



**Environmental Permitting Regulations (England and Wales)
Regulations 2010**

**Compilation of Environment Agency
Requirements, Approvals and Specifications**

made under

Permit Number BU6808/CD9259/V001

Issued to

BAE SYSTEMS Marine Ltd

for the

Disposal of Radioactive Waste from

BARROW SHIPYARDS NUCLEAR SITE

**BARROW-IN-FURNESS
CUMBRIA
LA14 1AF**

Issue V001. Dated 17/09/2010

Environmental Permitting Regulations (England & Wales) 2010 Compilation of Environment Agency Requirements, Approvals & Specifications	
Permit No: BU6808/CD9259 – Variation V001	Date of Issue
BAE SYSTEMS Marine Ltd, Barrow Shipyards Nuclear Site	17 September 2010

CURRENT REQUIREMENTS etc

Authorisation Condition	Requirement etc number	Issue Date
Schedule 1, Paragraph 5	*1/5/003	12/6/06
Schedule 1, Paragraph 6(a)(ii)	1/6(a)(ii)/002	7/4/2008
Schedule 1, Paragraph 6(b)	1/6(b)/002	7/4/2008
Schedule 1, Paragraph 9	1/9/002	7/4/2008
Schedule 1, Paragraph 10	1/10/002	7/4/2008
Schedule 1, Paragraph 15	*1/15/001	24/5/04
Schedule 1, Paragraph 15(b)(iii)	1/15(b)(iii)/001	24/5/04
Schedule 1, Paragraph 15(b)(iv)	*1/15(b)(iv)/001	24/5/04
Schedule 1, Paragraph 15(b)(vi)	1/15(b)(vi)/002	7/4/2008
Schedule 1, Paragraph 15(b)(ix)	1/15(b)(ix)/002	7/4/2008
Schedule 1, Paragraph 17	1/17/002	7/4/2008
Schedule 1, Paragraph 18	*1/18/001	24/5/04
Schedule 1, Paragraph 19	1/19/004	17/09/2010
Schedule 1, Paragraph 22(1)	*1/22(1)/001	24/5/04
Schedule 3, Paragraph 1	*3/1/002	7/4/2008
Schedule 4, Paragraph 1	*4/1/004	7/4/2008
Schedule 4, Paragraph 5	4/5/002	7/4/2008
Schedule 5, Paragraph 2(b)	*5/2(b)/002	7/4/2008
Schedule 5, Paragraph 5	*5/5/002	7/4/2008
Schedule 5, Table 1	*5/T1/001	24/5/04
Schedule 6, Paragraph 5	*6/5/001	14/12/2009
Schedule 6, Paragraph 6	*6/6/001	14/12/2009
Schedule 6, Table 1	*6/T1/001	14/12/2009
Schedule 7, Paragraph 1, Requirement 1	7/1.1/002	7/4/2008
Schedule 7, Paragraph 1, Requirement 2	7/1.2/002	7/4/2008
Schedule 7, Paragraph 1, Requirement 3	7/1.3/002	7/4/2008
Schedule 7, Paragraph 1, Requirement 6	7/1.6/001	24/5/04
Schedule 7, Paragraph 1, Requirement 7	7/1.7/001	24/5/04

* Indicates no details of approvals, specifications, agreements or notifications set against this requirement etc.

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Authorisation Condition

Schedule 1, Paragraph 19

The Operator shall supply such information in such format and within such time as the Agency may specify.

Environment Agency Specification

The Environment Agency specifies the following information, formats and timescales:-

1. The Operator shall report information relating to waste disposals as specified in Table 1 below, at the frequencies and within the timescales specified in that Table, and in accordance with the following:

Where components of a reportable quantity are determined to be Detection Limit¹ figures, the Operator shall provide an assessment of that component of the reportable quantity, treating it as positive data for the purposes of calculating the reportable quantity where appropriate.

- 1 The detection limit is the concentration for which there is 95% probability of detection when a single analytical result is obtained, detection being defined as the concentration which has a 95% probability of being greater than zero. This is alternatively expressed as a 95% probability of exceeding a decision level (or critical level) where the decision level is the level of activity which has a 95% probability of being greater than zero. Formulations of the detection limit for radioactivity measurements are given in:
L A Currie (1968). Limits for Qualitative Detection and Quantitative Determination. Analytical Chemistry, 40, 586-593. This was extended by JWR Dutton (MAFF, 1982) and reproduced in HMSO Publication – Determination of Radioactivity in Water by Multinuclide Gamma Ray Spectrometry 1989.
2. The Operator shall report the results of the environmental monitoring programme as specified in Table 2 below (and see EAR1/9) on a quarterly basis; the reports to be provided within 3 months of the end of the quarter to which they refer and in accordance with the following:
 - (a) All positive results (ie those exceeding the detection limit) shall be reported with an uncertainty which is at the 95% confidence level (ie 1.96 standard deviations). The basis upon which this is derived shall also be reported (eg counting statistics only). Where results are less than, or equal to, the detection limit, the detection limit value shall be reported (see paragraph 1 above for definition of detection limit).
 - (b) Reasons shall be identified for why any:
 - results are late;
 - sample has not been obtained;
 - analysis has not been undertaken;
 - relevant detection limit has not been achieved;

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- (c) Where gamma-spectrometry has been carried out on sediment samples, any positive results for potassium-40 shall be reported.

