



**ENVIRONMENT
AGENCY**

RADIOACTIVE SUBSTANCES ACT 1993

**CERTIFICATE OF AUTHORISATION
AND
INTRODUCTORY NOTE**

**DISPOSAL OF RADIOACTIVE WASTE
FROM NUCLEAR SITE**

BAE SYSTEMS Marine Limited

BARROW SHIPYARDS NUCLEAR SITE

**BARROW IN FURNESS
CUMBRIA
LA14 1AF**

AUTHORISATION NUMBER BU6808

INTRODUCTORY NOTE

- IN 1.** The following Certificate of Authorisation is issued by the Environment Agency under the provisions of section 13 of the Radioactive Substances Act 1993 ("the Act"). The Authorisation permits the disposal of the specified radioactive wastes from the specified site, subject to limitations and conditions.
- IN 2.** The Act is concerned with the control of radioactive material and accumulation and disposal of radioactive waste. The requirements of the Act relating to control of radioactive material and accumulation of radioactive waste do not apply to sites licensed under the Nuclear Installations Act 1965 because these matters are regulated under the terms of the site licence. The conditions attached to this Authorisation are, therefore, concerned only with matters that relate to the disposal of radioactive waste from the Operator's Nuclear Site at Barrow-in-Furness.
- IN 3.** The Operator's undertaking at the Barrow Shipyards nuclear site to which this authorisation relates is the build and commissioning of nuclear powered submarines. During these operations gaseous, liquid and solid radioactive waste may accrue. Gaseous waste may potentially arise from degassing operations on the submarine during testing and commissioning of the reactor plant. Following post critical operations on the submarine reactors primary circuit coolant will be treated prior to discharge to the environment via the United Utilities Ltd sewer system. Solid waste will arise from the disposal of ion exchange resins when the practical life of those resins is over following the treatment of the liquid effluent. There may be limited amounts of miscellaneous waste arising from general build and commissioning operations e.g. tissues, gloves, and plastic sheeting.
- IN 4.** The Certificate of Authorisation comprises a signed certificate together with 7 schedules. Schedule 1 contains general conditions that are applicable to all authorised waste types. Schedule 2 specifies the categories of radioactive waste and the disposal routes that are authorised. Schedules 3 to 6 include limitations and conditions on the radionuclides in the waste and the physical nature of the waste streams. Schedule 7 specifies information to be supplied and improvements to be carried out.
- IN 5.** The Authorisation allows the Agency to place requirements on the Operator to carry out various actions. Details of current requirements, associated specifications and approvals are placed on relevant public registers. Certain information provided by the Operator in response to Certificate requirements will also be placed on the registers.
- IN 6.** This note does not form part of the Certificate of Authorisation.



**ENVIRONMENT
AGENCY**

RADIOACTIVE SUBSTANCES ACT 1993

**Authorisation to Dispose of Radioactive Waste
from the premises of BAE SYSTEMS on the Nuclear Site at Barrow Shipyards,
Barrow-in-Furness**

BAE SYSTEMS Marine Limited

BU6808

This certifies that the Environment Agency in exercise of its powers under sections 16(2) and 16(8) of the Radioactive Substances Act 1993 ("the Act") has authorised

**BAE SYSTEMS Marine Limited
(Company Registration No 00229770)
("the Operator")**

whose Registered Office is

Warwick House
PO Box 87
Farnborough Aerospace Centre
Farnborough, Hampshire, GU14 6YU

**under sections 13(1) and 13(3) of the Act to dispose of radioactive waste from its
premises which are on the Nuclear Site at the**

**BARROW SHIPYARDS
Barrow-in-Furness, Cumbria**

subject to the limitations and conditions in the Schedules to this Certificate of Authorisation.

This Authorisation shall come into effect on 21st June 2004

Signed
(Mr T Hindle, North Area, EM Team Leader)

Authorised to sign on behalf of the Environment Agency

Dated the

Schedule 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 Radiation Protection Advisers, 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;
 - (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;
 - (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;
 - (vii) 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.

(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.

