these authorisations. Under the Act "Radioactive waste" includes solids, liquids and gases. "Disposal" includes discharge to air and water, incineration, and transfer to other sites, as well as disposal by land burial at the national low-level waste repository at Drigg and a few other landfill facilities.

Authorisations have been issued over the past forty years to a number of operators including British Nuclear Fuels plc (BNFL), their current subsidiary Magnox Electric plc, United Kingdom Atomic Energy Authority, British Energy and Amersham plc. UK nuclear sites include nuclear power stations (mainly carbon dioxide gas cooled reactors of the Magnox Type - natural uranium metal fuel in a magnesium alloy can - and of the Advanced Gas-cooled Reactor type – low enriched uranium oxide fuel in a stainless steel can), uranium processing and reprocessing facilities and research facilities.

When many of the authorisations were first issued in the 1960's and 1970's as the facilities began operating, the discharge limits were set at relatively high levels reflecting their expected performance at the time and the then radiological criteria. As operational experience was gained, progressive improvements were made to waste management practices. Radioactive discharges became more closely controlled and were reduced to levels generally well below the original authorised limits.

From the 1980s onwards UK Government policy has been for authorisations to be reviewed regularly. The Agency and its predecessors have aimed at carrying out reviews at about four year intervals. Such reviews (1) have resulted in limits at levels more closely reflecting actual discharges, thus demanding further improved control.

While efforts have been directed in the past at establishing appropriate limits in the authorisations, less emphasis has been placed on the other conditions imposed. Prior to the formation of the Environment Agency, authorisations in England were issued jointly by two Government Departments one of which, the Ministry of Agriculture Fisheries and Food, was itself structured such that one section was responsible for discharges to air and another for discharges to water. Consequently each site held a number of single discharge route authorisations.

As a result of the former regulatory structure, while improvements were made to individual medium authorisations, no attempt had been made to bring all the authorisations together in a single document. A review initiated shortly after formation of the Agency in 1996 highlighted the need for a more holistic approach towards the environment, and in particular to be explicit about what was being required of the operator's management system. Additionally, legal advice and public expectation both pointed to the need for review and consistency where appropriate. The importance of getting the authorisation conditions right was emphasised by the experience, albeit successful, of taking enforcement including prosecution action in relation to the failure of discharge filtration equipment at two power stations. For example the previous authorisation requirement for maintenance of plant and equipment in good repair could be interpreted as applying to systems in use, not those provided as spares.

In 1998 an opportunity (2) arose to introduce new authorisations at eight sites simultaneously, when BNFL applied to operate the sites itself, where they had previously been operated by its subsidiary Magnox Electric.

OBJECTIVES OF REVIEW

The Agency's objective was to consider the regulatory system as a whole. A key principle was to emphasise that the site operator is the body with the responsibility for environmental performance. As such, the operator should be clear what is being expected of it, have a management system which sets out how it is complying, and be able to demonstrate it is complying with each of the limitations and conditions of its authorisation. Furthermore the operator should be able to demonstrate that it is complying with regulatory requirements independently of the regulator. The role of the regulator is that of an external auditor.

The need for a consistent approach, with a single multi-media authorisation covering all radioactive waste disposal routes from an operator on a single site, was seen as vital.

Additionally, a further major input was from Article 47 of the European Basic Safety Standards Directive (BSS Directive) which requires European Union Member States to require undertakings (operators) responsible for relevant practices to carry out the following tasks:

- a) achieving and maintaining an optimal level of protection of the environment and the population;
- b) checking the effectiveness of technical devices for protecting the environment and the population;
- c) acceptance into service, from the point of view of surveillance of radiation protection, of equipment and procedures for measuring and assessing, as appropriate, exposure and radioactive contamination of the environment and the population;
- d) regular checking of measuring instruments and regular checking that they are serviceable and correctly used.'

When considering these requirements the issues were applied more widely. For example when looking at (c), the acceptance into service of all relevant instrumentation was considered not purely that associated with 'surveillance of radiation protection'.

