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Collation and presentation of radioactivity trend data from MAFF monitoring programmes from 1994-1998

FOOD STANDARDS AGENCY

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Environment Report RL 4/05

Collation and presentation of radioactivity trend data from MAFF monitoring programmes from 1994-1998

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Project RP0445

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SUMMARY

Until April 2000, the Ministry of Agriculture, Fisheries and Food operated a nationwide monitoring programme for radioactivity. At that time responsibility for the bulk of the programme transferred to the Food Standards Agency.
This project took the basic data from the published annual reports of the monitoring and produced a text for wide readership describing the longer-term trends in discharges, levels in the environment and doses to critical groups.

1. INTRODUCTION

The Ministry of Agriculture, Fisheries and Food (MAFF) had an extensive programme of monitoring radioactivity in food and the environment of the UK until March 2000. At that time responsibility for the major part of the programme transferred to the Food Standards Agency, on its formation in April 2000. MAFF had a policy of making the results of its programme openly available in reports published each year (for example MAFF, 1995 and Camplin, 1995). However, the reports were highly detailed and technical, and did not consider the longer term trends in levels in food and the environment or in the resulting radiation exposures. MAFF therefore developed a requirement that had two main aims:

- To produce information for a wide readership, primarily in the vicinity of nuclear installations, describing the impact from radioactive waste discharges, and
- To present this information in the context of time trends. The period chosen for the project was 1994 - 1998.

The work undertaken for MAFF is summarised in this report. It comprises a brief description of the approach used to collect and assess relevant information. The main products are a draft document to present the information (Appendix 1) and the detailed data on which the presentation is based (Appendices 2 and 3).

The Food Standards Agency inherited the results of the project in April 2000 and have managed the subsequent publication of this report. The project was undertaken by the Centre for Environment, Fisheries and Aquaculture Science (CEFAS)

2. APPROACH

2.1. Data Collection

The scope of the project was defined to comprise the main sites discharging radioactive wastes in England and Wales. The sites are listed in Table 1. Three main types of data were collected:

- Liquid and gaseous discharges of radioactivity
- Concentrations of radioactivity in the environment and dose rates in intertidal areas for the most important locations near nuclear sites

- Doses assessed for the most exposed members of the public, the "critical group".

Most conventional pathways were considered. However, the impact of direct radiation and of gaseous discharges, which are not readily detected in the environment through monitoring (primarily argon-41), was not included.

Data have been collected for the period 1994-1998 from three main sources:

- the Aquatic Environment Monitoring Report (AEMR) for 1994 (Camplin, 1995),
- the Terrestrial Radioactivity Monitoring Report for 1994 (MAFF, 1995)
- the Radioactivity in Food and the Environment Reports (RIFE) for 1995-1998 (MAFF, 1996; MAFF and SEPA, 1997, 1998, 1999).

In view of the importance of the Sellafield site a longer period was chosen for some data taking in the period 1989-1998 (Hunt, 1990, Camplin, 1992,1993a, 1993b, 1994, MAFF, 1990, 1991, 1992, 1993, 1994)

Much of this data was available in electronic files held by CEFAS following their use in preparation of AEMR and RIFE reports. Other data was transferred from MAFF. Initial discussions with the customer established the breadth of data to be included and the general format of tables and graphs in which they were to be displayed. In compiling the data into a form suitable for the trend report, any changes in methodology, which had taken place between AEMR, RIFE and TRAMP reports (e.g. in determining dose coefficients) were removed and a consistent approach for the whole period was used. In bringing together data from annual reports into the trend report quality control checks were undertaken to ensure that the data had been transferred and manipulated correctly.

2.2. Data Description

A draft document was prepared which comprised two main parts:

- generic text introducing the terms and quantities used in radiological protection and the principles and practice underlying the monitoring programmes.

- Site-specific text including trend charts of the data and information on operations, ownership and waste disposal routes.

The data for presentation in the trend charts was selected to represent the most significant aspects of discharges and their effects. A brief commentary on any gross changes over the relevant periods was included in the site texts. However, in many cases there was little change of significance.

3. RESULTS

The results of the project are given in Appendices to this report.

- Appendix 1 – draft site-specific text for each of the 20 sites considered
- Appendix 2 – the underlying discharge and dose rate data
- Appendix 3 - estimates of dose to critical groups

The data tables are available in the form of Excel files from CEFAS.

4. ACKNOWLEDGEMENTS

The authors are grateful to the Ministry of Agriculture, Fisheries and Food for funding the project and to Paul Tossell of the Food Standards Agency for his helpful advice as Project Officer in the latter stages of the project.

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TABLE 1: Scope of data

Site	Period
Aldermaston	5 years, 1994-1998
Amersham	5 years, 1994-1998
Barrow	5 years, 1994-1998
Berkeley and Oldbury	5 years, 1994-1998
Bradwell	5 years, 1994-1998
Capenhurst	5 years, 1994-1998
Cardiff	5 years, 1994-1998
Devonport	5 years, 1994-1998
Dungeness A and B	5 years, 1994-1998
Hartlepool	5 years, 1994-1998
Harwell	5 years, 1994-1998
Heysham 1 and 2	5 years, 1994-1998
Hinkley Point A and B	5 years, 1994-1998
Sellafield and Drigg	10 years, 1989-1998
Sizewell A and B	5 years, 1994-1998
Springfields	5 years, 1994-1998
Trawsfynydd	5 years, 1994-1998
Winfrith	5 years, 1994-1998
Wylfa	5 years, 1994-1998

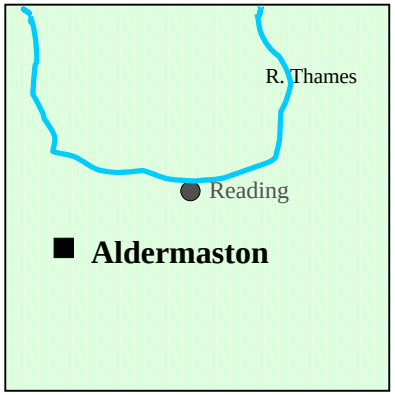
APPENDIX 1

A brief description of sites including trends in radionuclides discharged, monitored levels in food and the environment, and estimated radiation doses to local inhabitants.

Notes

1. **Descriptions of operations and owners are for 2004, not 1998.**
2. **Some of the concentrations are below analytical detection limits, but are presented in the graphs as positive values.**
3. **Doses below 0.005 mSv (i.e. 0.5% of the dose limit) are presented in the graphs as 0.5%.**

Aldermaston



FACTS

Operations	A nuclear defence establishment currently run by The Atomic Weapons Establishment Management Ltd
Owners	Owned by the Ministry of Defence
Wastes	Gaseous wastes from various stacks on site. Liquid discharges are made to the River Thames at Pangbourne, the Aldermaston Stream and to the sewage works at Silchester

STANDARDS

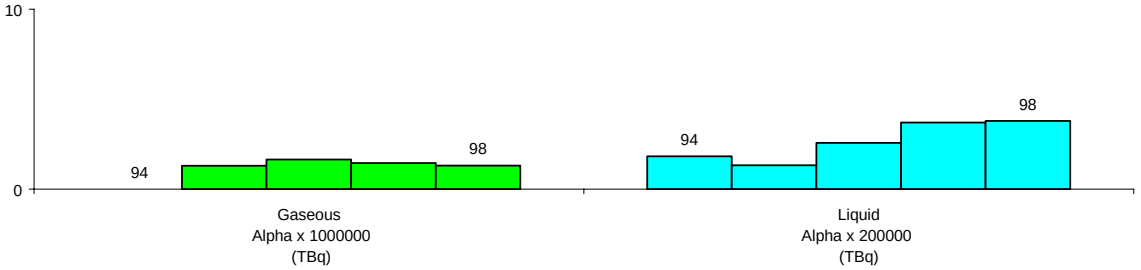
No major trends in discharges took place in this period though there was a slight increase in the liquid alpha radioactivity discharged.

Measured levels are similar to those expected for natural radioactivity and fallout. Variations in levels are unlikely to be site related. Reductions in tritium levels in milk are due to the introduction of more accurate methods of measurement which have lower detection levels

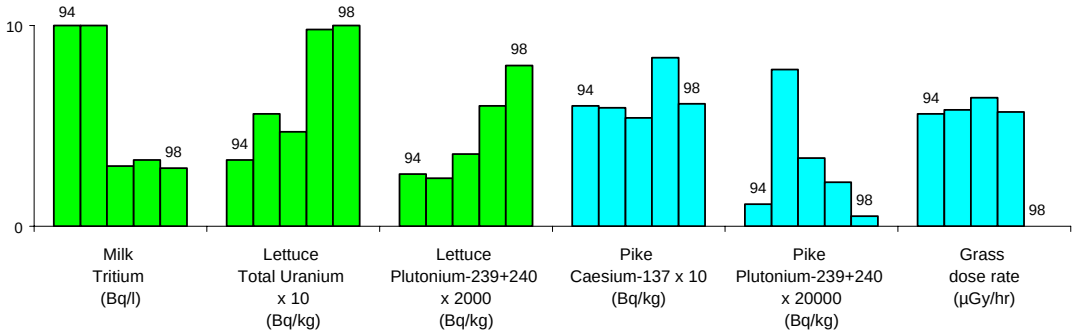
Doses to local people are less than 10 microsieverts in a year or **less than 1% of the limit**.

TRENDS

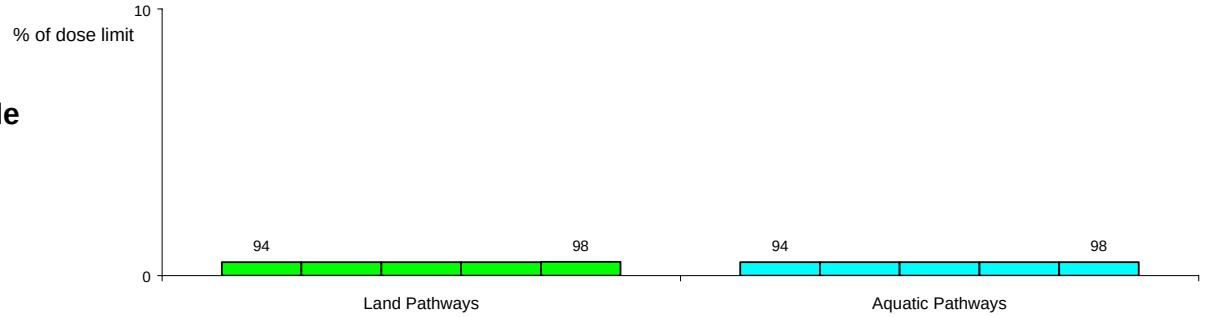
Waste Discharge



Food and Environment



Dose To People



Amersham

FACTS

Operations	Manufactures radioactively labelled materials for use in medicine, research and industry
Owners	Owned by GE Healthcare
Wastes	Gaseous wastes, are discharged from various stacks on site Discharges of liquid wastes are made to sewers serving the Maple Lodge sewage works; releases enter the Grand Union Canal and the River Colne

STANDARDS

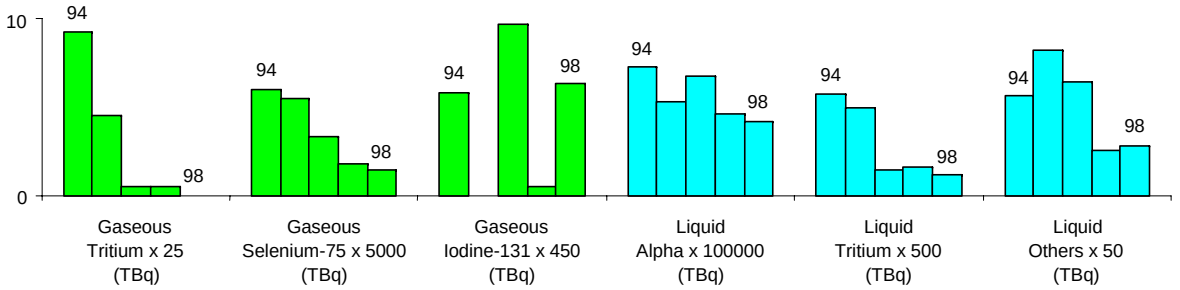
There was a general decrease in gaseous and liquid discharges over the 5 year period with the exception of gaseous iodine.

Measured levels in food and the environment are similar to those expected for natural radioactivity and fallout with only very small site-related increases.
No major trends in contamination are evident. Reductions in tritium levels in milk are due to the introduction of more accurate methods of measurement which have lower detection levels.