Table 1 –Waste Disposal Information Requirements

INFORMATION TO BE SUPPLIED #	FREQUENCY REQUIRED	DATE BY WHICH INFORMATION IS TO BE SUPPLIED
As specified in Proforma 1 - Monthly Liquid Effluent Discharge Return.	Monthly	14 days after end of month when discharges made (regardless of whether or not the route was used in that month)
As specified in Proforma 2 – Monthly Gaseous Effluent Discharge Return	Monthly	14 days after end of month when discharges made (regardless of whether or not the route was used in that month)
As specified in Proforma 3 – Annual Return for Transfers of Waste to incinerator at Hythe, Hampshire	Annually	30 days after the end of each calendar year (regardless of whether route was used that year)
As specified in Proforma 4 – Annual Return for Transfers of LLWR Waste	Annually	30 days after the end of each calendar year (regardless of whether route was used that year)
As specified in Proforma 5 Metallic LLW transferred to the operator of the Metals Recycling Facility at Lillyhall or the LLWR for treatment	Annually	60 days after the end of the reporting period

- # Returns may be submitted using a format substantially similar to that shown in the relevant proforma.

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Table 2 – Environmental Monitoring Programme

INFORMATION TO BE SUPPLIED #	FREQUENCY REQUIRED	DATE BY WHICH INFORMATION IS TO BE SUPPLIED
As specified in Proforma 6 – Quarterly Return under the Environmental Monitoring Programme.	Quarterly	3 months after the end of the quarter to which it refers.

3. The Operator shall notify the Agency of any anomalous environmental monitoring results obtained and any remedial action taken.
4. The Operator shall also supply information relating to disposals of radioactive waste as specified in the Reporting Form (proforma 6, referenced PI-2(RAS) below), taking account of the guidance provided in the Reporting Form, and in accordance with the following:
 - (a) the information shall be provided not later than 28 February each year for disposals made during the preceding calendar year;
 - (b) the information provided on release quantities shall be the Operator's best estimate achievable with the time and resources available. The Operator is not required to perform additional monitoring, beyond any demanded by the RSA93 authorisation, in order to complete the Reporting Form; and
 - (c) the information shall be provided by:
 - (i) electronic data capture (on-line form or XML file transfer) at www.environment-agency.gov.uk/pi ; or
 - (ii) sending three paper copies of the completed Reporting Form to the Agency.
5. Information relating to the analysis of check samples as required and specified by EAR1/10 shall be sent to:

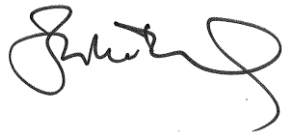
Environment Agency
Radiological Monitoring Assessment
Lutra House,
Dodd Way (Off Seedlee Road),
Walton Summit,
Bamber Bridge,
Preston PR5 8BX.
6. Information required by this specification shall be sent to:

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Nuclear Regulation Group (North)
Environment Agency
Ghyll Mount
Gillan Way
Penrith
Cumbria CA11 9BP

Specification number 1/19/003 issued on 14th December 2009 is withdrawn with effect from 24th September 2010.

This specification is effective from 24th September 2010.



Signed

Dr. Juliet L A Long

Authorised to sign on behalf of the Environment Agency

Dated the16 September 2010

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PROFORMA 1 – MONTHLY LIQUID EFFLUENT DISCHARGE RETURN

BAE SYSTEMS

SERIAL No.

MONTHLY LIQUID EFFLUENT DISCHARGE RETURN	
Month:	Year:
Total Volume of Liquid Effluent Discharged (m³)	

Radionuclides	Total Activity Discharged in the Month (GBq)	Rolling 12 Month Total Activity Discharged (GBq)	% of Annual Limit	Rolling Quarterly Total Activity (GBq)	% of Rolling Quarterly Notification Level
Tritium					
Gamma emitting radionuclides					
Carbon-14			N/A		N/A

Disposal Route	Discharge to Sewer
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This report is made in accordance with BAE SYSTEMS Marine Limited Barrow Shipyards Certificate of Authorisation Number BU6808, issued by the Environment Agency under the provisions of Section 13 of the Radioactive Substances Act 1993.

SIGNATURE	
PRINT NAME	
DATE	

F Radiation Safety 012

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PROFORMA 2 – MONTHLY GASEOUS EFFLUENT DISCHARGE RETURN

BAE SYSTEMS

SERIAL No.