Schedule 2

AUTHORISED RADIOACTIVE WASTE TYPES AND DISPOSAL ROUTES

1. In this Schedule, the Operator is authorised to dispose only of the radioactive waste types identified in the Table in this Schedule and only by the relevant disposal route(s) specified in the Table.

Table

Radioactive Waste Type	Disposal Route
Gaseous Waste	Discharge to the Environment
Aqueous Waste	Discharge to Sewer
	Transfer to UKAEA Winfrith
Solid Waste	Transfer to Shanks Chemical Services Ltd, Charleston Rd, Hardley, Hythe, Southampton, Hants
	Transfer to BNFL at Sellafield or Drigg and UKAEA at Winfrith for the purpose of final disposal at BNFL Drigg

Schedule 3

LIMITATIONS AND CONDITIONS RELATING TO DISPOSAL OF RADIOACTIVE GASEOUS WASTE BY DISCHARGE TO THE ENVIRONMENT

1. The Operator shall only discharge radioactive gaseous waste to the environment by means of the outlets identified in Table 1 in this Schedule and such other outlets as the Agency may approve in writing.
2. The Operator shall not in any year discharge gaseous waste in which the activity of any radionuclide or group of radionuclides specified in Table 2 in this Schedule exceeds the relevant Annual Limit.

Table 1

Authorised Gaseous Discharge Outlets
Nuclear Facilities Barge Dis-entrainment Column

Table 2

Radionuclide or Group of Radionuclides	Annual Limit, GBq
Tritium	0.0032
Argon-41	48

Schedule 4

LIMITATIONS AND CONDITIONS RELATING TO DISPOSAL OF RADIOACTIVE AQUEOUS WASTE BY DISCHARGE TO THE ENVIRONMENT

1. The Operator shall only discharge radioactive aqueous waste to the environment through the systems specified in Table 1 in this Schedule and such other systems as the Agency may approve in writing.
2. The Operator shall use the best practicable means to exclude all entrained solids, gases and non-aqueous liquids from radioactive aqueous waste prior to discharge to the environment.
3. The Operator shall not in any year discharge aqueous waste in which the activity of any radionuclide or group of radionuclides specified in Table 2 in this Schedule exceeds the relevant Annual Limit.
4. If, in any quarter, the activity in aqueous waste discharged of any radionuclide or group of radionuclides specified in Table 2 in this Schedule exceeds the relevant Quarterly Notification Level, the Operator shall provide the Agency with a written submission which includes:
 - (a) details of the occurrence;
 - (b) a description of the means used to minimise the activity of aqueous waste discharged;
 - (c) a review of those means having regard to paragraphs 1 and 2 in Schedule 1;not later than 14 days from making the record which demonstrates such excess.
5. For the purposes of demonstrating compliance with the limitations and conditions of this Authorisation relating to other gamma emitting radionuclides in aqueous waste, the Operator shall:
 - (a) take samples of relevant aqueous waste and transfer to a Marinelli beaker for counting by high resolution gamma spectrometry using a high purity germanium semiconductor detector, calibrated against a 200 kBq mixed gamma standard supplied to the product code QCY44 by High Technology Sources Limited. Gamma emitters will be identified, specific activities quantified and total gamma activity reported by relating to the total volume discharged.

Or using other suitable methods which have been agreed in writing by the Environment Agency.

Table 1

Authorised Aqueous Discharge System(s)
The system provided by the Operator for the discharge of liquid effluent involves the Nuclear Facilities Barge, which provides for ion exchange, holding, sampling, analysis and sentencing of liquid effluents prior to discharge into the sewer, following which subsequent treatment takes place at the Salthouse Treatment Works. Ultimately the effluent is discharged to the environment at Headin Haw above the Piel Channel.