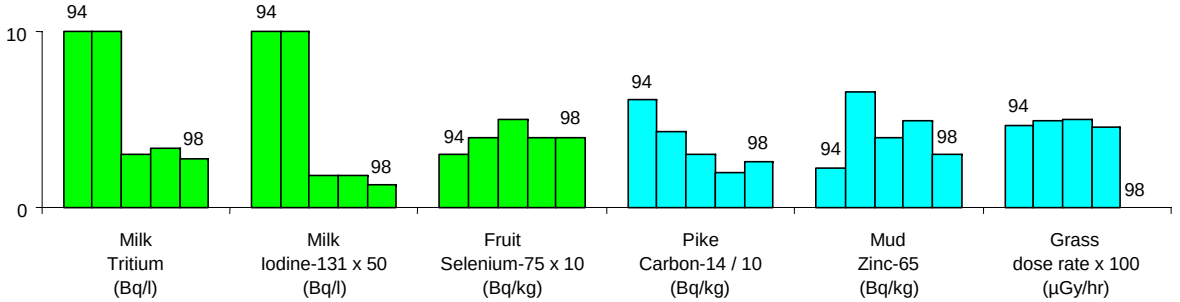
Doses to local people are less than 20 microsieverts in a year or **less than 2% of the limit.**

TRENDS

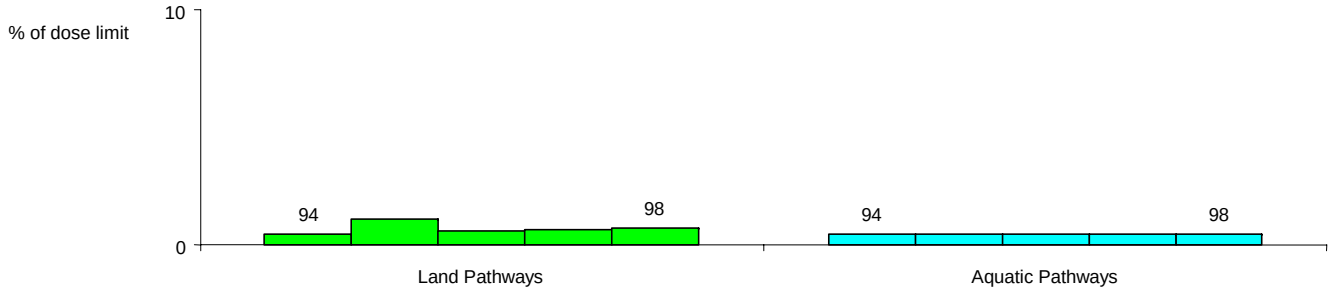
Waste discharge



Food and environment



Dose to people



Barrow

FACTS

Operations	A nuclear defence establishment currently run by BAE Systems Marine Ltd
Owners	Owned by the Ministry of Defence
Wastes	Very small amounts of liquid wastes relating to submarine activities are discharged into the Irish Sea

STANDARDS

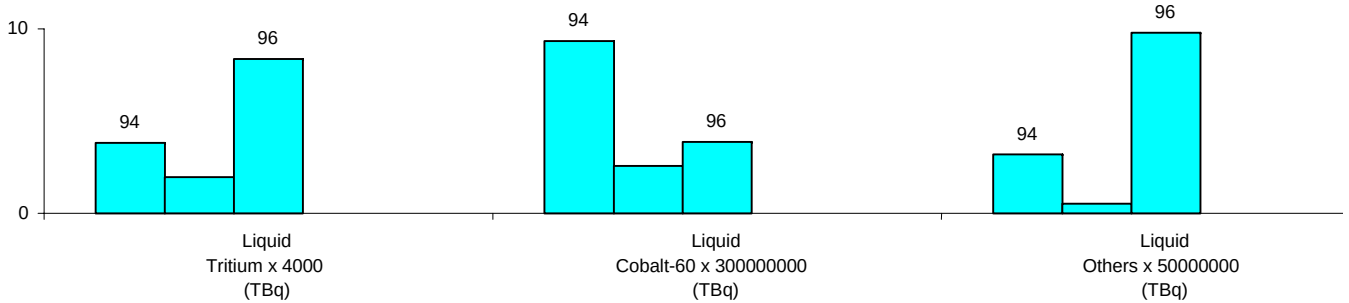
Discharges were very low with no discharges from the site in 1997 and 1998.

Natural radioactivity and Sellafield are the main sources of radioactivity detected. No major trends in contamination are evident, however, there was a steady increase in cobalt-60 in mud and sand due to Sellafield.

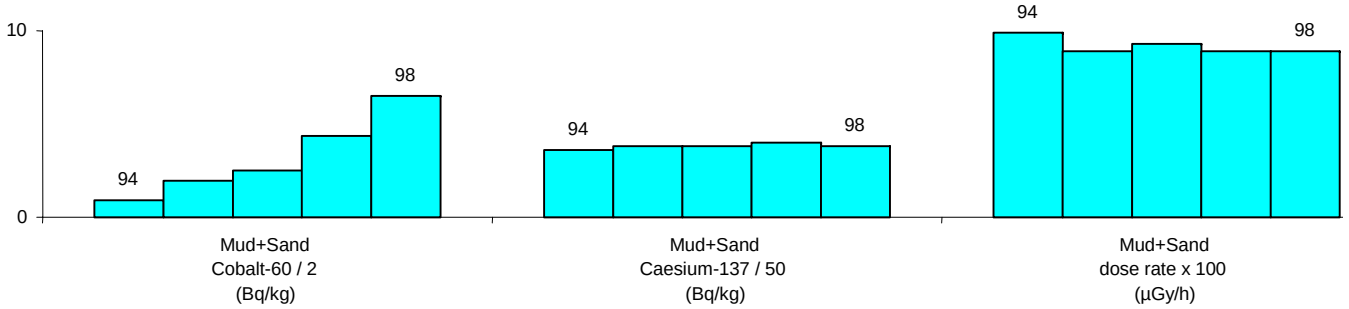
Doses to local people are less than 40 microsieverts in a year or **less than 4% of the limit.** They are mainly due to Sellafield.

TRENDS

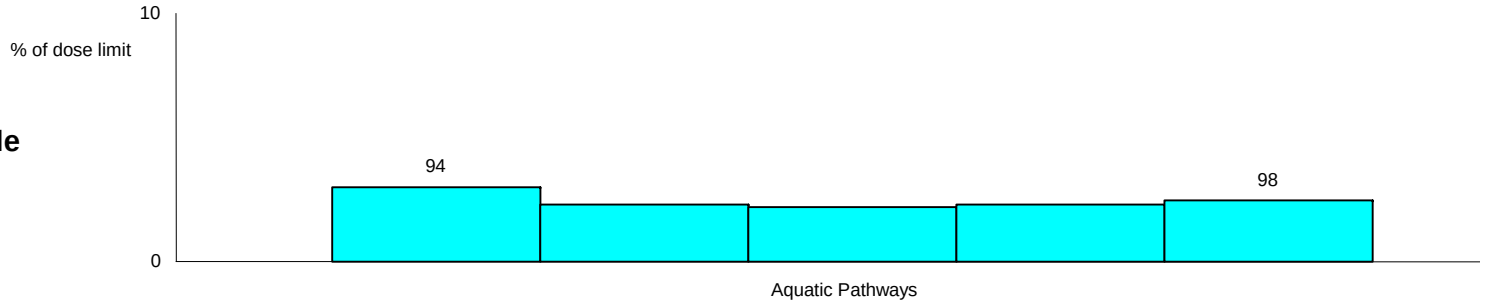
Waste discharge



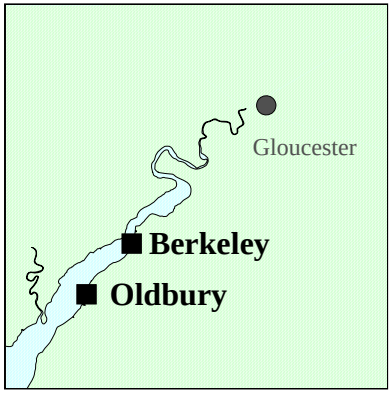
Food and environment



Dose to people



Berkeley and Oldbury



FACTS

Operations	Berkeley, a nuclear power station undergoing decommissioning Berkeley Technology Centre, a research facility Oldbury, a nuclear power station powered by Magnox reactors; capacity 430 Megawatts
Owners	Berkeley and Oldbury are currently owned by BNFL plc.
Wastes	Gaseous wastes are discharged from reactor buildings and stacks, mostly tritium and carbon-14. Liquid radioactive wastes are discharged into the Severn Estuary, mostly tritium and caesium-137.

STANDARDS

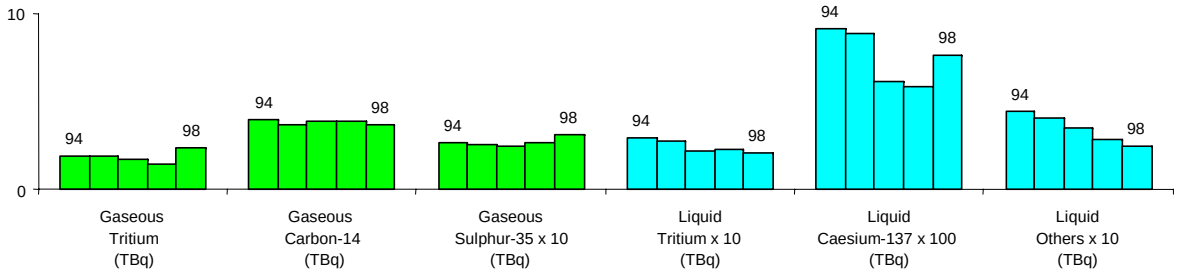
The sites are considered together as any effects will be in the same area.
No major trends in discharges took place though there was a small decrease in the liquid wastes discharged over the five year period.

Radioactivity detected includes natural radioactivity, Sellafield radioactivity in samples from the sea, radioactivity from other sites discharging into the Bristol Channel and fallout from weapons testing and Chernobyl.
A small amount of site-related activity in food and the local environment are detected.
No major trends in contamination are evident. Reductions in tritium levels in milk are due to the introduction of more accurate methods of measurement which have lower detection levels

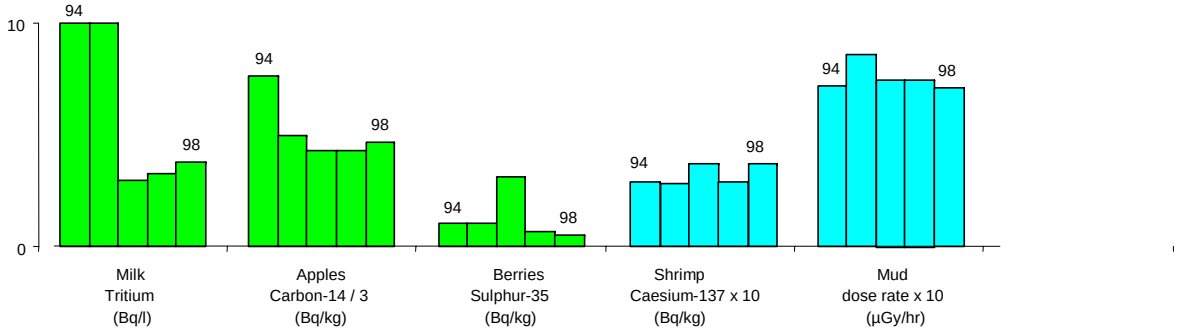
Doses to local people are less than 20 microsieverts in a year or **less than 2% of the limit.**

TRENDS

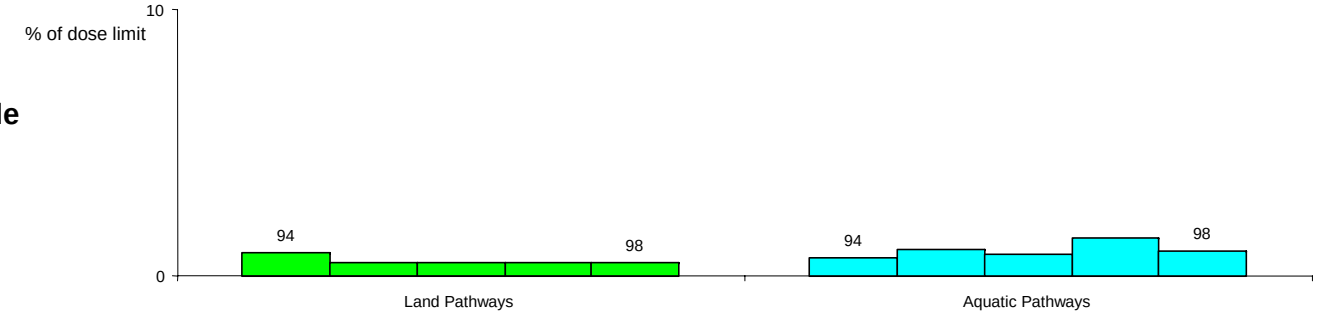
Waste discharge



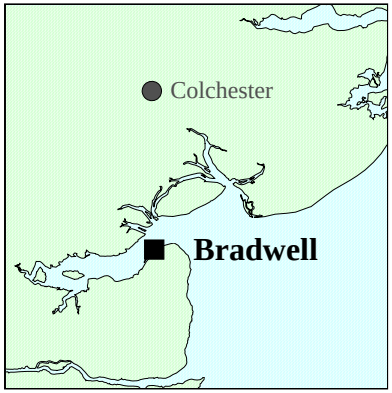
Food and environment



Dose to people



Bradwell



FACTS

Operations	A nuclear power station currently undergoing decommissioning
Owners	Owned by BNFL plc.
Wastes	Gaseous wastes are discharged from reactor buildings and stacks. Liquid wastes discharge from a pipeline to the River Blackwater Estuary

STANDARDS

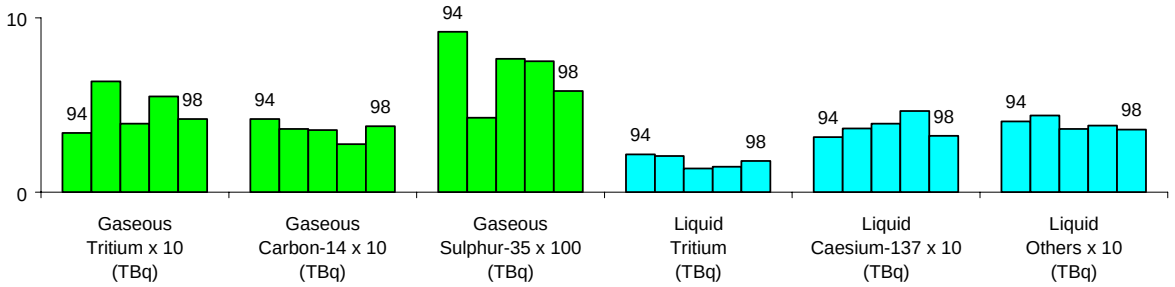
No major trends in discharges took place in this period.