MONTHLY GASEOUS EFFLUENT DISCHARGE RETURN	
Month:	Year:
Total Volume of Gaseous Effluent Discharged (m³)	

Radionuclides	Total Activity Discharged in the Month (GBq)	Total Activity Discharged in the Year (GBq)	% of Annual Limit
Tritium/Tritiated Water			
Argon-41			

Disposal Route	Discharge to Environment
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PRINT NAME	
DATE	

F Radiation Safety 013

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**PROFORMA 3 – ANNUAL RETURN FOR TRANSFERS OF WASTE TO
INCINERATOR AT HYTHE, HAMPSHIRE**

BAE SYSTEMS

YEAR:

ANNUAL RETURN FOR TRANSFERS OF WASTE TO INCINERATOR AT HYTHE, HAMPSHIRE				
Date of Transfer	Volume (m ³)	Tritium (MBq)	Carbon-14 (MBq)	Other Beta / Gamma Emitting Radionuclides (MBq)
ANNUAL TOTALS				
ANNUAL LIMIT (to 31/12/2010)	1.5	30	5	45
ANNUAL LIMIT (from 01/01/2011)	1	5	0	2

Disposal Route	Incineration at Hythe, Hampshire
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PRINT NAME	
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PROFORMA 4 – ANNUAL RETURN FOR TRANSFERS OF LLWR WASTE

BAE SYSTEMS

YEAR:

ANNUAL RETURN FOR TRANSFER OF LLWR WASTE												
DATE of TRANSFER	DESCRIPTION OF WASTE	VOLUME m ³	ACTIVITY, MBq								SPECIFIC ACTIVITY, GBq/tonne	
			Uranium	Radium-226 plus Thorium- 232	Other alpha emitters	Carbon -14	Iodine- 129	Tritium	Cobalt- 60	Other radionuclides	Alpha emitting radionuclides	All other radionuclides
ANNUAL TOTALS:											N/A	N/A
ANNUAL LIMITS:												
OVERALL ANNUAL VOLUME LIMIT			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		

This report is made in accordance with BAE SYSTEMS Marine Limited Barrow Shipyards Certificate of Authorisation Number BU6808, issued by the Environment Agency under the provisions of Section 13 of the Radioactive Substances Act 1993.

SIGNATURE	
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**PROFORMA 5 –
Authorisation No. BJ6348/CB8758 Schedule 7
Metallic LLW Transfer Report**

Year:

Radionuclide or Group of Radionuclides	Metallic LLW Transferred to the Operator of the Metals Recycling Facility at Lillyhall this Year TBq	Metallic LLW Transferred to the LLWR this Year for Treatment TBq
Uranium		
Radium (Ra)-226 plus Thorium (Th)-232		
Other alpha emitters ¹		
Carbon (C)-14		
Iodine (I)-129		
Tritium (H)-3		
Cobalt (Co)-60		
Other radionuclides ²		
Volume (m ³)		
Weight (kg)		

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 the Table and
- b) any other radionuclides specified in writing by the Agency

Report Number: nnnn

Version number: n

Issue date: dd month yyyy

Prepared by: (Print name)..... Signature:.....

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PROFORMA 6 – QUARTERLY RETURNS UNDER THE ENVIRONMENTAL MONITORING PROGRAMME

BAE SYSTEMS

QUARTERLY RETURN UNDER THE ENVIRONMENTAL MONITORING PROGRAMME	
SAMPLE DATE	
QUARTER	

ANALYSIS OF SEDIMENT				
LOCATION	OLD SLIPWAY BEHIND SMITE GRID REF	ROA ISLAND GRID REF		
ANALYTE	ACTIVITY Bq/kg DRY WEIGHT	WET/DRY RATIO	ACTIVITY Bq/kg DRY WEIGHT	WET/DRY RATIO
Co-60				
K-40				
C-14				
Mn-54				
H-3 (OBT)				
Gamma Dose Rate at 1 m (LWM/HWM)	µSv/hr		µSv/hr	

ANALYSIS OF SHELLFISH		
TYPE	MUSSELS	
LOCATION	ROA ISLAND GRID REF.	
ANALYTE	ACTIVITY Bq/kg DRY WEIGHT	WET/DRY RATIO
Co-60		
C-14		
Mn-54		
H-3 (OBT)		

**indicates measured result at or below the Limit of Detection*

This report is made in accordance with BAE SYSTEMS Marine Limited Barrow Shipyards Certificate of Authorisation Number BU6808, issued by the Environment Agency under the provisions of Section 13 of the Radioactive Substances Act 1993.

SIGNATURE	
PRINT NAME	
DATE	

F RADIATION SAFETY 002

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PROFORMA 7

PI-2(RAS): Pollution Inventory reporting form for radioactive waste



**ENVIRONMENT
AGENCY**

Pollution Inventory reporting form for radioactive waste

Annual disposals (including transfers)
Radioactive Substances Act 1993

Please read the guidance notes on this form carefully before you complete it.

You may make an electronic return using an on-line web form or XML file transfer (details available by following the links from www.environment-agency.gov.uk/pi) instead of using this paper form.

This reporting form is published by the Environment Agency for the purpose of obtaining information from operators on annual activity releases of radioactive wastes to air, water and sewer and annual transfers of radioactive wastes to other sites or operators (**see note 1 on the scope of reporting**).