Article 47 (2) of the BSS Directive also requires 'qualified experts to be concerned in the discharge of these duties'.

In 2000 the UK Government issued a Direction which required the Agency, when discharging its functions, to ensure i) that all exposures to ionizing radiation of any member of the public and of the population as a whole resulting from disposal of radioactive waste are kept as low as reasonably achievable, economic and social factors being taken into account and ii) that doses to members of the public should not exceed limits as specified in the BSS Directive. The Agency was also directed to observe the requirements of Article 47 of the BSS Directive when discharging these functions. The new template also addresses these requirements.

The requirement for the operator to use best practicable means to minimise discharges has been a condition in authorisations issued since the 1960s. The review concluded however, that there was a need to improve and clarify its application to both waste creation and waste disposal.

The review also concluded that the introduction of explicit conditions on maintenance requirements was needed.

Finally, while noting the requirement of the Act that all 'material particulars' should be in the authorisation, the need was identified for a clear mechanism for the use of supporting documents specifying matters of detail relating to the authorisation. For this, a systematic approach was needed so that operators were clear what was being required of them.

FEATURES OF NEW AUTHORISATION

The new authorisation was developed from the existing single medium authorisations. The strengths of many of the existing conditions were recognised and it was decided to capitalise on these clarifying where appropriate, removing weaknesses and introducing relevant new conditions. This approach focused on the necessary changes and avoided change for change's sake, so minimising the risk of misinterpretation by operators and other unintended consequences.

Template Authorisation

A standard pattern was developed for all sites with a formal certificate of authorisation subject to limitations and conditions laid out in a number of schedules. The conditions of Schedule 1 (Appendix) apply to all disposal routes at all sites. It is the Agency's intent, providing no significant legal or practical difficulty is found with these conditions, not to change them again for at least five years when we will next formally review them. Subsequent schedules are disposal route specific with standard features tailored for the nuclear site concerned.

Schedules

1. General Limitations and Conditions
2. Waste Types and Disposal Routes
3. Gaseous Discharges
4. Aqueous Discharges
5. On-site Incineration
6. Transfer to Drigg
7. Transfer to Other Premises
- (8) On-site disposal
- (8or 9) Improvement & Information Requirements

Schedule 1

The conditions are grouped under six headings: Disposal; Management; Sampling, Measurements etc; Records; Provision of Information; and Interpretation.

Disposal

The first five conditions of the authorisation directly relate to the disposal/discharge of waste.

Conditions 1 and 2 respectively require the use of 'best practicable means' (BPM) to minimise the radioactivity of waste requiring disposal and to minimise the radioactivity of waste in discharges. 'Best practicable means' is an expression used for some 130 years in UK environmental law and the related 'reasonably practicable' (used mainly in UK health and safety law in terms such as 'as low as reasonably practicable' and 'so far as is reasonably practicable') has been tested in the courts. Use of BPM places the onus on the operator to continually review all his activities to see what can be done to reduce discharges etc. An analogy, of an ever-tightening elastic band has been used. These conditions are to be interpreted against a Government policy background seeking the progressive reduction of discharges.

Conditions 3 and 4 emphasise the need for maintenance and checking of equipment, systems and procedures. It is the operator's responsibility to determine and substantiate the frequency etc. of maintenance and checking. The regulator wishes to see that what is done is appropriate to achieve its goals.

Management

The sixth condition of Schedule 1, relating to management, is a major new introduction in the authorisation. Breaking it down into its sections:

'The Operator shall:

- (a) have a management system, organisational structure and resources sufficient to achieve compliance with the limitations and conditions of this Authorisation, and which include:'

This is the crux of the condition. It incorporates the criterion of sufficiency to achieve compliance and gives a clear statement on the breadth of what must be considered. There was much internal debate on the meaning of 'sufficient'. The subsequent words describing the Agency's criteria for sufficiency were chosen with care. In the event of a compliance problem or event, the test will be: Was the system sufficient to achieve compliance?

The term 'environmental management' system was not used. The management system was seen to best apply to all activities in an integrated way.