Table 2

Radionuclide or Group of Radionuclides	Annual Limit, GBq	Quarterly Notification Level, GBq
Tritium	12	4
Other gamma emitting radionuclides	0.0035	0.001

Schedule 5

LIMITATIONS AND CONDITIONS RELATING TO DISPOSAL OF RADIOACTIVE WASTE BY TRANSFER TO BNFL AT DRIGG OR SELLAFIELD AND UKAEA AT WINFRITH FOR THE PURPOSE OF FINAL DISPOSAL AT BNFL'S SITE AT DRIGG (Drigg Waste)

1. The Operator shall not:
 - (a) transfer any consignment of Drigg Waste in which the activity of alpha emitting radionuclides exceeds 4 gigabecquerels per tonne or the activity of all other radionuclides exceeds 12 gigabecquerels per tonne;
 - (b) in any calendar year transfer Drigg Waste in which, in total, the activity of any radionuclide or group of radionuclides listed in Table 1 in this Schedule exceeds the relevant Annual Limit;
 - (c) in any calendar year transfer Drigg Waste in which, in total, the volume of the waste exceeds the Annual Limit specified in Table 2 in this Schedule;
2. The Operator shall not transfer Drigg Waste:
 - (a) unless it has been treated or packaged in such a way as to render it, so far as is reasonably practicable, insoluble in water and not readily flammable;
 - (b) which contains any of the following materials, unless otherwise agreed in writing by the Agency:
 - (i) metals and other materials which readily react either with water or air with the evolution of heat or flammable gases;
 - (ii) explosive materials;
 - (iii) liquids with flashpoint less than 21 °C absorbed on solid materials;
 - (iv) strong oxidising agents;
 - (v) pressurised gas cylinders or pressurised aerosol containers;
 - (vi) materials which generate or are capable of generating toxic gases, vapours or fumes harmful to persons handling the waste;
 - (vii) chemical complexing or chelating agents.
3. The Operator shall ensure that the transfer of Drigg Waste is in accordance with the directions of the person to whom the waste is transferred.
4. The Operator shall:

- (a) ensure that the person to whom Drigg Waste is transferred receives at the time of transfer of each consignment a clear and legible note signed on the Operator's behalf stating:
- (i) that the activity of alpha emitting radionuclides in the consignment does not exceed 4 gigabecquerels per tonne and that the activity of all other radionuclides does not exceed 12 gigabecquerels per tonne;
 - (ii) the total activity in the consignment of each radionuclide or group of radionuclides listed in Table 1 in this Schedule;
- (b) obtain a record signed on behalf of the person to whom Drigg Waste is transferred, at the time of transfer, stating that the transfer has taken place.
5. If required by the Agency, the Operator shall ensure that any consignment or part of any consignment of Drigg Waste found, following transfer, not to be in accordance with the limitations and conditions of this Authorisation:
- (a) is packaged in accordance with the appropriate transport regulations;
 - (b) is returned as soon as is reasonably practicable to the Barrow Shipyards Nuclear Site.

Table 1*

Radionuclide or Group of Radionuclides	Annual Limit, MBq
Uranium	0
Radium-226 plus Thorium-232	0
Other alpha emitters ¹	0
Carbon-14	40.1
Iodine-129	0
Tritium	35.0
Cobalt-60	6.0
Other radionuclides ²	31.1

1 "other alpha emitters" means alpha-emitting radionuclides with half-lives greater than three months excluding uranium, radium-226 and thorium-232

2 "other radionuclides" means:

- (a) iron-55 and beta-emitting radionuclides with half-lives greater than three months unless individually specified in this Table and
- (d) any other radionuclides specified in writing by the Agency

* This schedule is time limited to a one-off disposal to be completed by the end of 2004