The form consists of six parts:

Part 1 About the report, declaration and confidentiality

Part 2 Releases to air

Part 3 Releases to sewer

Part 4 Releases to controlled water

Part 5 Transfers of radioactive waste and

Part 6 Guidance notes

Which part of the form to fill in

Everyone must fill in Part 1, questions 1.1 – 1.7, completing releases on other Parts as appropriate. Return to Part 1, then fill in and sign questions 1.8 – 1.9 'Disclosure of information' and 'Declaration'. Part 1 *will help you to decide which other parts you need to complete*.

1 About the report

1.1 Authorisation number (see note 2)

Reference number of authorisation for site

1.2 Operator's details

Operator's name

Address

Postcode

Contact points

Phone

Fax

Email

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1.3 Year this report covers

Releases to the environment

Releases to the environment are those releases which are made directly to the environment and not transferred to another organisation first for them to make the release.

1.4 Releases to air (see note 3)

Does your authorisation(s) allow the release of radioactive waste directly to air, including by on-site incineration, (ie not transferred to another organisation or site which then releases to air) ?

No ☐ go to question 1.5

Yes ☐ please complete Part 2 of this form and then go to question 1.5

1.5 Releases to sewers (see note 3)

Does your authorisation(s) allow the release of radioactive waste directly to sewer (ie not transferred to another organisation or site which then releases to sewer) ?

No ☐ go to question 1.6

Yes ☐ please complete Part 3 of this form and then go to question 1.6

1.6 Releases to controlled water (see note 3)

Does your authorisation(s) allow the release of radioactive waste directly to controlled water (ie not transferred to another organisation or site which then releases to controlled water) ?

No ☐ go to question 1.7

Yes ☐ please complete Part 4 of this form and then go to question 1.7

Transfers of Radioactive Waste

1.7 Transfers of radioactive waste

Do your authorisation(s) allow for the transfer of radioactive waste to another organisation or site?

No ☐ go to question 1.8

Yes ☐ please complete Part 5 of this form and then go to question 1.8

Disclosure of information

For many years government policy has been to give the public access to information held by agencies and authorities who deal with environmental issues.

The Environment Agency and relevant local authorities must allow members of the public to examine specified documents covered by the Radioactive Substances Act 1993 (RSA93). The only exceptions to this are

- *where the Secretary of State or the National Assembly for Wales has decided to restrict access to the information on the grounds of national security*
- *trade secrets and information about 'relevant processes'. RSA93 defines a 'relevant process' as 'any process applied for the purposes of, or in connection with, the production or use of radioactive material'.*

In practice, this means that the information in this form will be made publicly available. If you believe any information provided on this form is confidential, because it is covered by one of the above exceptions, you should

- enclose a letter giving your reasons in full
- check the 'confidential' box next to the items on the form which you think are confidential.

1.8 Do you consider any of the information reported in the attached tables is confidential?

No ☐

Yes ☐ please give details

- ☐ some of the information
- ☐ all of the information

please remember to include a letter giving your reasons.

Declaration

1.9 Please ensure you have completed all parts of the form and sign below.

Signature

Name

Position

Date

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public register.

What happens next?

Please make three copies of the completed form. Send the original and two copies of the form back to your local Environment Agency office. The remaining copy should be retained for your own records.

If you need to find out where your local office is, please contact us on 0845 9333 111.

Part 2 Releases to air starts on the next page

The Data Protection Act 1998

"The Environment Agency is responsible for regulating environmental protection, flood defence, water resources and fisheries. It has a duty to discharge its functions to protect and enhance the environment and to promote conservation and recreation".

The information provided will be processed by the Environment Agency to fulfil its regulatory and monitoring functions, and the form may be placed on relevant public register(s).

We may also use the information and/or disclose it in connection with the following:

- offering/providing you with our literature/services relating to environmental matters
- consulting with the public, public bodies and other organisations (eg Health and Safety Executive Local Authorities, Emergency Services, Defra, National Assembly for Wales) on environmental issues
- carrying out statistical analysis, research and development on environmental issues
- providing public register information to enquirers
- investigating possible breaches of environmental law and taking any resulting action
- preventing breaches of environmental law
- Assessing customer service satisfaction and improving our service.

We may pass it on to our agents/representatives to do these things on our behalf.

You should ensure that any persons named on this form are informed of the contents of this Data Protection Notice.

If the person completing the form has good reason for not wishing to sign the form (eg personal security) then the form should be passed to a senior manager who is willing to sign the form. If this is not possible you will need to write to your local Agency office to explain your concerns and seek agreement that both a signed and unsigned form can be submitted. The unsigned form will be placed on the

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Part 2 Releases to air

Please refer to the guidance notes in Part 6

Please use units of Bq and scientific notation (eg 4.2 10⁹ Bq or 4.2 E9 Bq).