Small increases in radioactivity above background levels in food and the local environment are found due to the site. The normal background sources of natural radioactivity, Sellafield radioactivity in samples from the sea and fallout from weapons testing and Chernobyl are detected. No major trends in contamination are evident, though a small decrease in zinc-65 in oysters has occurred. Reductions in tritium levels in milk are due to the introduction of more accurate methods of measurement which have lower detection levels

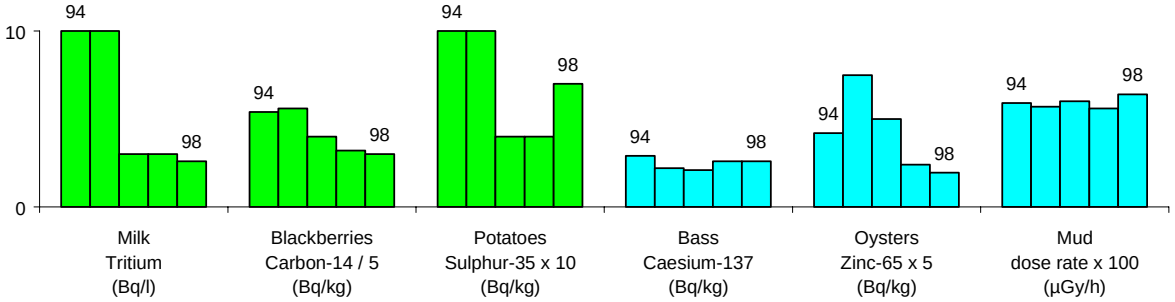
Doses to local people are less than 20 microsieverts in a year or **less than 2% of the limit**.

TRENDS

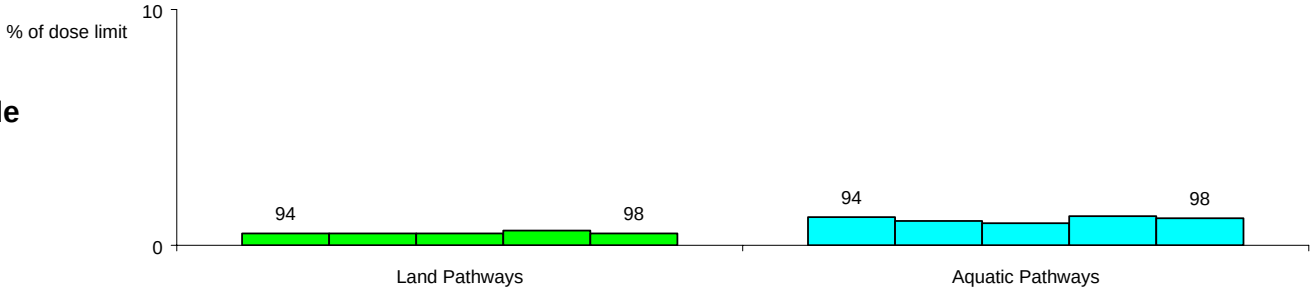
Waste discharge



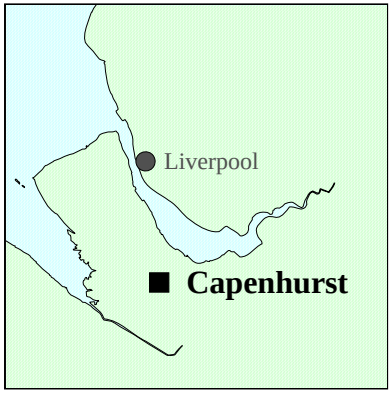
Food and environment



Dose to people



Capenhurst



FACTS

Operations	Enrichment of uranium and dismantling of redundant plant
Owners	Enrichment facility owned by Urenco (Capenhurst) Ltd Redundant plant owned by BNFL plc
Wastes	Gaseous wastes discharged via stacks Liquid wastes discharged via the Rivacre Brook to the Mersey Estuary.

STANDARDS

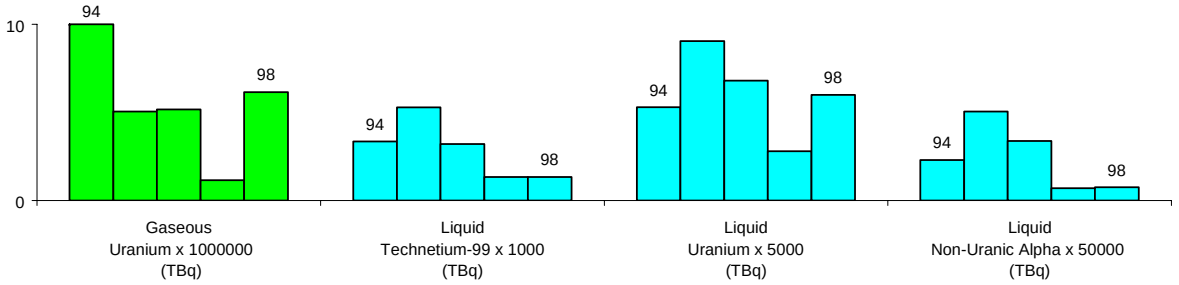
There was a general, small decrease in gaseous and liquid discharges over the 5 year period.

There is a general decrease in levels in food and the local environment. Small increases in technetium-99 in mud are likely to be due to Sellafield.

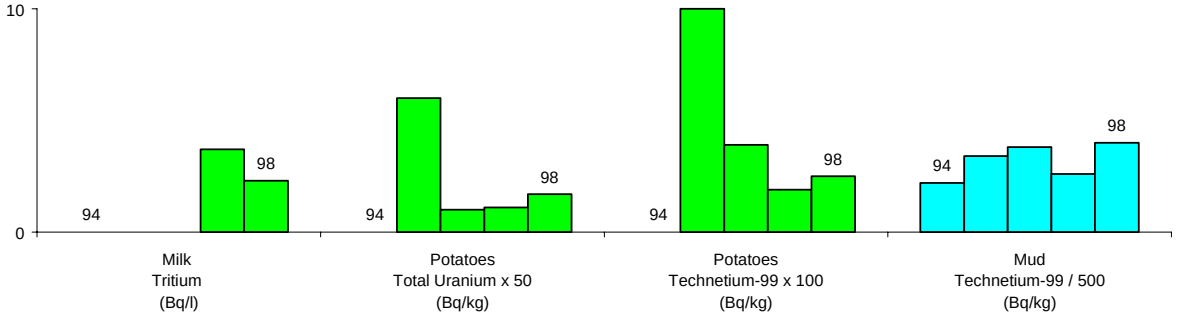
Dose to local people are less than 20 microsieverts in a year or **less than 2% of the limit**.

TRENDS

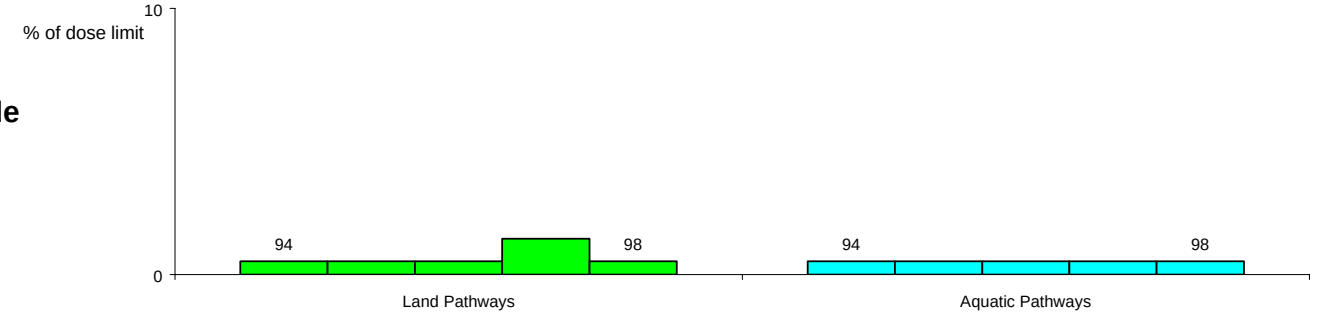
Waste discharge



Food and environment



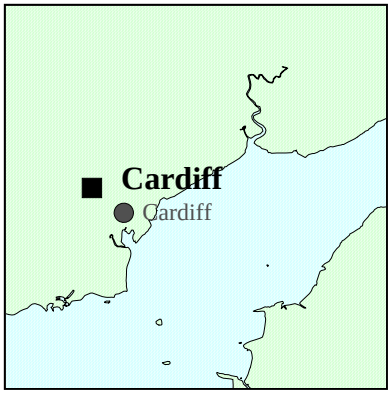
Dose to people



Cardiff

FACTS

Operations	Production of radiolabelled compounds used in research, diagnostic kits used in medicine and radio-pharmaceuticals
Owners	Owned by GE Healthcare
Wastes	Gaseous wastes are discharged from stacks, mostly tritium and carbon-14. Liquid wastes are discharged via sewer and the River Taff into the Severn Estuary. Mostly tritium and carbon-14



STANDARDS

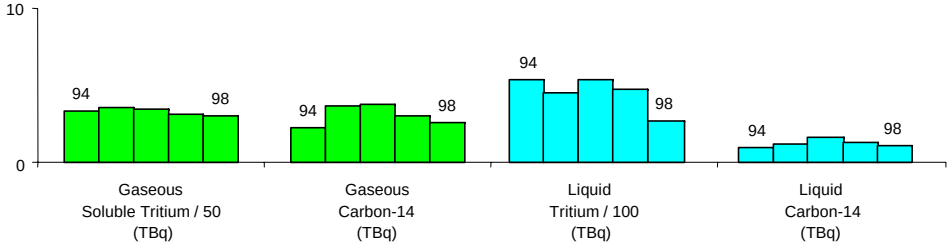
No major trends in discharges took place in this period.

The radioactivity in the majority of food and local environment samples remained generally constant over the period and affected by discharges from the site.
Normal background sources of natural radioactivity, possible Sellafield radioactivity in samples from the sea and fallout from weapons testing and Chernobyl were detected.
No major trends in contamination are evident.