The organisational structure of the nuclear industry is likely to continue to change. However it is important that operators recognise that in planning and implementing these changes and in striving for efficiency they take full account of the need to maintain the structure and resources to enable them to comply with the authorisation.

- (i) written arrangements specifying how the Operator will achieve compliance with each limitation and condition of this authorisation, to include arrangements for the control of modifications to the design and operation of systems and equipment;

The requirement for such arrangements reflects the importance not only of design but also of how the plant is operated. The operator recognises what is needed to comply with the authorisation through preparing and implementing the arrangements. The need to think through and control the design and implementation of modifications is a major area especially during the decommissioning of plants.

- ii) provision for consultation with such suitable RPAs, or other such qualified experts approved by the Agency in writing, as are necessary for the purpose of advising the Operator as to compliance with the limitations and conditions of this authorisation and, in particular, on matters addressed in paragraphs 1, 2, 4, 12 and 13 in this schedule.

The use of Radiation Protection Advisers or other such qualified experts is required by the BSS Directive. Conditions 1 and 2 refer to BPM in relation to arisings and discharges, condition 4 refers to maintenance, conditions 12 and 13 to instrumentation. It is considered that these are areas where the operator needs expert advice. A system is needed for identification of these individuals. Some of the experience required by the site operator is provided by existing Radiation Protection Advisers appointed under the Ionising Radiations Regulations 1999. The Agency is developing the criteria for suitable 'other qualified experts' in discussion with operators.

- (iii) written Environmental Operating Rules and operating instructions;

Environmental Operating Rules are analogous to safety operating rules. Rules are needed so as to keep the facility within an operating envelope that is acceptable from the environmental viewpoint e.g. a rule might be applied to minimum plant availability during normal operation so as to maintain adequate redundancy in discharge systems. Both these and the need for written operating instructions applicable to environmental aspects were born of failings the Agency observed in operators' existing practices. These failings showed that operators overfocussed on the limits specified in authorisations and did not recognise the implications of other general non-numerical conditions.

- (iv) a written maintenance schedule and instructions;

Again a similar requirement to that used for safety purposes but which addresses those items of plant and equipment which are relevant to compliance with the radioactive waste disposal authorisation.

- (v) adequate supervision of the disposal of radioactive waste by suitably qualified and experienced persons, whose names shall be clearly displayed with each copy of the Certificate of Authorisation that is posted on the premises as required by section 19 of the Act;

This condition requires the identification of key decision-makers and demands that those making decisions on radioactive waste disposals have appropriate training and experience. In practice this is a manageable short list of individuals who have the operator's authority to make final sanction decisions on disposals of radioactive waste.

- (vi) adequate supervision by suitably qualified and experienced persons of the operation and maintenance of the systems and equipment provided to meet the requirements of paragraphs 1 and 2 in this Schedule and for the disposal of radioactive waste;

Similarly this requires the identification by name, of all supervisory staff involved in the operation and maintenance of the relevant systems and equipment. In practice it is generally a larger list than above with specific areas of responsibility identified, consistent with each individual's qualifications and experience. On reflection it would have been appropriate to include measurement systems (Condition 11) within the scope of this condition. However any such change will only be introduced following the next review of the template.

- (vii) internal audit and review of the Operator's management system;

The need for effective internal audit of the operator's system is an essential component in providing the operator with confidence that its systems and arrangements are adequate to ensure compliance and that compliance is being achieved. It emphasises that the Agency requires the operator to know whether its systems are appropriate and being followed.

- (b) inform the Agency in writing, at least 28 days or such shorter period agreed by the Agency before the first disposal of radioactive waste is made under the terms of this Authorisation, of the organisational structure and resources, together with such parts of the management system as the Agency specifies, provided to achieve compliance with the limitations and conditions of the Authorisation;

This provides the Agency with baseline information and enables it to demand more if it is considered it is needed. Initially the Agency would normally only seek a "route-map" of the operator's management arrangements and subsequently call for more detailed arrangements if it considered it necessary. Given the sheer volume of paper involved in an operator's management system it would not be practicable for the Agency to hold all the documentation and, furthermore, would introduce the problem of document upkeep. Of course the Agency's site inspectors have access to the complete suite of management system documents at the operator's sites.