Annual reporting threshold	Radionuclide	Release to air		Confidential?
		Total release (Bq)	Method	reasons should be provided
		N/A, BRT or release (see note 4)	M, C or E (see note 5)	Tick if claimed
1 10 ¹¹ Bq (100 GBq)	Tritium			
1 10 ⁹ Bq (1 GBq)	Carbon-14			
1 10 ¹¹ Bq (100 GBq)	Fluorine-18			
1 10 ⁸ Bq (100 MBq)	Sulphur-35			
1 10 ¹² Bq (1 TBq)	Argon-41			
1 10 ¹² Bq (1 TBq)	Krypton-85			
1 10 ¹² Bq (1 TBq)	Technetium-99m			
1 10 ⁹ Bq (1 GBq)	Ruthenium-106			
1 10 ⁷ Bq (10 MBq)	Iodine-125			
1 10 ⁶ Bq (1 MBq)	Iodine-129			
1 10 ⁷ Bq (10 MBq)	Iodine-131			
1 10 ¹² Bq (1 TBq)	Xenon-133			
1 10 ⁸ Bq (100 MBq)	Caesium-137			
1 10 ⁹ Bq (1 GBq)	Radon-222 (see note 6)			
1 10 ⁷ Bq (10 MBq)	Uranium alpha			
1 10 ⁶ Bq (1 MBq)	Plutonium alpha			
1 10 ⁶ Bq (1 MBq)	Americium-241			
Please account for any other releases, which you have not reported above:				
1 10 ⁶ Bq (1 MBq)	Other Alpha Particulate (see note 8)			
1 10 ⁶ Bq (1 MBq)	Other Beta/Gamma Particulate (see note 8)			

Part 3 Releases to sewer is on the next page

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Part 3 Releases to sewer

Please refer to the guidance notes in Part 6

Please use units of Bq and scientific notation (eg 4.2 10⁹ Bq or 4.2 E9 Bq).

Annual reporting threshold	Radionuclide	Release to sewer		Confidential?
		Total release (Bq)	Method	reasons should be provided
		N/A, BRT or release (see note 4)	M, C or E (see note 5)	Tick if claimed
1 10 ⁶ Bq (1 MBq)	Total Alpha (see note 7)			
1 10 ⁶ Bq (1 MBq)	Total Beta/Gamma (excl tritium) (see note 7)			
1 10 ¹¹ Bq (100 GBq)	Tritium			
1 10 ⁸ Bq (100 MBq)	Carbon-14			
1 10 ¹⁰ Bq (10 GBq)	Fluorine-18			
1 10 ⁸ Bq (100 MBq)	Sodium-22			
1 10 ⁶ Bq (1 MBq)	Phosphorus-32			
1 10 ⁷ Bq (10 MBq)	Phosphorus-33			
1 10 ⁷ Bq (10 MBq)	Sulphur-35			
1 10 ⁷ Bq (10 MBq)	Chromium-51			
1 10 ⁷ Bq (10 MBq)	Cobalt-57			
1 10 ⁶ Bq (1 MBq)	Cobalt-58			
1 10 ⁶ Bq (1 MBq)	Cobalt-60			
1 10 ⁸ Bq (100 MBq)	Gallium-67			
1 10 ⁶ Bq (1 MBq)	Selenium-75			
1 10 ⁹ Bq (1 GBq)	Strontium-89			
1 10 ⁷ Bq (10 MBq)	Strontium-90			
1 10 ⁹ Bq (1 GBq)	Yttrium-90			
1 10 ⁶ Bq (1 MBq)	Zirconium-95			
1 10 ⁶ Bq (1 MBq)	Niobium-95			
1 10 ⁶ Bq (1 MBq)	Technetium-99			
1 10 ¹⁰ Bq (10 GBq)	Technetium-99m			
1 10 ⁸ Bq (100 MBq)	Ruthenium-106			
1 10 ⁸ Bq (100 MBq)	Indium-111			
1 10 ⁸ Bq (100 MBq)	Antimony-125			
1 10 ⁹ Bq (1 GBq)	Iodine-123			
1 10 ⁸ Bq (100 MBq)	Iodine-125			

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Annual reporting threshold	Radionuclide	Release to sewer		Confidential?
		Total release (Bq)	Method	<i>reasons should be provided</i>
		<i>N/A, BRT or release (see note 4)</i>	<i>M, C or E (see note 5)</i>	Tick if claimed
1 10 ⁷ Bq (10 MBq)	Iodine-129			
1 10 ⁸ Bq (100 MBq)	Iodine-131			
1 10 ⁷ Bq (10 MBq)	Caesium-134			
1 10 ⁷ Bq (10 MBq)	Caesium-137			
1 10 ⁸ Bq (100 MBq)	Cerium-144			
1 10 ⁸ Bq (100 MBq)	Samarium-153			
1 10 ¹¹ Bq (100 GBq)	Erbium-169			
1 10 ⁹ Bq (1 GBq)	Thallium-201			
1 10 ⁷ Bq (10 MBq)	Thorium-230			
1 10 ⁷ Bq (10 MBq)	Thorium-232			
1 10 ⁸ Bq (100 MBq)	Uranium alpha			
1 10 ⁷ Bq (10 MBq)	Neptunium-237			
1 10 ⁷ Bq (10 MBq)	Plutonium alpha			
1 10 ⁸ Bq (100 MBq)	Plutonium-241			
1 10 ⁷ Bq (10 MBq)	Americium-241			
1 10 ⁸ Bq (100 MBq)	Curium-242			
Please account for any other releases, which you have not reported above:				
1 10 ⁶ (1 MBq)	Other Alpha (see note 8)			
1 10 ⁶ (1 MBq)	Other Beta/Gamma (see note 8)			