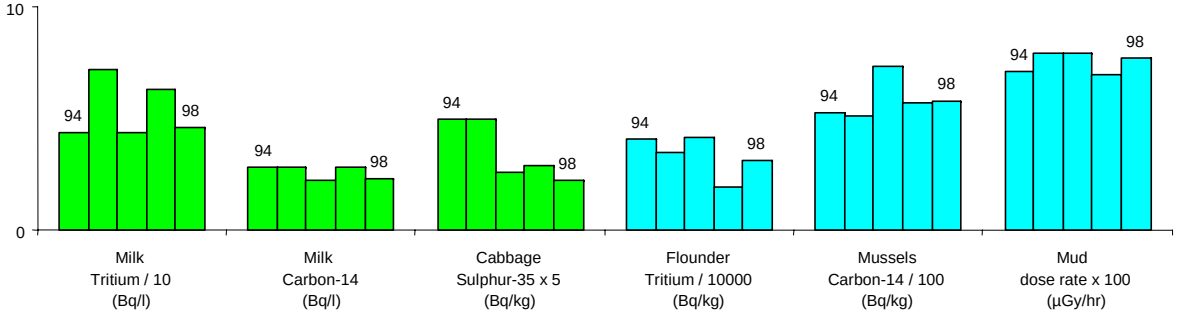
Doses to local people are less than 100 microsieverts in a year or **less than 10% of the limit.**

TRENDS

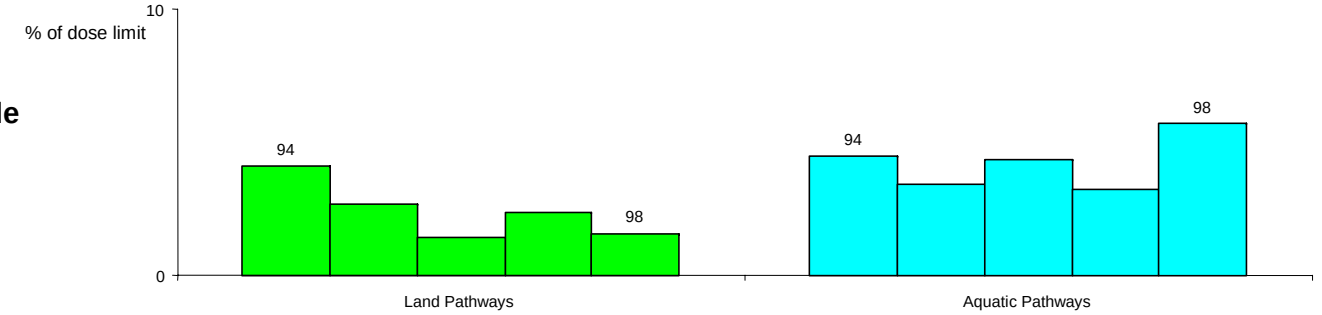
Waste discharge



Food and environment



Dose to people



Devonport

FACTS

Operations	Devonport, a defence establishment currently run by Devonport Royal Dockyard Ltd
Owners	Owned by the Ministry of Defence
Wastes	Discharges of liquid wastes, mostly tritium, made via sewer and pipeline to the Tamar Estuary.

STANDARDS

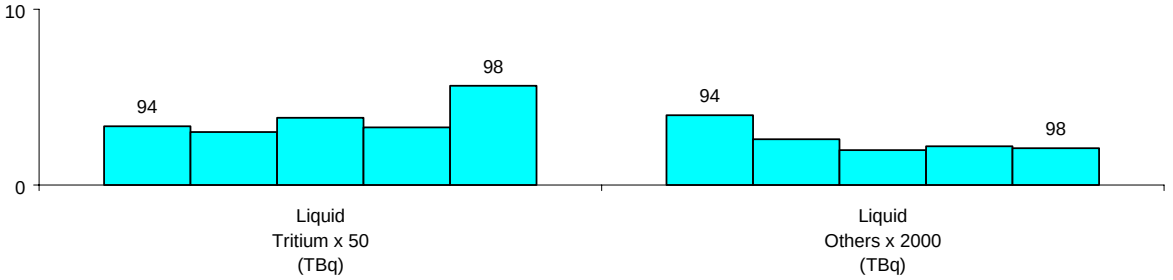
Discharges to sea remained generally constant throughout the period.

The small amounts of radioactivity detected in food and the local environment were mostly due to the normal background sources of natural radioactivity, possible Sellafield radioactivity in samples from the sea and fallout from weapons testing and Chernobyl. Cobalt-60 from the site is also evident. No major trends are apparent.

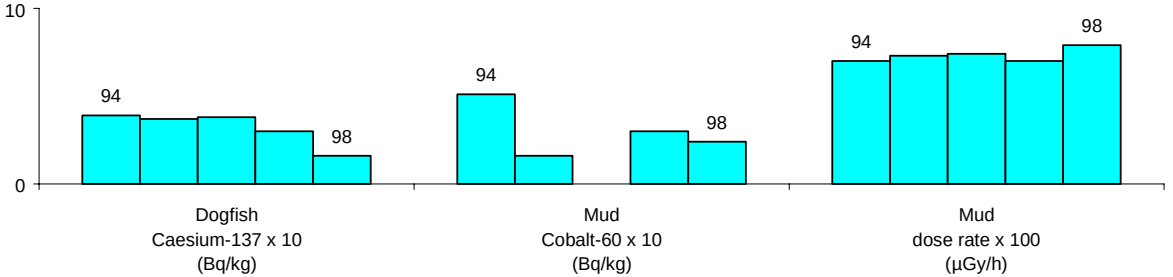
Doses to local people are less than 20 microsieverts in a year or **less than 2% of the limit.**

TRENDS

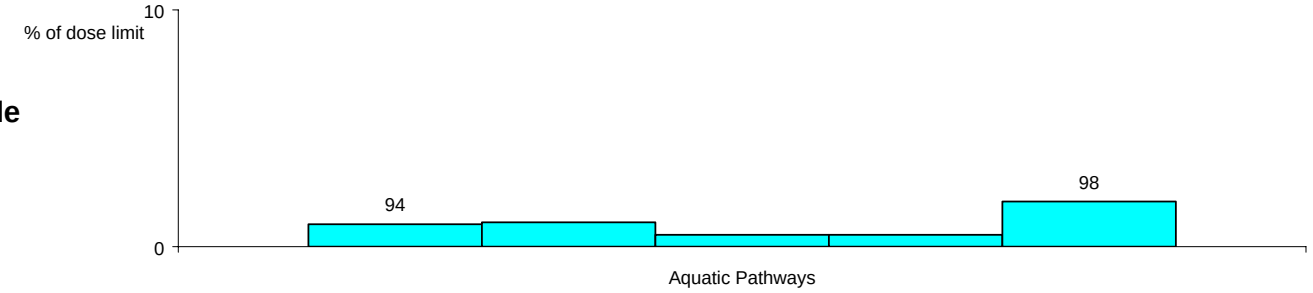
Waste discharge



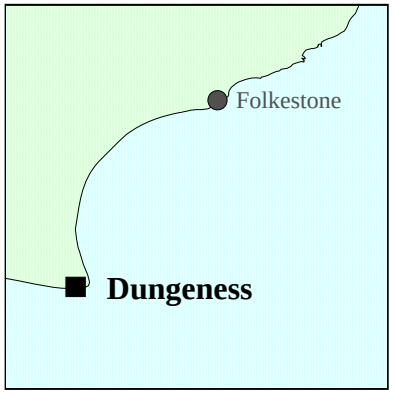
Food and environment



Dose to people



Dungeness



FACTS

Operations	Dungeness 'A', a nuclear power station powered by Magnox reactors; capacity 450 Megawatts Dungeness 'B', a nuclear power station powered by Advanced Gas-cooled Reactors; capacity 1110 Megawatts
Owners	'A' currently owned by BNFL plc. 'B' currently owned by British Energy Generation Ltd
Wastes	Gaseous wastes from reactor buildings and stacks, mostly carbon-14 and tritium Liquid wastes from separate, but adjacent outfalls to the English Channel, mostly tritium and caesium-137

STANDARDS

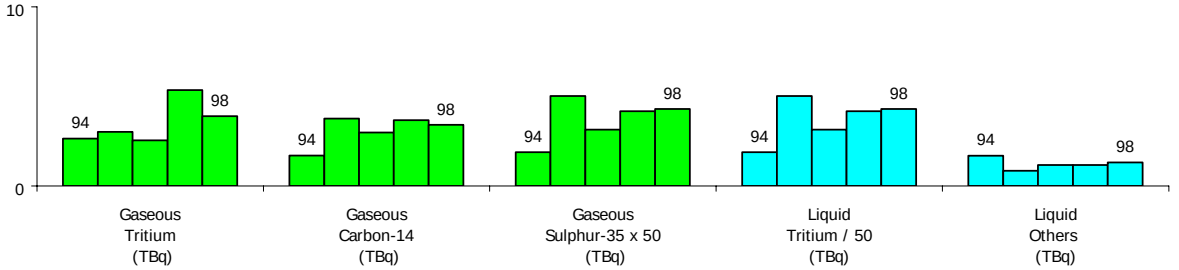
There was a small general increase in gaseous and liquid waste discharges over the five years.

Small increases above background levels in food and the local environment are found due to the site. The normal background sources of natural radioactivity and fallout from weapons testing and Chernobyl are also detected.
No major trends in contamination are evident. The levels of sulphur-35 in green beans and cobalt-60 in shrimp showed variability. Reductions in tritium levels in milk are due to the introduction of more accurate methods of measurement which have lower detection levels

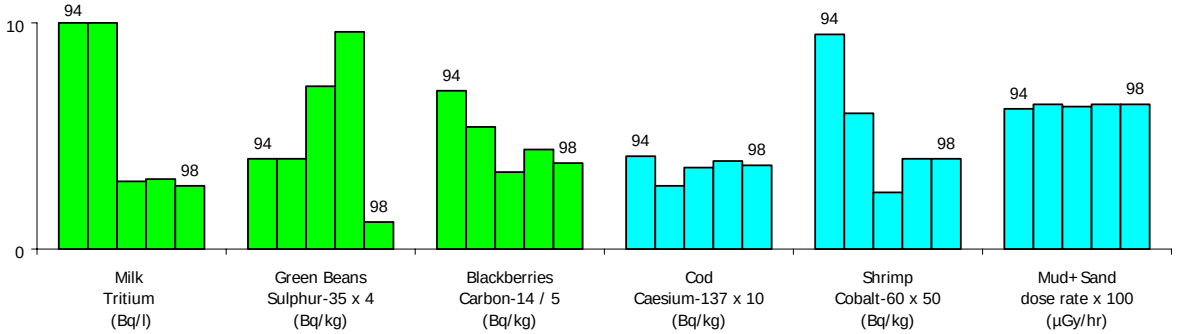
Doses to local people are less than 30 microsieverts in a year or **less than 3% of the limit.**

TRENDS

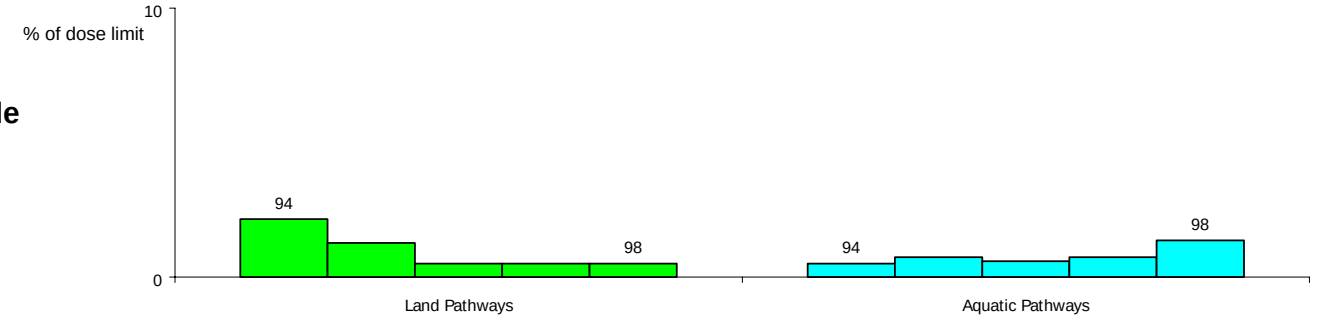
Waste discharge



Food and environment



Dose to people



Hartlepool

FACTS

Operations	A nuclear power station powered by twin Advanced Gas-cooled Reactors; capacity 1210 Megawatts
Owners	Currently owned by British Energy Generation Ltd
Wastes	Gaseous wastes from reactor buildings and stacks, mostly carbon-14 and tritium. Liquid wastes from pipeline to the North Sea, mostly tritium.

STANDARDS

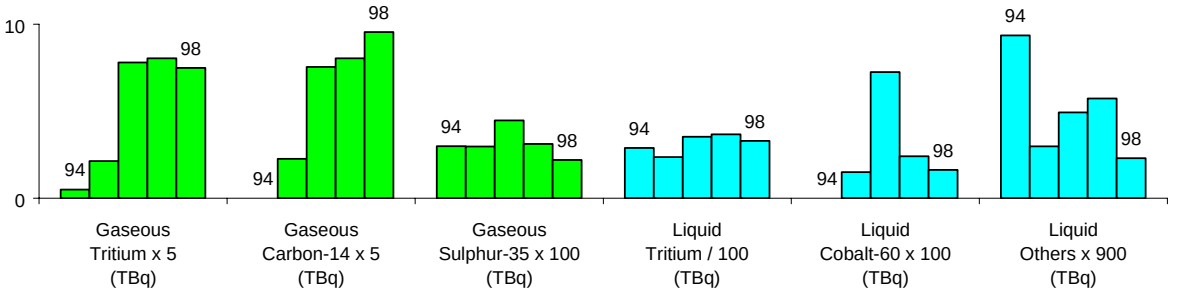
No major trends in discharges took place in this period, though there was an increase in gaseous carbon-14 and tritium.