- (c) inform the Agency, at least 28 days in advance or, where this is not possible, without delay, of any change in the management system, organisational structure or resources, which might have, or might reasonably be seen to have, a significant impact on how compliance with the limitations and conditions of this Authorisation is achieved.

This sets out the Agency's expectation to receive proper advance notification of any relevant changes but it is framed to take account of exceptional circumstances, e.g. unplanned loss of key staff, where this might not be possible. This ensures that non-compliance does not occur for reasons which were unavoidable. The use of the word "how" within this condition clarifies that the Agency requires to be informed about changes that might have a significant impact on how compliance is achieved not just where changes have a significant impact on if compliance can be achieved.

Thus the key features of the overall management condition mean that the duty to comply falls clearly to the Operator, that the Agency does not approve, impose or approve a specific management system and that the tests of compliance are the existence of specified components and the adequacy to achieve compliance.

Sampling, Measurements etc

Conditions 7-13 strengthen and clarify requirements on sampling, etc.

Condition 7 places a requirement on the operator to carry out measurements and analysis etc to determine compliance with the authorisation. This condition places an absolute duty on the operator to do what it believes is required to demonstrate compliance.

Condition 8 acknowledges that some measurements (and thus limits) e.g. of 'total-alpha' radionuclides discharged, rely on the method of measurement. This is because more than one radionuclide is being measured at the same time using a measurement method which is unable to discriminate between the different radionuclides. In such cases the key details of the method used to determine the content of the waste are set out in the appropriate later schedule. In all cases where discharges of a specific radionuclide is limited e.g. caesium -137, then the best practicable means of measurement must be used.

Condition 9 enables the Agency to require the operator to carry out specified measurements. The Agency uses this condition to require the operator to carry out an extensive environmental monitoring programme.

Conditions 11-13 provide for the requirements of Article 47 of the BSS Directive, by introducing requirements for checking the performance of systems. They also extend explicitly into the area of maintenance of relevant instrumentation.

Records

Conditions 14 -18 concern the making and retention of records.

Provision of information

Conditions 19-21 refer to information to be provided to or sought by the Agency.

Condition 19 enables the Agency to require the operator to provide information relating to the authorisation, for example to require the operator to provide monthly reports of radioactive discharges and disposals.

Condition 20 requires the operator to develop and provide to the Agency a document which sets out the methods and techniques that the operator will use to assess the activity of radioactive wastes including discharges.

Interpretation

This section defines the terms used in the authorisation.

Enabling conditions

Several of the conditions of the authorisation (e.g. condition 19) enable the Agency to specify further detailed requirements. For each of these conditions the Agency issues an 'Environment Agency Requirement' document specifying in detail what, if anything, the Agency requires. All of these documents are compiled into a 'Compilation of Environment Agency Requirements (CEAR)' document that sets out all of the agreements, approvals, notifications and specifications for that authorisation. A key advantage of this arrangement is that it provides an easily quality assured, auditable system for these matters of detail which helps to ensure that both the Agency and the operator are clear on all that is required.

Since each of these requirements are enabled through the authorisation all are enforceable and any failure to comply is dealt with by the normal enforcement arrangements with statutory notices and prosecution as options.

EXPERIENCE TO DATE WITH THE NEW AUTHORISATION TEMPLATE

Experience so far with the new template has been very good. Nuclear operators have accepted and generally welcomed the new style of authorisation as being clearer and more transparent and have put significant resources, effort and commitment into being ready for its introduction.

No substantial problems have been encountered with its introduction at about a dozen sites including some of those operated by BNFL and Magnox Electric plc. The Agency is closely monitoring this early experience to ensure that all problems are identified and dealt with.

The introduction of the new template authorisation has raised awareness at sites not just of radioactive waste issues but also of wider environmental matters. The Agency considers that this in itself is a significant benefit.