Part 4 Releases to controlled water and land starts on the next page

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Part 4 Releases to controlled water

Please refer to the guidance notes in Part 6

Please use units of Bq and scientific notation (eg 4.2 10⁹ Bq or 4.2 E9 Bq)

Annual reporting threshold	Radionuclide	Release to controlled water		Confidential?
		Total release (Bq)	Method	reasons should be provided
		N/A, BRT or release (see note 4)	M, C or E (see note 5)	Tick if claimed
1 10 ⁶ Bq (1 MBq)	Total Alpha (see note 7)			
1 10 ⁶ Bq (1 MBq)	Total Beta/Gamma (excl tritium) (see note 7)			
1 10 ¹² Bq (1 TBq)	Tritium			
1 10 ⁸ Bq (100 MBq)	Carbon-14			
1 10 ¹⁰ Bq (10 GBq)	Sulphur-35			
1 10 ⁷ Bq (10 MBq)	Cobalt-60			
1 10 ⁸ Bq (100 MBq)	Strontium-90			
1 10 ⁹ Bq (1 GBq)	Yttrium-90			
1 10 ⁹ Bq (1 GBq)	Zirconium-95			
1 10 ⁸ Bq (100 MBq)	Niobium-95			
1 10 ⁹ Bq (1 GBq)	Technetium-99			
1 10 ⁹ Bq (1 GBq)	Ruthenium-106			
1 10 ¹⁰ Bq (10 GBq)	Antimony-125			
1 10 ⁸ Bq (100 MBq)	Iodine-129			
1 10 ⁷ Bq (10 MBq)	Caesium-134			
1 10 ⁸ Bq (100 MBq)	Caesium-137			
1 10 ⁹ Bq (1 GBq)	Cerium-144			
1 10 ⁷ Bq (10 MBq)	Thorium-230			
1 10 ⁷ Bq (10 MBq)	Thorium-232			
1 10 ⁸ Bq (100 MBq)	Uranium alpha			
1 10 ⁸ Bq (100 MBq)	Neptunium-237			
1 10 ⁸ Bq (100 MBq)	Plutonium alpha			
1 10 ¹⁰ Bq (10 GBq)	Plutonium-241			
1 10 ⁸ Bq (100 MBq)	Americium-241			
1 10 ¹⁰ Bq (10 GBq)	Curium-242			
Please account for any other releases, which you have not reported above:				
1 10 ⁶ (1 MBq)	Other Alpha (see note 8)			

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Annual reporting threshold	Radionuclide	Release to controlled water		Confidential?
		Total release (Bq)	Method	<i>reasons should be provided</i>
		<i>N/A, BRT or release (see note 4)</i>	<i>M, C or E (see note 5)</i>	Tick if claimed
1 10 ⁶ (1 MBq)	Other Beta/Gamma (see note 8)			

Part 5 Transfers of radioactive waste starts on the next page

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Part 5 Transfers of radioactive waste (see note 9)

Please refer to the guidance notes in Part 6
Please note that transfers of VLLW (ie waste disposed of as normal refuse under the terms of your authorisation) for disposal should not be reported

Please use units of Bq and scientific notation (eg 4.2 10⁹ Bq or 4.2 E9 Bq).

Part 5a Transfers of radioactive waste for incineration

Annual reporting threshold	Radionuclide	Total transfer (Bq)	Method	Confidential? reasons should be provided
		<i>N/A, BRT or release (see note 4)</i>	<i>M, C or E (see note 5)</i>	Tick if claimed
1 10 ⁶ (1 MBq)	Total Alpha (see note 7)			
1 10 ⁶ (1 MBq)	Total Beta/Gamma (excl tritium) (see note 7)			
1 10 ¹¹ (100 GBq)	Tritium			

Part 5b Transfers of radioactive waste for controlled burial at a landfill site specified in authorisation

Annual reporting threshold	Radionuclide	Total transfer (Bq)	Method	Confidential? reasons should be provided
		<i>N/A, BRT or release (see note 4)</i>	<i>M, C or E (see note 5)</i>	Tick if claimed
1 10 ⁶ (1 MBq)	Total Alpha (see note 7)			
1 10 ⁶ (1 MBq)	Total Beta/Gamma (excl tritium) (see note 7)			
1 10 ¹¹ (100 GBq)	Tritium			

Part 5c Transfers of radioactive waste for disposal at Drigg

Annual reporting threshold	Radionuclide	Total transfer (Bq)	Method	Confidential? reasons should be provided
		<i>N/A, BRT or release (see note 4)</i>	<i>M, C or E (see note 5)</i>	Tick if claimed
1 10 ⁶ (1 MBq)	Total Alpha (see note 7)			
1 10 ⁶ (1 MBq)	Total Beta/Gamma (excl tritium) (see note 7)			
1 10 ¹¹ (100 GBq)	Tritium			