Only small increases above background levels in food and the local environment due to the site are found. The normal background sources of natural radioactivity, Sellafield radioactivity in samples from the sea and fallout from weapons testing and Chernobyl are detected.
No major trends in contamination are evident. Reductions in tritium levels in milk are due to the introduction of more accurate methods of measurement which have lower detection levels

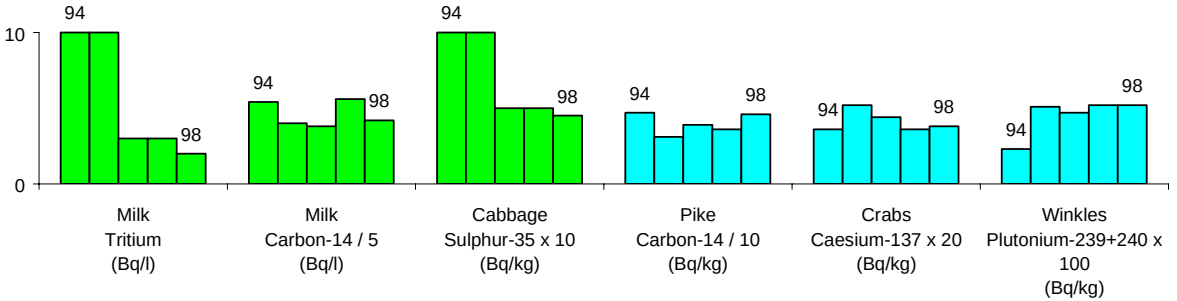
Doses to local people are less than 20 microsieverts in a year or **less than 2% of the limit.**

TRENDS

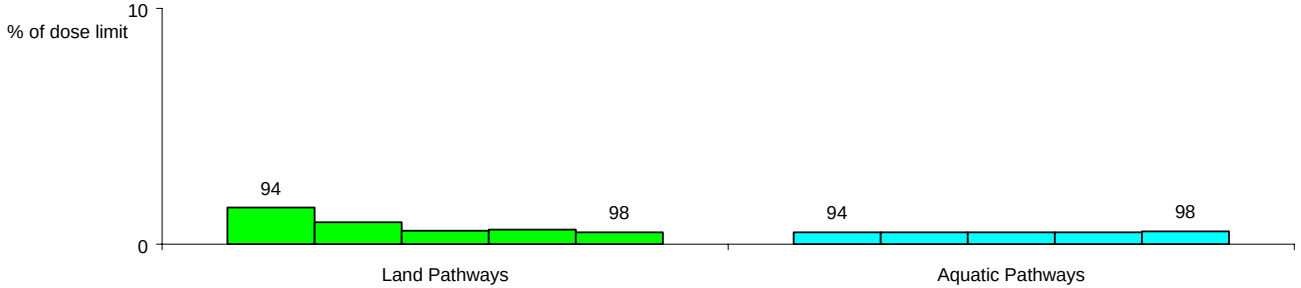
Waste discharge



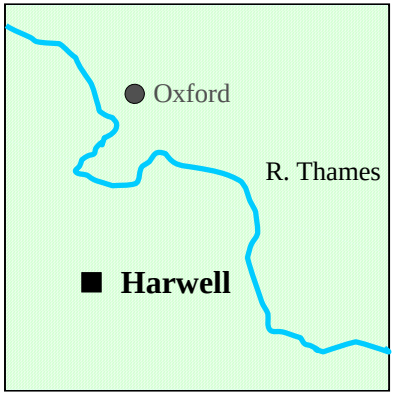
Food and environment



Dose to people



Harwell



FACTS

Operations	Radiochemical laboratories and high-active handling facilities
Owners	Owned by the United Kingdom Atomic Energy Authority
Wastes	Gaseous wastes into the atmosphere, mostly tritium. Liquid discharges to River Thames at Sutton Courtenay and to the Lydebank Brook, mostly tritium

STANDARDS

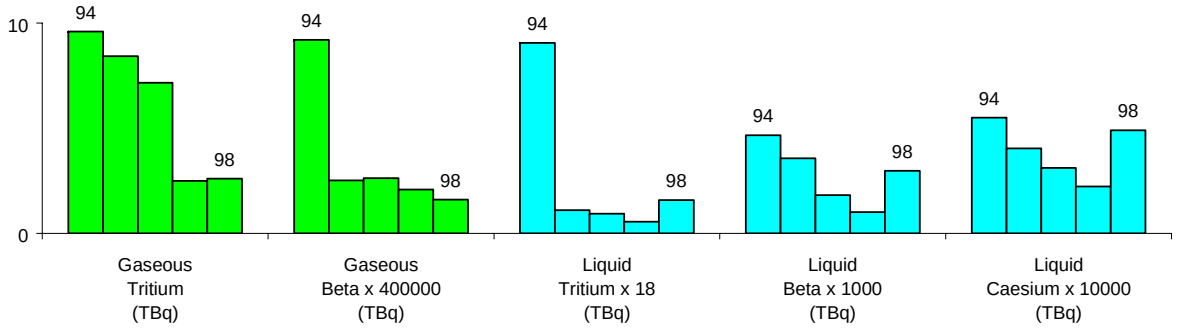
All gaseous and liquid discharges decreased over this period as operations involving radioactivity declined.

Small increases in radioactivity above background levels in food and the local environment are found due to the site. The normal background sources of natural radioactivity are detected.
No major trends in contamination are evident. Reductions in tritium levels in milk and honey are due to the introduction of more accurate methods of measurement which have lower detection levels

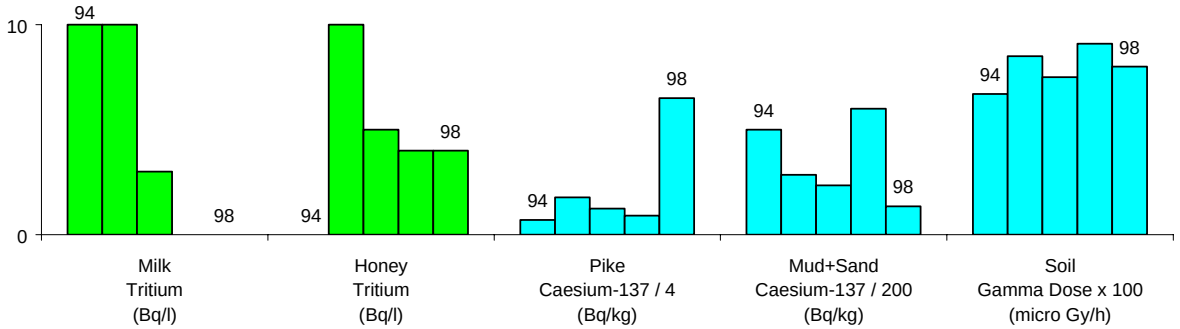
Doses to local people are less than 20 microsieverts in a year or **less than 2% of the limit.**

TRENDS

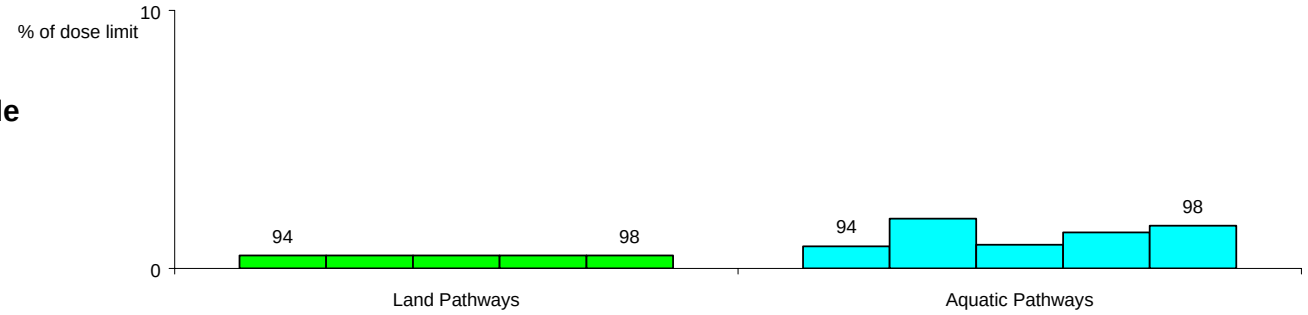
Waste discharge



Food and environment



Dose to people



Heysham

FACTS

Operations	Two nuclear power stations powered by Advanced Gas-cooled Reactors; Heysham '1' capacity 1150 Megawatts Heysham '2' capacity 1250 Megawatts
Owners	Both stations currently owned by British Energy Generation Ltd
Wastes	Gaseous wastes from reactor buildings and stacks. Mostly carbon-14 and tritium. Liquid wastes, mostly tritium, discharged from adjacent outfalls to Morecambe Bay,

STANDARDS

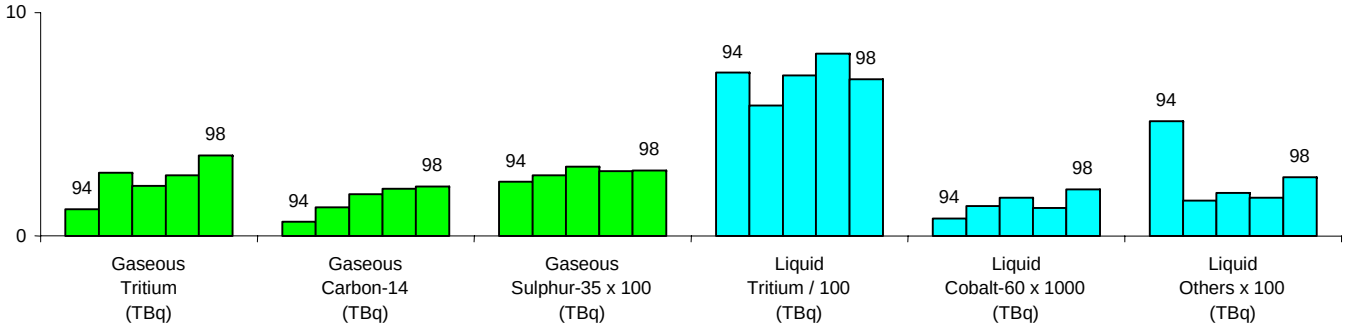
No major trends in discharges took place in this period though there was a slight increase in gaseous wastes discharged.

Most of the radioactivity detected in samples from the sea is due to Sellafield. Small increases above the Sellafield background are detected for a few radionuclides.
No major trends in contamination are evident, though there were small reductions in caesium-137 in seafood, reflecting lower levels of this radionuclide from Sellafield in the Irish Sea. Reductions in tritium levels in milk are due to the introduction of more accurate methods of measurement which have lower detection levels

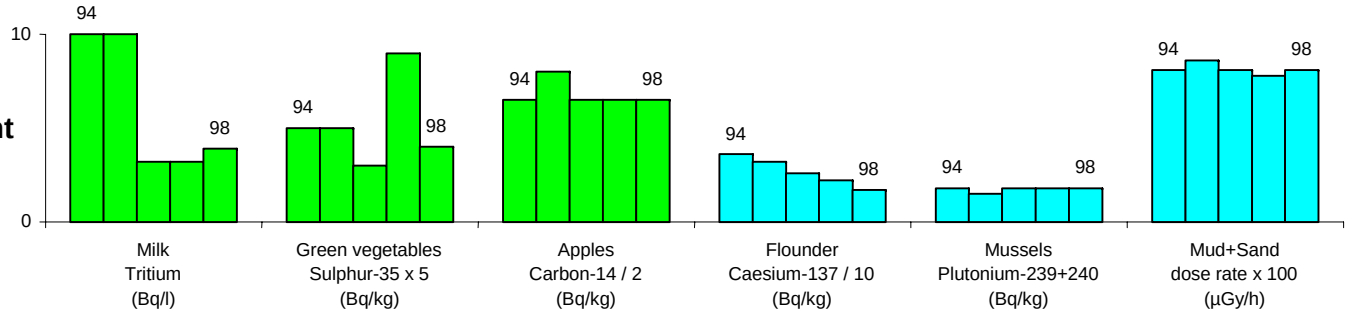
Doses to local people are less than 90 microsieverts in a year or **less than 9% of the limit.**
Most of the dose is due to Sellafield contamination