CONCLUSIONS

A thorough review of the Agency's regulatory approach has resulted in a step change in its authorisations notably with the introduction of a single integrated authorisation for each nuclear site and the inclusion of new requirements relating to the operator's management system. The Agency's aim is to introduce the new authorisation template at all the nuclear sites it regulates within the next three years.

REFERENCES

- 1 C G Hardman et al.. WM 94, Regulation of Radioactive Waste Discharges from Nuclear Power Plants in England and Wales.
- 2 RE Smith et al, Conference Paper, Stockholm, 2001. Recent UK Experience of Involving the Public in Decisions on Radioactive Discharges.

APPENDIX 1**GENERAL LIMITATIONS AND CONDITIONS****DISPOSAL**

1. The Operator shall use the best practicable means to minimise the activity of radioactive waste produced that will require disposal under this Authorisation.
2. The Operator shall use the best practicable means to:
 - (a) minimise the activity of gaseous and aqueous radioactive waste disposed of by discharge to the environment;
 - (b) minimise the volume of radioactive waste disposed of by transfer to other premises;
 - (c) subject to paragraph 5 in this Schedule, 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; where the relevant waste types and disposal routes are specified in the Table in Schedule 2.
3. The Operator shall maintain in good repair the systems and equipment provided:
 - (a) to meet the requirements of paragraphs 1 and 2 in this Schedule;
 - (b) for the disposal of radioactive waste.
4. The Operator shall check, at an appropriate frequency, the effectiveness of systems, equipment and procedures provided:
 - (a) to meet the requirements of paragraphs 1 and 2 in this Schedule;
 - (b) for the disposal of radioactive waste.
5. If required by the Agency, the Operator shall only dispose of radioactive waste at such times, in such a form and in such a manner as the Agency specifies.

MANAGEMENT

6. The Operator shall:
 - (a) have a management system, organisational structure and resources which are sufficient to achieve compliance with the limitations and conditions of this Authorisation and which include:
 - (i) written arrangements specifying how the Operator will achieve compliance with each limitation and condition of this authorisation, to include arrangements for control of modifications to the design and operation of systems and equipment;
 - (ii) provision for consultation with such suitable RPAs, or other such qualified experts approved by the Agency in writing, as are necessary for the purpose of advising the Operator as to compliance with the limitations and conditions of this Authorisation and, in particular, on the matters addressed in paragraphs 1, 2, 4, 12 and 13 in this Schedule;
 - (iii) written Environmental Operating Rules and operating instructions;
 - (iv) a written maintenance schedule and instructions; adequate supervision of the disposal of radioactive waste by suitably qualified and experienced persons, whose names shall be clearly displayed with each copy of the Certificate of Authorisation that is posted on the premises as required by section 19 of the Act;
 - (v) adequate supervision by suitably qualified and experienced persons of the operation and maintenance of the systems and equipment provided to meet the requirements of paragraphs 1 and 2 in this Schedule and for the disposal of radioactive waste;
 - (vi) internal audit and review of the Operator's management system;

- (b) inform the Agency in writing, at least 28 days or such shorter period agreed by the Agency before the first disposal of radioactive waste is made under the terms of this Authorisation, of the organisational structure and resources, together with such parts of the management system as the Agency specifies, provided to achieve compliance with the limitations and conditions of the Authorisation;
- (c) inform the Agency, at least 28 days in advance or, where this is not possible, without delay, of any change in the management system, organisational structure or resources, which might have, or might reasonably be seen to have, a significant impact on how compliance with the limitations and conditions of this Authorisation is achieved.