Part 5d Other transfers of radioactive waste

Annual reporting threshold	Radionuclide	Total transfer (Bq)	Method	Confidential? reasons should be provided
		<i>N/A, BRT or release (see note 4)</i>	<i>M, C or E (see note 5)</i>	Tick if claimed
1 10 ⁶ (1 MBq)	Total Alpha (see note 7)			
1 10 ⁶ (1 MBq)	Total Beta/Gamma (excl tritium) (see note 7)			
1 10 ¹¹ (100 GBq)	Tritium			

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Part 6 Guidance notes

Note ref	Subject	Guidance
1	Scope of reporting	Reports should be provided by all persons holding a radioactive waste disposal authorisation. Reports will not be required for disposal of radionuclides which fall below the Schedule 1 limits in the Radioactive Substances Act 1993. Similarly, reports will not be required for the disposal of radioactive waste covered by exemptions orders.
2	Authorisation Number	Please enter the authorisation number for the main Radioactive Substances Act 1993 authorisation for the organisation on the site (ie the authorisation covering the majority of the disposal routes). Nuclear sites should enter the number used for charging purposes for the site. Please contact your local Agency office if you do not have this number.
3	Releases to air, sewer and controlled waters	• Releases to air - Releases to air means those releases from atmospheric discharge points specified in the authorisation(s) (including incinerator stacks), together with fugitive releases. • Releases to sewer - Discharges to sewer are those for which the non-radioactive component is controlled under Section 118 of the Water Industry Act 1991. This section states that effluent from trade premises may only be discharged to a public sewer with the consent of the sewerage undertaker. Such consent is made in the form of a 'trade effluent discharge consent' issued by the undertaker upon application by the occupier of the trade premises. • Controlled waters - Controlled waters are as defined in Section 104 of the Water Resources Act 1991. Definitions for coastal waters, estuaries and rivers/inland waters are outlined below: – Sea or coastal waters, for the reporting form, are those waters up to three miles from the coast. The detailed definition is: 'A coastal water means all the water on the landward side of a line every point of which is at a distance of three nautical miles on the seaward side from the nearest point of the baseline from which the breadth of territorial waters is measured, extending where appropriate in the case of watercourses, up to the outer limit of the estuary.' The baseline referred to here is an outline round the coast of the United Kingdom which coincides with the outer edge of all estuaries and which 'rounds off' the details of the coast. Maps of the baseline are held by the Environment Agency. – Estuary is defined in line with the Urban Waste Water Treatment Directive (91/271/EEC): 'estuary means the transitional area at the mouth of a river between fresh water and coastal waters. Member states shall establish the outer (seaward) limits of estuaries for the purpose of this Directive...'. Estuary boundaries have been established by the United Kingdom in pursuance of this definition, and maps of these boundaries are held by the Environment Agency. – Rivers and inland waters include surface fresh waters which are defined, by default, as those inland surface waters which are not part of an estuary.
4	Release, BRT or NA	An entry is required for each and every radionuclide listed, in the 'Total release' column. You must put either release data, 'BRT' or 'NA' in each box: • Release – where a release occurs the amount released should be reported as radioactivity in units of Becquerel (Bq) and scientific notation (eg 4.2 10⁹ Bq or 4.2 E9 Bq). The Agency recommends that two significant figures are used when reporting the quantity of activity released (ie 4.2 10⁹ rather than 4.21 10⁹). When rounding figures to achieve two significant figures, round up from the number 5 or above, and down from the figure 4 or below (eg 1.55 10⁹ would be rounded up to 1.6 10⁹ and 1.54 10⁹ would be rounded down to 1.5 10⁹). • BRT – below reporting threshold level: Where the release has been determined and is found to be below the indicated annual reporting level thresholds this may be entered on the reporting form as BRT. The threshold reporting levels for a given radionuclide to a particular medium are outlined in the reporting form for each individual radionuclide to the medium concerned. If you would prefer to report the actual release to the Agency, then you may do so. However, the release will be reported as less than the relevant threshold when it is reported on the Agency's website. • NA – not applicable: Where no release of this radionuclide occurs to that medium this should be entered on the reporting form as N/A.

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- 5 **Measurement, Calculation and Estimation** The reporting form requires that the operator state how each release has been primarily determined. There are three ways of determining the release, which are by:

- Measurement (M) - releases derived from direct monitoring results, based on actual monitoring of a radionuclide via a given discharge route.
- Calculation (C) - releases based on calculation from plant/operation specific data.
- Estimation (E) - releases based on best estimates.

The Agency does not consider that there is a hierarchy in terms of quality of data obtained by measurement, calculation or estimation.

Measurement includes:

- Spot sampling and analysis of effluent held in a tank prior to discharge.
- Flow proportional sampling of effluent during discharge and subsequent analysis.