Table 2*

Annual Limit, cubic metres
3

* This schedule is time limited to the end of 2004

Schedule 6

LIMITATIONS AND CONDITIONS RELATING TO DISPOSAL OF RADIOACTIVE WASTE BY TRANSFER TO OTHER PREMISES

1. The Operator shall not in any calendar year transfer radioactive waste to a person specified in the Table 1 in this Schedule in which, in total:
 - (a) the activity of any relevant radionuclide or group of radionuclides exceeds the relevant Annual Activity Limit for waste of the type specified; or
 - (b) the volume of the waste and its immediate packaging exceeds the relevant Annual Volume Limit for waste of the type specified.
2. The Operator shall ensure that the transfer of radioactive waste is in accordance with the directions of the person to whom the waste is transferred.
3. The Operator shall:
 - (a) ensure that the person to whom waste is transferred receives at the time of transfer of each consignment a clear and legible note signed on the Operator's behalf stating the total activity in the consignment of each relevant radionuclide or group of radionuclides listed in the Table 1 in this Schedule;
 - (b) obtain a record signed on behalf of the person to whom waste is transferred, at the time of transfer, stating that the transfer has taken place.
4. If required by the Agency, the Operator shall ensure that any consignment or part of any consignment of waste found, following transfer, not to be in accordance with the limitations and conditions of this Authorisation:
 - (a) is packaged in accordance with the appropriate transport regulations;
 - (b) is returned as soon as is reasonably practicable to the Barrow Shipyards Nuclear Site.

Table 1

Person to whom waste may be transferred	Waste Type	Radionuclide or Group of Radionuclides	Annual Activity Limit, MBq	Annual Volume Limit, cubic metres
UKAEA, Winfrith ⁽¹⁾	Aqueous Waste	Uranium	0.51	0.06 ⁽³⁾
		Cobalt-60	0.03	
		Other Beta Radionuclides	1.0	
Shanks Chemical Services Ltd, Charleston Rd, Hardley, Hythe, Southampton, Hampshire. ⁽²⁾	Solid Combustible Wastes	Tritium	5 ⁽²⁾	1 ⁽³⁾
		All other radionuclides	2 ⁽²⁾	

(1) This route is a time-limited one-off disposal to be completed by the end of 2004

(2) subject to an overall specific activity limit of 400Bq/g

(3) total volume of all waste, including packaging.

Schedule 7

IMPROVEMENT AND ADDITIONAL INFORMATION REQUIREMENTS

1. The Operator shall complete the requirements specified in Table 1 in this Schedule by the relevant completion date and where relevant, shall notify the Agency in writing within 14 days of the completion of each of those requirements.

Table 1

Requirement	Completion Date
1. The Operator shall provide the Agency with a full report of a comprehensive review of whether the current disposal routes (including proposed modifications) continue to represent the best practicable environmental option for waste disposal from the site, together with a programme for carrying out any necessary changes identified by the review.	3 years from the effective date of this Authorisation, and at such intervals thereafter as the Agency specifies in writing.
2. The Operator shall provide the Agency with a full report of a comprehensive review of national and international developments in best practice for minimising all waste disposals, together with a strategy for achieving reductions in discharges.	3 years from the effective date of this Authorisation and at such intervals thereafter as the Agency specifies in writing.
3. The Operator shall provide the Agency with a full report of a comprehensive review of the means used to assess the activity of radionuclides in disposals and to determine compliance with this Authorisation including consideration of national and international developments in best practice.	3 years from the effective date of this Authorisation and at such intervals thereafter as the Agency specifies in writing.
4. The operator shall upgrade the liquid effluent abatement system to ensure appropriate mechanisms are in place to prevent compaction of the ion exchange bed, and ensure that laboratory wastes can be introduced to the system, in order to minimise the creation of waste resin, and the radioactivity of liquid discharges from the laboratory.	3 years from the effective date of the authorisation and at least one year prior to the first discharges from the first Astute submarine build radioactive commissioning operations.
5. The Operator shall sample and analyse liquid effluent discharges of liquid effluent for ¹⁴ C and provide a report to the Environment Agency.	3 months following completion of Power Range Testing on the first Astute class submarine.
6. The Operator shall provide the Agency with a full report on a comprehensive review of the BAE SYSTEMS management arrangements and	3 years from the effective date of the authorisation and at least one year prior to the first discharges

techniques associated with the operation of waste plant and equipment, and the sampling, measurement and analysis of waste discharges.	from the first Astute submarine commissioning operations, and at such intervals thereafter as the Agency specifies in writing.
7. The operator shall provide to the Agency a programme of its internal audit of radioactive waste procedures and waste consignments carried out under the requirement of paragraph 6 in Schedule 1 of this authorisation.	3 months from the effective date of this authorisation, and at such intervals thereafter as the Agency specifies in writing.