SAMPLING, MEASUREMENTS, TESTS, SURVEYS AND CALCULATIONS

7. The Operator shall take samples and conduct measurements, tests, surveys, analyses and calculations to determine compliance with the limitations and conditions of this Authorisation.
8. The Operator shall use the best practicable means when taking samples and conducting measurements, tests, surveys, analyses and calculations to determine compliance with the limitations and conditions of this Authorisation, unless particular means are specified in this Authorisation.
9. If required by the Agency, the Operator shall take such samples and conduct such measurements, tests, surveys, analyses and calculations, including environmental measurements and assessments, at such times and using such methods and equipment as the Agency specifies.
10. If required by the Agency, the Operator shall, as the Agency specifies:
 - (a) keep samples;
 - (b) provide samples;
 - (c) dispatch samples for tests at a laboratory and ensure that the samples or residues thereof are collected from the laboratory within three months of receiving written notification that testing and repackaging in accordance with the appropriate transport regulations are complete.
11. The Operator shall maintain in good repair systems and equipment provided for:
 - (a) carrying out any monitoring and measurements necessary to determine compliance with the limitations and conditions of this Authorisation;
 - (b) measuring and assessing exposure of members of the public and radioactive contamination of the environment.
12. The Operator shall have and comply with appropriate criteria for the acceptance into service of systems, equipment and procedures for:
 - (a) carrying out any monitoring and measurements necessary to determine compliance with the limitations and conditions of this Authorisation;
 - (b) measuring and assessing exposure of members of the public and radioactive contamination of the environment.
13. The Operator shall carry out:
 - (a) regular calibration, at an appropriate frequency, of systems and equipment provided for:
 - (i) carrying out any monitoring and measurements necessary to determine compliance with the limitations and conditions of this Authorisation;
 - (ii) measuring and assessing exposure of members of the public and radioactive contamination of the environment;

- (b) regular checking, at an appropriate frequency, that such systems and equipment are serviceable and correctly used.

RECORDS

14. The Operator shall, subject to paragraph 18 in this Schedule:
 - (a) make and retain records sufficient to demonstrate whether the limitations and conditions of this Authorisation are complied with;
 - (b) retain records made in accordance with any previous Authorisation issued to the Operator and related to the premises covered by this Authorisation;
 - (c) retain records transferred to the Operator by any predecessor operator which were made in accordance with any previous Authorisation related to the premises covered by this Authorisation.
15. The Operator, not later than 14 days after the end of each month or within such longer period as the Agency may approve in writing, shall in respect of all disposals of radioactive waste made during that month:
 - (a) make a record of each measurement, analysis, test and survey conducted for the purpose of this Authorisation in relation to those disposals;
 - (b) make a record which shows clearly and legibly:
 - (i) the type of waste and the disposal route;
 - (ii) the name of each radionuclide or group of radionuclides, specified in the relevant Table in the relevant Schedule, which is present;
 - (iii) the activity of each such radionuclide or group of radionuclides per cubic metre of the waste, unless otherwise agreed in writing by the Agency;
 - (iv) for Drigg waste, the activity of each such radionuclide or group of radionuclides per tonne of the waste, unless otherwise agreed in writing by the Agency;
 - (v) the total activity of each such radionuclide or group of radionuclides;
 - (vi) the total volume in cubic metres, unless otherwise agreed in writing by the Agency;
 - (vii) for Drigg waste, the total mass in tonnes;
 - (viii) the date and time on which or period during which the disposal took place;
 - (ix) any other information the Agency may specify.
16. If the Operator amends any record made in accordance with this Authorisation it shall ensure that the original entry remains clear and legible.
17. The Operator shall keep the records referred to in paragraph 15 in this Schedule in a manner and place approved by the Agency.
18. The Operator shall retain the records referred to in paragraphs 14 and 15 in this Schedule until notified in writing by the Agency that the records no longer need to be retained.

PROVISION OF INFORMATION

19. The Operator shall supply such information in such format and within such time as the Agency may specify.
20. The Operator shall inform the Agency in writing, at least 14 days before the first disposal of radioactive waste is made under the terms of this Authorisation, of the techniques being employed to determine the activity of radioactive waste disposals and shall inform the Agency in writing in advance of any modifications to those techniques.

21. The Operator shall inform the Agency without delay if the Operator has reason to believe that disposal of radioactive waste is occurring, has occurred or might occur which does not comply with the limitations and conditions of this Authorisation, and shall report the circumstances in writing to the Agency as soon as practicable thereafter.