Calculation includes:

- Derivation of total activity which has been released to sewer from records of the volumes of laboratory solutions and their reference activity concentration which have been disposed of to drain via a laboratory sink.
- Assessment of the releases to sewer from the recorded activity of radio-pharmaceutical products which have been administered to patients, combined with well characterised excretion rates for these products from patients. Use of the excretion rates contained within the Agency's field officers handbook may be considered to fall within this category.
- Use of well characterised radionuclide specific incinerator partitioning factors along with data on input activities to the incinerator which have been derived through calculation or measurement. In this case, measurement means sampling and analysis of the waste to be incinerated and calculation means, for example, recorded volumes and activity concentrations of waste radiochemical products.
- Use of nuclear codes to assess activity of noble gases present in fuel elements and assumption that this inventory is released to air during processing.
- Calculation of total alpha and total beta/gamma releases by summation of the individual releases of radionuclides, where the majority of these releases have been determined by measurement or calculation.

Estimation includes:

- Derivation of releases to air and sewer based on previous experience of the likely proportion of activity released to air and sewer from a particular type of experiment and the number of such experiments performed in a year.
- Use of incinerator partitioning factors along with data on input activities to the incinerator which have been derived through estimation. Estimation in this case includes bags of clinical waste which have been monitored with portable radiological instruments and activity content assigned on the basis of conversion factors from counts per second or dose rate to activity.
- Derivation of total alpha and total beta/gamma releases by summation of the individual releases of radionuclides, where the majority of these releases have been determined by estimation.

Where a key part of the derivation of a release is based on estimation, then the release should be considered to have been estimated, whether or not, measurement and calculation have also been used.

- 6 **Radon-222** It is only necessary to report radon-222 releases to air where there is a specific limit for this radionuclide in your authorisation. The intention is to only report process releases of radon-222. However, it is technically challenging to separate natural releases of radon-222 (eg from building materials and underlying bedrock) from process releases. There are a few significant process related releases of radon-222 in England and Wales. These are recognised by authorisation limits being placed on this particular radionuclide.

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- 7 **Total alpha and total beta/gamma (excl tritium)** The Agency is requiring that all operators report the total alpha and total beta/gamma (excluding tritium) releases to controlled water or sewer. This is to enable release data to be collated so that compliance with the targets in the UK Discharge Strategy 2002 - 2020 can be assessed. Releases of total alpha and total beta/gamma to air are not required as there are no targets for these in the UK Discharge Strategy. Some operators already have authorisations which contain total alpha and total beta/gamma limits and undertake monitoring against these limits. However, for many operators, some calculation of the total alpha and total beta/gamma releases will need to be made.
- **Sites measuring releases of total alpha, total beta/gamma or other activity (normally nuclear sites) -** Where total alpha or total beta/gamma is measured to determine compliance with an authorisation, then best practicable means will be employed to measure the site specific mix of radionuclides. For this reason, some operators will use gas proportional counting for total beta/gamma measurements, for example, and others will use liquid scintillation counting. Whatever the method used, you should report these measurements of total alpha and/or total beta/gamma.
 - **No measurements of total alpha or total beta/gamma (normally non-nuclear sites) -** Where no measurements of total alpha or total beta/gamma activity are made, then the sum of the individual releases of alpha-emitting and beta/gamma emitting radionuclides (excluding tritium) should be calculated for reporting purposes. You should report all non-alpha emitting radionuclides in the total beta/gamma category, except tritium. For example, positron emitters and electron-capture radionuclides should be reported as total beta/gamma. Tritium is excluded from the beta/gamma category because of the relatively large releases and significantly lower radiological impact compared to other beta/gamma radionuclides.
- 8 **Other alpha and other beta/gamma** You may have authorised releases of other radionuclides which are not listed on the form. These releases should be accounted for under the generic categories of other alpha and other beta/gamma. You should report all non-alpha emitting radionuclides in the other beta/gamma category. For example, positron emitters and electron-capture radionuclides should be reported as other beta/gamma. The purpose of reporting against this category is to enable the Agency to identify any significant reporting omissions.
- For releases to air, the categories of other alpha particulate and other beta/gamma particulate are specified. It has been judged to be unreasonable to expect nuclear operators to quantify all their releases of short-half-life noble gases under an other alpha or beta/gamma category. Hence the other alpha and other beta/gamma categories are limited to particulate releases. For some radionuclides, releases could be in either particulate or gaseous form. If you would prefer to assume that all other alpha and beta/gamma releases are particulate then you may do so rather than take disproportionate efforts in attempting to exclude the gaseous components.
- 9 **Transfers of radioactive waste** Transfers of radioactive waste in any form (ie solid, liquid or gaseous) should be reported for waste movements only. This does not cover movement of radioactive substances. As indicated under note 1, transfers of radioactive waste covered by exemption orders should not be reported. All transfers between different organisations or sites (ie inter-site transfers), not covered by 5a, 5b or 5c, should be reported under Part 5d Other Transfers. This will include reporting of transfers of liquid waste made via a pipeline from one organisation to another under Part 5d Other Transfers.