TRENDS

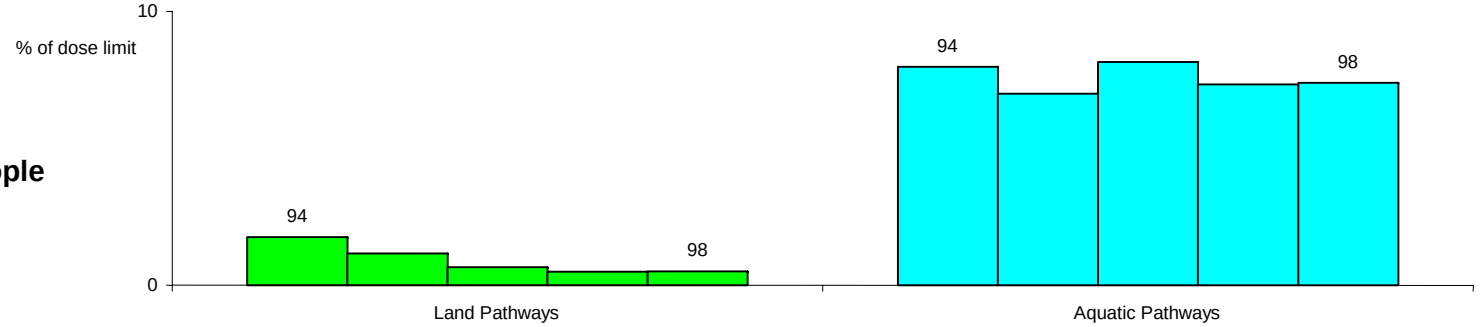
Waste discharge



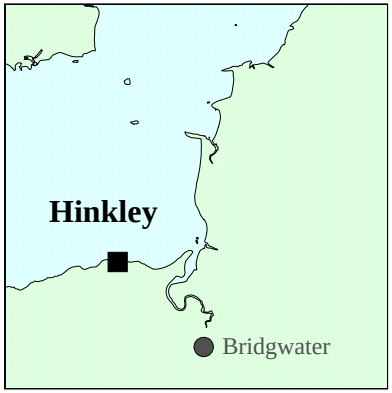
Food and environment



Dose To People



Hinkley



FACTS

Operations	Hinkley 'A', a nuclear power station undergoing decommissioning Hinkley 'B', a nuclear power station powered by Advanced Gas-cooled Reactors; capacity 1220 Megawatts
Owners	'A' currently owned by BNFL plc 'B' currently owned by British Energy Generation Ltd
Wastes	Gaseous wastes from reactor buildings and incinerator stacks, mostly tritium and carbon-14. Liquid wastes into the Bristol Channel, mainly tritium

STANDARDS

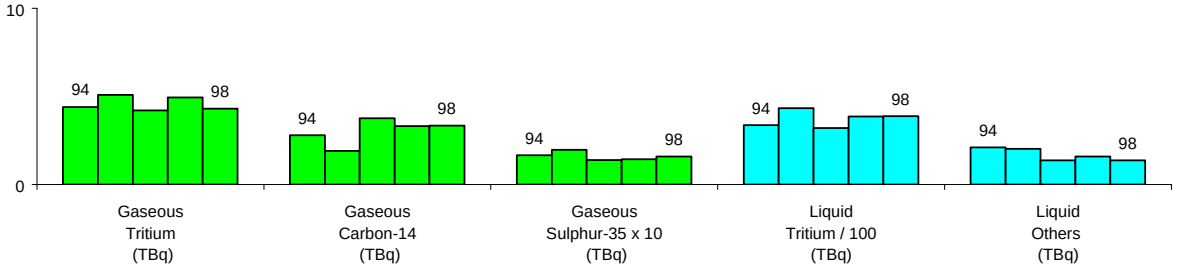
No major trends took in discharges took place in this period with both gaseous and liquid wastes generally remaining constant.

Small increases in radioactivity above background levels in food and the local environment are found due to the power stations. The normal background sources of natural radioactivity, possible Sellafield radioactivity in samples from the sea, radioactivity from other establishments which discharge into the Bristol Channel and fallout from weapons testing and Chernobyl are also detected.
No major trends in contamination are evident. Reductions in tritium levels in milk are due to the introduction of more accurate methods of measurement which have lower detection levels

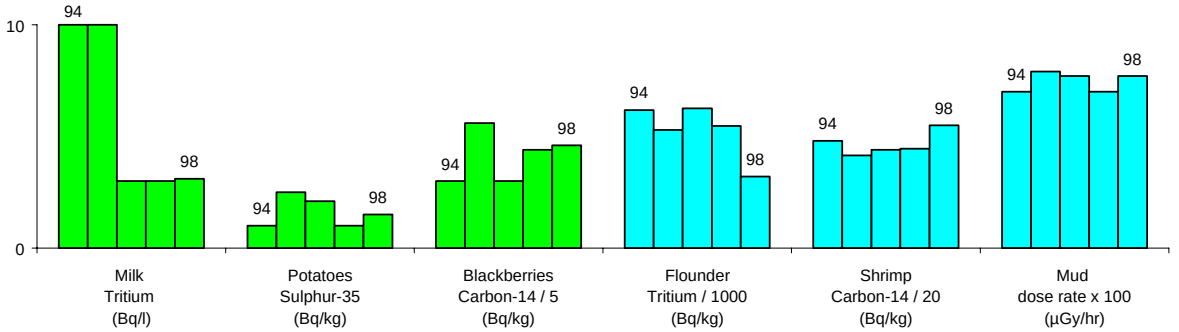
Doses to local people are less than 30 microsieverts in a year or **less than 3% of the limit.**

TRENDS

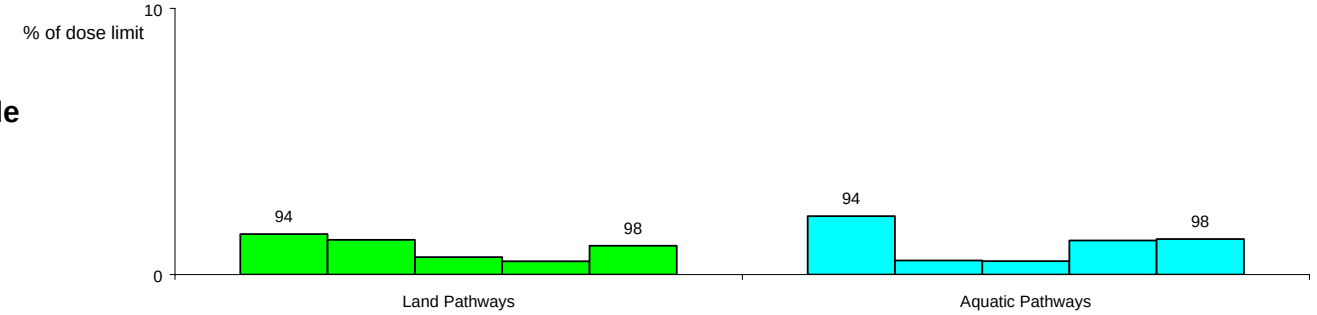
Waste discharge



Food and environment



Dose to people



Sellafield and Drigg

FACTS

Operations	Sellafield, facilities include fuel element storage, Magnox and oxide fuel reprocessing plants, decommissioning of nuclear facilities, and Calder Hall, a nuclear power station now being decommissioned Drigg, a land-based radioactive waste-disposal facility
Owners	BNFL plc own most of the Sellafield and Drigg sites
Wastes	Gaseous wastes from the various stacks on the Sellafield site, mostly carbon-14 and tritium. Liquid discharges are made via pipelines and via the Seaburn sewer outfall to the Irish Sea

STANDARDS - DISCHARGES

Discharges from Drigg radioactive waste-disposal facility are small and their effects are generally indistinguishable from those due to Sellafield. The effects of discharges from Sellafield are widespread and therefore closely monitored. Thus a greater amount of data is available than for other sites and some is shown in the charts on the following pages. Most of these charts also include additional data for the period 1989-1993.

Discharges of alpha and beta types of radioactivity, which include most of the more toxic radionuclides, generally decreased during this period due to improved waste management practices. However, discharges of beta activity to the sea increased. This was largely because of increased treatment of stored wastes which led to increased discharges of technetium-99.

Some discharges of carbon-14 to the atmosphere were diverted to liquid wastes. Increases in tritium in liquid wastes were due to commencement of operation in THORP. In 1997 there was an incident at the plant which turns waste into glass (the Waste Vitrification Plant). This caused a large increase in ruthenium-106 discharges to the atmosphere. Additional monitoring was carried out for this incident

Sellafield and Drigg - continued

STANDARDS - LEVELS IN FOOD AND THE ENVIRONMENT

Some increases in radioactivity in milk and food from the land are detected due to Sellafield. However, the most noticeable effects are found in the sea. Contamination from sea discharges is detected throughout northern europe. The charts show information for places close to Sellafield.
Data are shown for fish, crabs, winkles, and mud. Most of the radioactivity in seafood is due to Sellafield. Some decreases have been found during the period, particularly for caesium-137 and these were due to reductions in discharges before and during the period. Increases of technetium-99 in seafood were due to discharges from treatment of stored wastes.

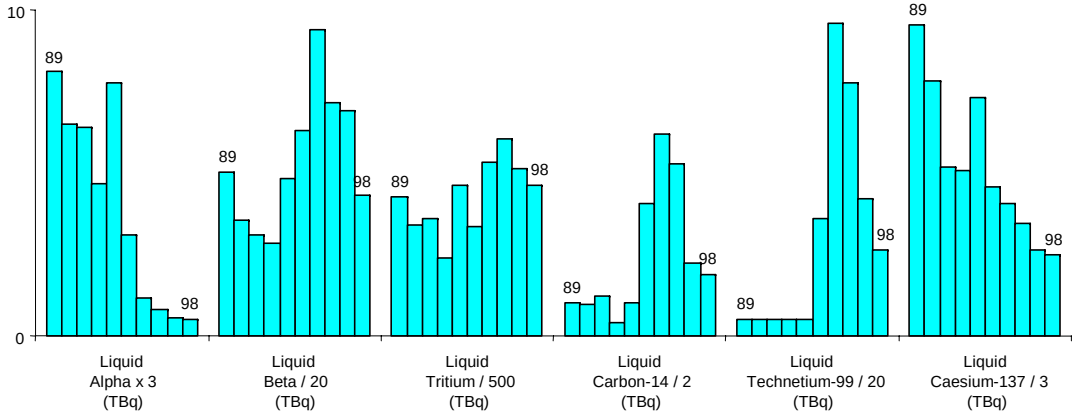
STANDARDS - DOSES TO PEOPLE

The trends in doses to people are shown for three groups of seafood consumers (aquatic pathways) and one group of local milk, vegetable and meat consumers (land pathways). Doses to local Cumbrian seafood consumers are bigger than those at Fleetwood (Lancashire) or Dumfriess and Galloway, reflecting the distribution of contamination in the Irish sea. The seafood doses to the last two groups are roughly constant. The variation in dose to the Cumbrian seafood consumers is partly due to changes in levels of contamination but mainly due to changes in how much fish and shellfish is eaten. The increase in 1998 was due to external gamma doses. The types of radioactivity that affect the dose to people are shown as pie charts. The most important radionuclides are americium-241, caesium-137, plutonium-239 and –240 and technetium-99

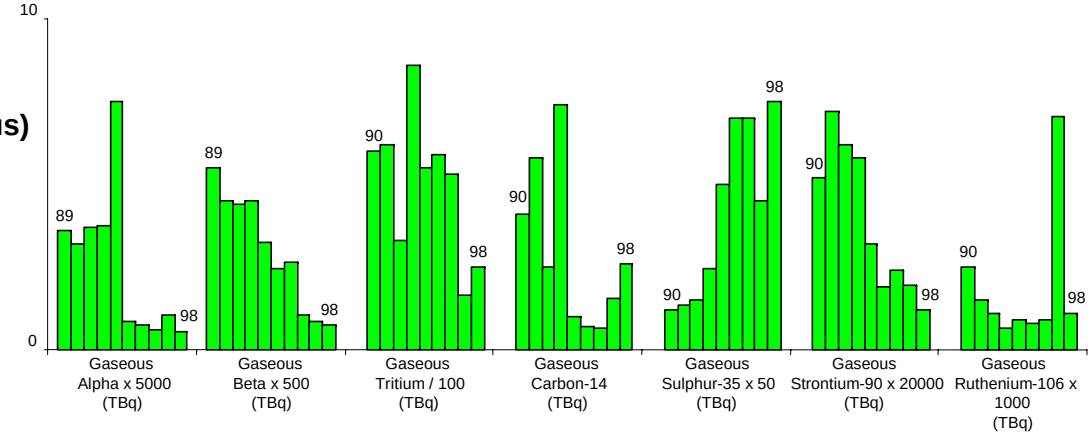
Doses to local people are less than 200 microsieverts in a year or **less than 20% of the limit**.