INTERPRETATION

22. (1) In this Certificate of Authorisation -

- (a) except where otherwise specified, words and expressions defined in the Radioactive Substances Act 1993 shall have the same meanings when used in this Certificate of Authorisation as they have in that Act;
- "activity", expressed in becquerels, means the number of spontaneous nuclear transformations occurring in a period of one second;
- "the Agency" means the Environment Agency;
- "aqueous waste" means radioactive waste in the form of a continuous aqueous phase together with any entrained solids, gases and non-aqueous liquids;
- "Authorisation" means an authorisation issued under the Radioactive Substances Act 1993 or the Radioactive Substances Act 1960;
- "best practicable environmental option" means the radioactive waste management option, for a given practice, that provides the most benefit or least damage to the environment as a whole in the long term as well as in the short term, taking into account operational doses and risks, and social and economic factors.
- "Bq, kBq, MBq, GBq, TBq and PBq" are used as abbreviations meaning becquerels, kilobecquerels, megabecquerels, gigabecquerels, terabecquerels and petabecquerels respectively;
- "BNFL" means British Nuclear Fuels plc;
- "calendar year" means a period of 12 consecutive months beginning on 1 January;
- "consignment" means an individual shipment of radioactive waste not greater in volume than 40 cubic metres or such lesser volume as specified in writing by the Agency;
- "Drigg Waste" means solid radioactive waste, including any immediate package, intended by the Operator for final disposal at BNFL's site at Drigg;
- "environment" means all, or any, of the media of air, water (to include sewers and drains) and land;
- "Environmental Operating Rule" means a mandatory restriction on operation, established by the Operator, which is necessary to ensure compliance with this Authorisation;
- "gaseous waste" means radioactive waste in the form of gases and associated mists and particulate matter;
- "maintenance instructions" means instructions for carrying out any maintenance that may have an effect on compliance with this Authorisation;
- "maintenance schedule" means a programme for maintenance of all systems and equipment that contribute to achieving compliance with this Authorisation;
- "month" means calendar month (ie 1-31 January, 1-28/29 February, 1-31 March, etc);
- "operating instructions" means instructions for carrying out any operation that may have an effect on compliance with this Authorisation;
- "organic liquid waste" means radioactive waste in the form of liquid, not being aqueous waste, containing one or more organic chemical compounds;
- "package" includes any sack, drum, container or wrapping;

"quarter" means any period of three consecutive months;

"RPA" means a Radiation Protection Adviser appointed under Regulation 13 of the Ionising Radiations Regulations 1999;

"samples" includes samples that have been prepared or treated to enable measurements of activity to be made;

"Schedule" means a Schedule forming part of this Certificate of Authorisation;

"week" means a period of 7 consecutive days commencing at a day and time to be notified in writing to the Agency by the Operator at least 14 days before any disposal of radioactive waste is made under the terms of this Authorisation, any subsequent change being notified in writing to the Agency at least 7 days in advance;

"year" means any period of 12 consecutive months;

- (b) "UKAEA" means United Kingdom Atomic Energy Authority;
<Other site specific definitions>.

- (2) In this Certificate of Authorisation the Interpretation Act 1978 shall apply as it does to an Act of Parliament and in particular words in the singular include the plural and words in the plural include the singular.
- (3) (a) In determining whether particular means are the "best practicable" for the purposes of this Authorisation, the Operator shall not be required to incur expenditure whether in money, time or trouble which is, or is likely to be, grossly disproportionate to the benefits to be derived from, or likely to be derived from, or the efficacy of, or likely efficacy of, employing them, the benefits or results produced being, or likely to be, insignificant in relation to the expenditure.
- (b) Where reference is made to the use of "best practicable means" in this Certificate of Authorisation, the means to be employed shall include:
- (i) the provision, maintenance and manner of operation of any relevant plant, machinery or equipment;
 - (ii) the supervision of any relevant operation.