TRENDS

Waste discharges (liquid)

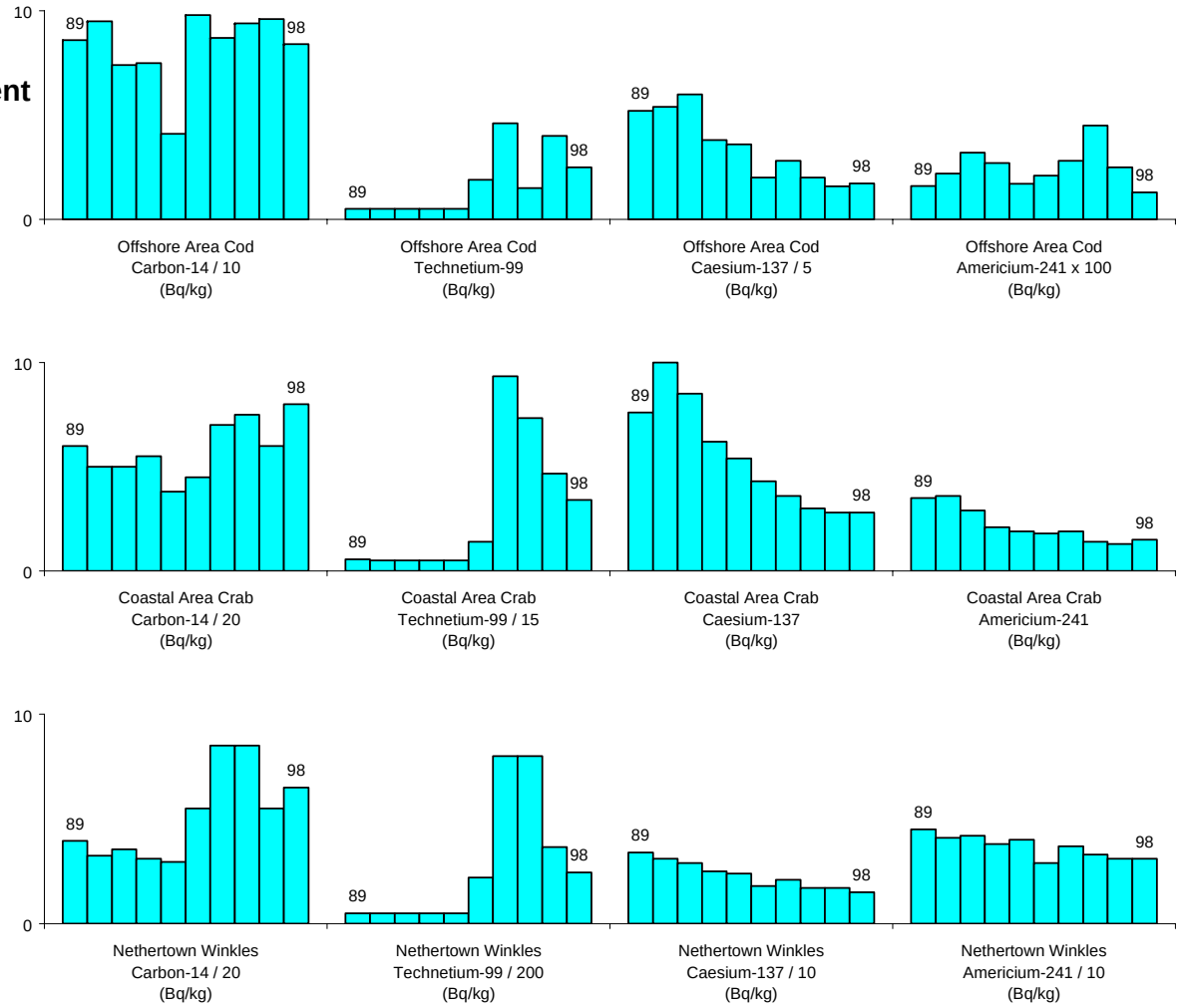


Waste discharges (gaseous)



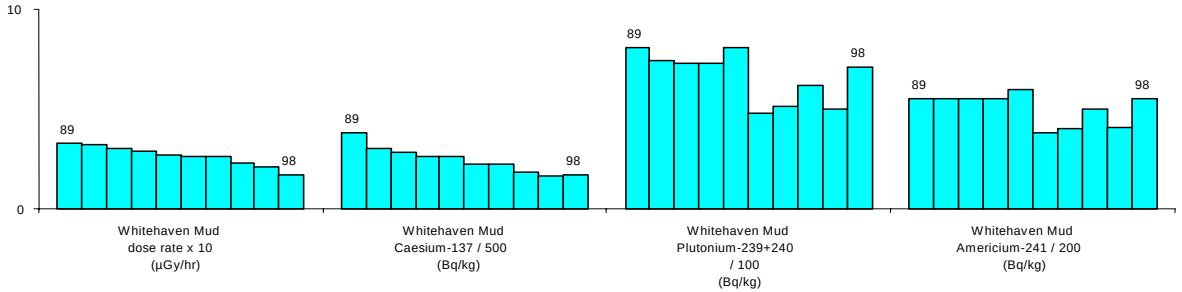
TRENDS

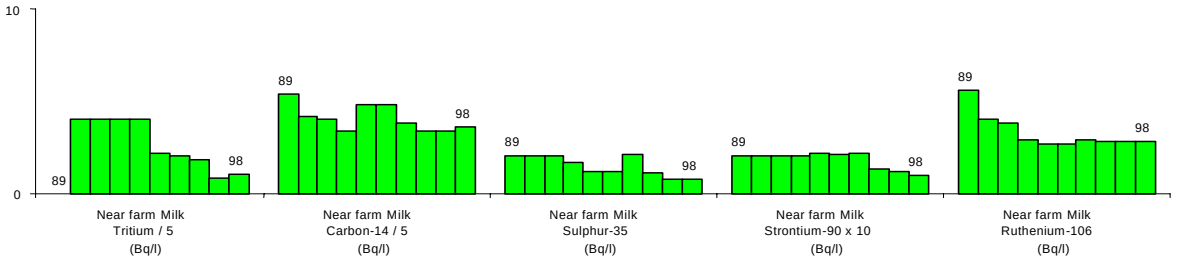
Food and Environment
Part 1



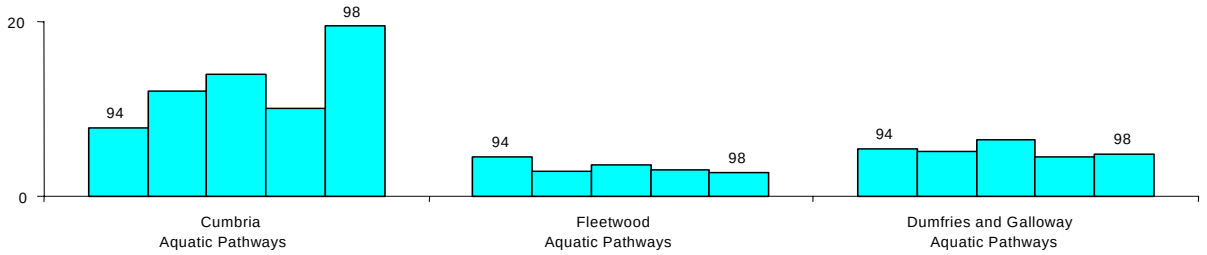
TRENDS

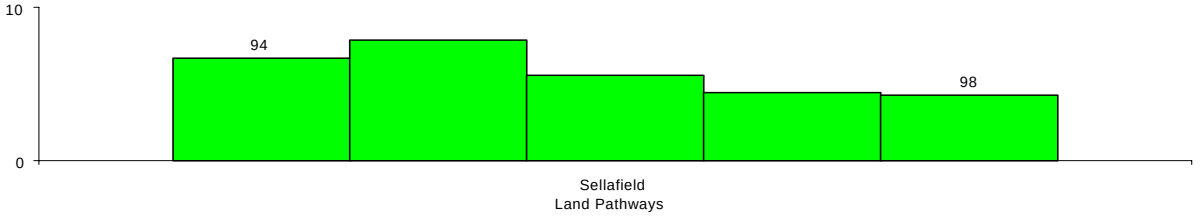
Food and Environment
Part 2





Dose To People

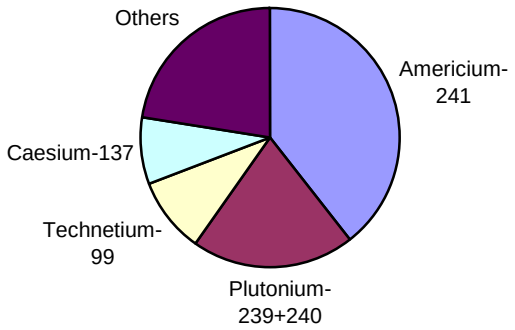




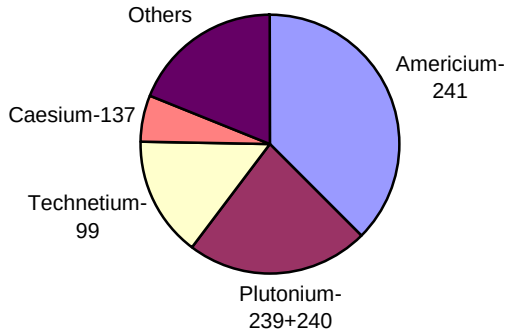
TRENDS

Type of Radioactivity (Aquatic doses)

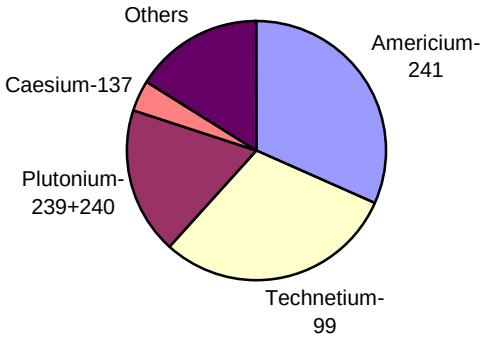
1994



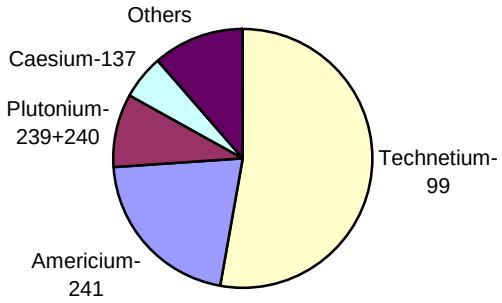
1995



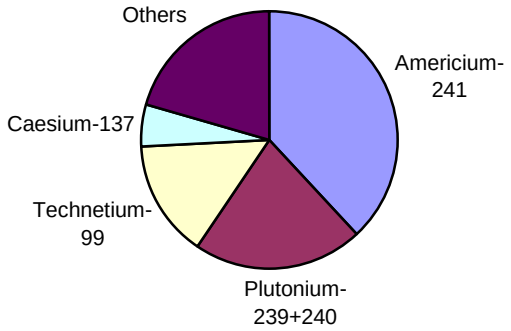
1996



1997



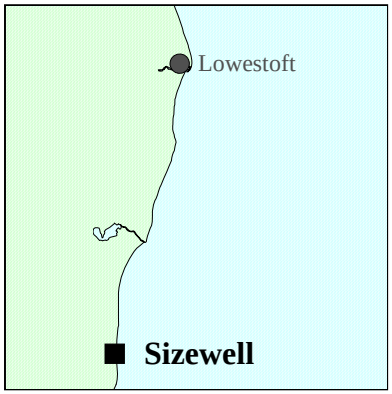
1998



Sizewell

FACTS

Operations	Sizewell A, a nuclear power station powered by Magnox reactors; capacity 420 Megawatts Sizewell B, a nuclear power station powered by a pressurised water reactor; capacity 1190 Megawatts
Owners	'A' currently owned by BNFL plc 'B' currently owned by British Energy Generation Ltd
Wastes	Gaseous wastes from reactor buildings and incinerator stacks, mostly tritium and carbon-14 Liquid wastes from shared pipeline to North Sea, mostly tritium and caesium-137



STANDARDS

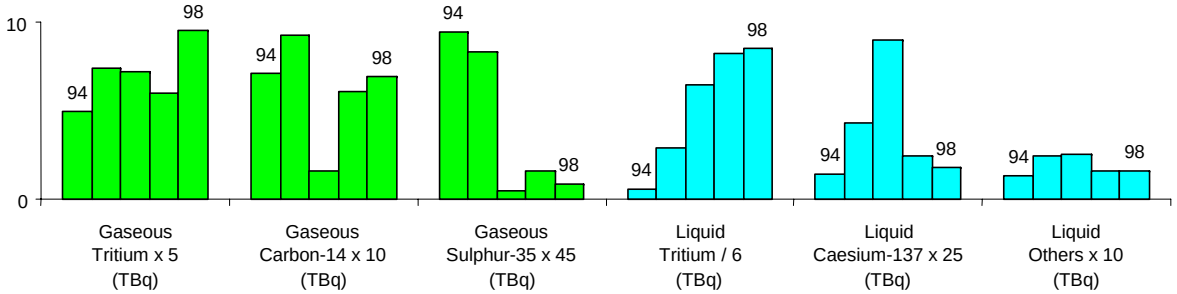
In gaseous wastes in this period there was a decrease in sulphur-35 and increase in tritium wastes. In discharges to sea, there was a general increase in tritium and some increases in caesium-137. The tritium increase was due to the start-up of the B station in 1995, while the caesium-137 was caused by corrosion of fuel in the Magnox ponds

Small increases in radioactivity in food and the local environment are found due to the power stations. The normal background sources of natural radioactivity, Sellafield radioactivity in samples from the sea and fallout from weapons testing and Chernobyl are also detected. No major trends in contamination are evident. Reductions in tritium levels in milk are due to the introduction of more accurate methods of measurement which have lower detection levels

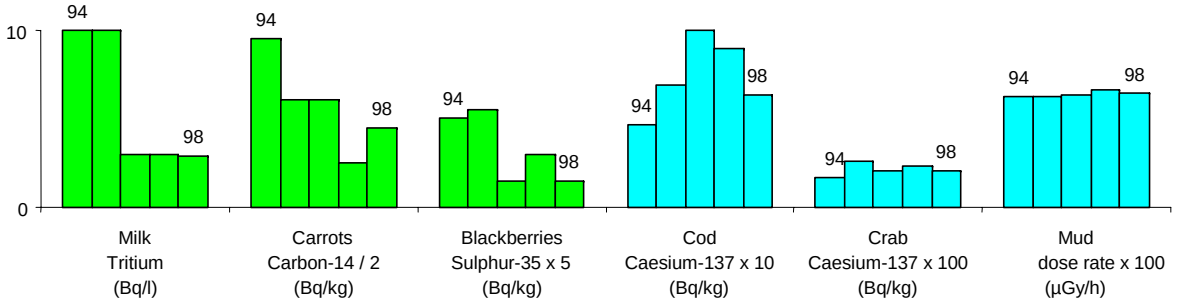
Doses to local people are less than 20 microsieverts in a year or **less than 2% of the limit**.

TRENDS

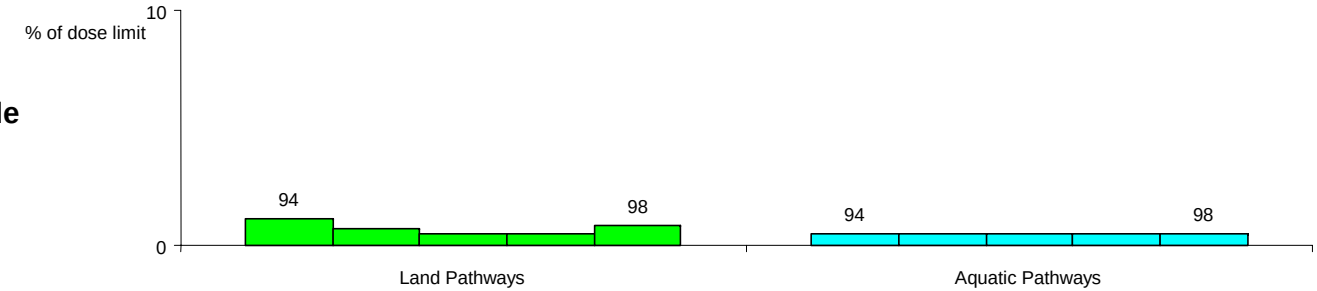
Waste discharge



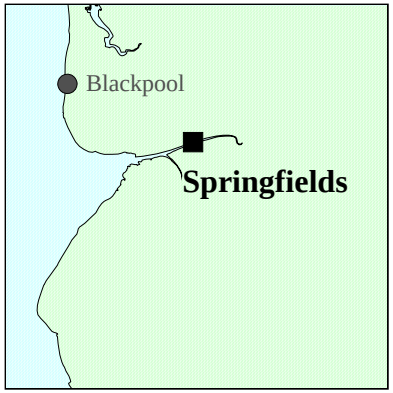
Food and environment



Dose to people



Springfields



FACTS

Operations	Manufactures fuel elements for nuclear reactors and produces uranium hexafluoride
Owners	Owned by BNFL plc
Wastes	Gaseous wastes discharged from stacks, mainly uranium. Liquid wastes discharged via pipeline into the Ribble Estuary, mainly uranium and thorium.

STANDARDS

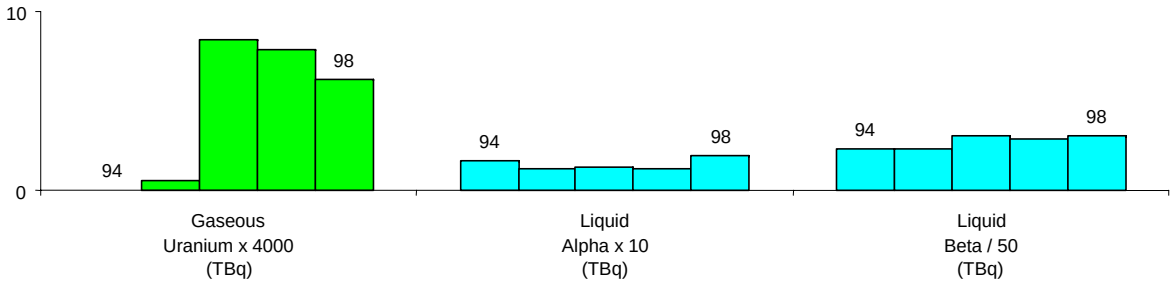
There was a small decrease in uranium in gaseous wastes and a small increase in beta discharges in liquid wastes. There are no data for 1994.

Radioactivity in food and the local environment remained generally constant over the period, though there were decreases in thorium-234 in mud. Radioactivity from Sellafield and normal background sources of natural radioactivity are also detected in the estuary.

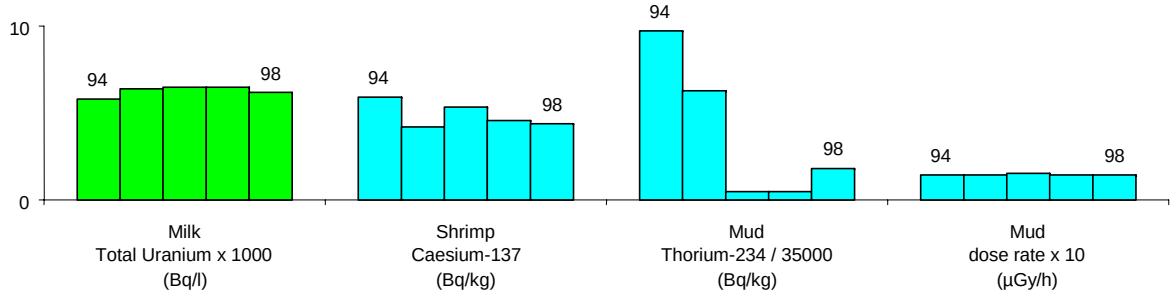
Doses to local people are less than 200 microsieverts in a year or **20% of the limit.**
Most of these doses are due to Sellafield activity

TRENDS

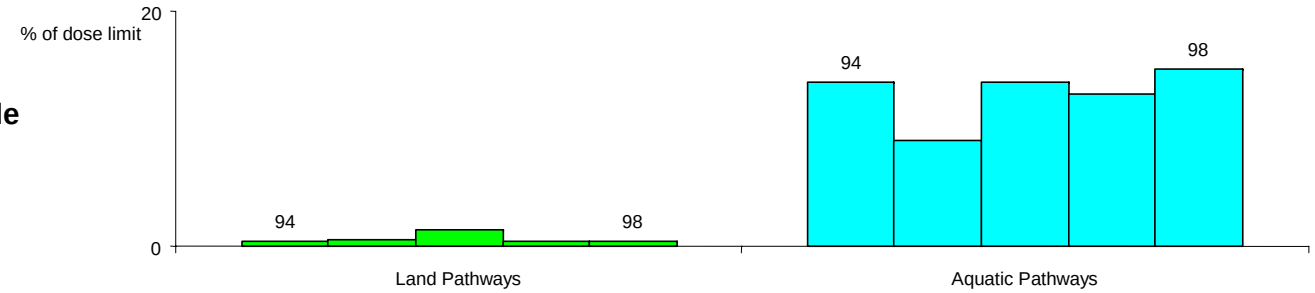
Waste discharge



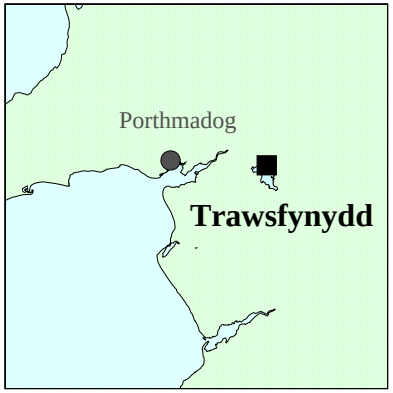
Food and environment



Dose to people



Trawsfynydd



FACTS

Operations	A nuclear power station in the process of being decommissioned
Owners	Currently owned by BNFL plc
Wastes	Gaseous wastes from reactor building and stacks Liquid radioactive wastes discharged into freshwater lake

STANDARDS

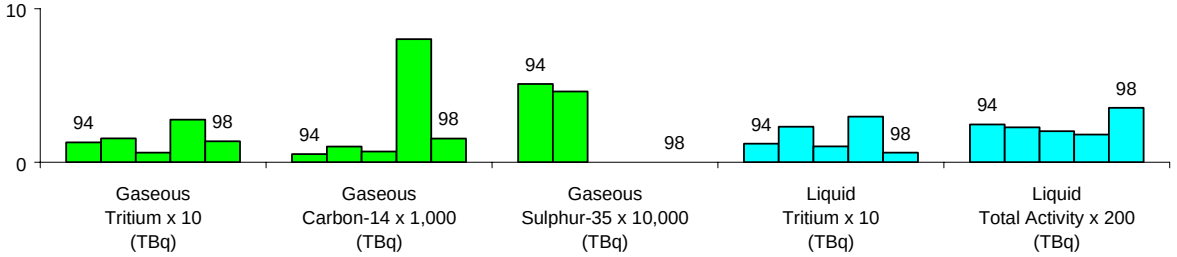
No major trends in discharges took place in this period though there was a decrease in sulphur-35 in gaseous wastes, and an increase in carbon-14 in gaseous wastes in 1997.

Man-made radioactivity in the lake is largely due to discharges from the power station. Small increases in radioactivity on land are due to gaseous discharges. Normal background sources of natural radioactivity, contamination from Chernobyl fallout and radioactivity from weapons testing are also detected.
No major trends in contamination are evident, though there were reductions in strontium-90 in brown trout. Reductions in tritium levels in milk are due to the introduction of more accurate methods of measurement which have lower detection levels

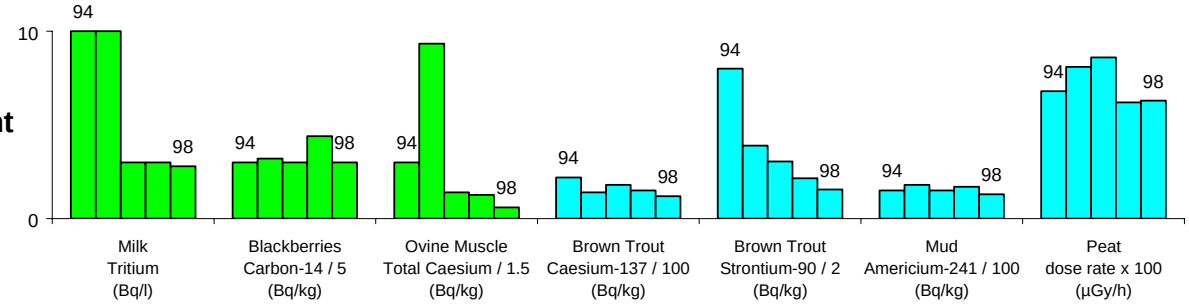
Doses to local people are less than 50 microsieverts in a year or **less than 5% of the limit**.
The most important route of exposure is by consumption of fish from the lake.

TRENDS

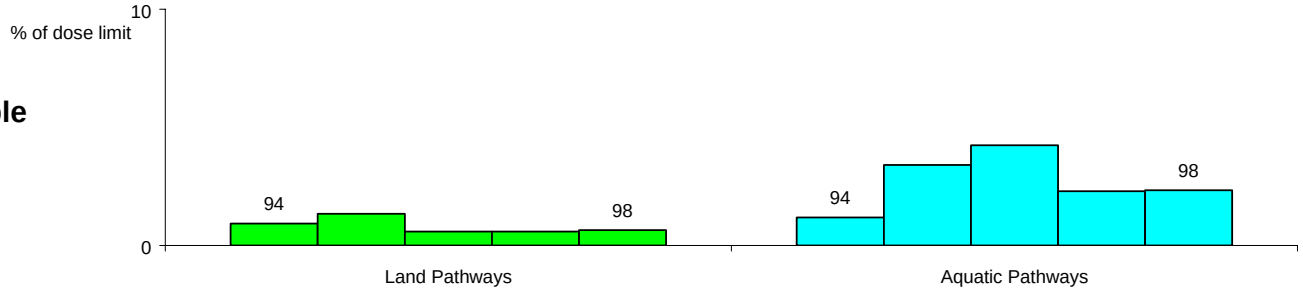
Waste Discharge



Food and Environment



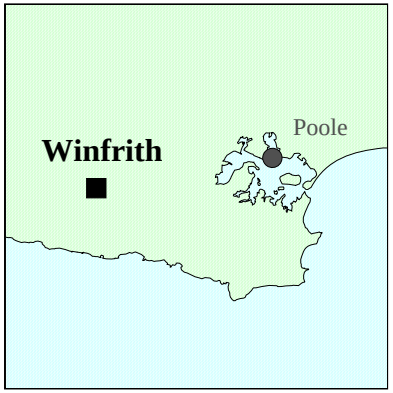
Dose To People



Winfrith

FACTS

Operations	Nuclear research facilities including a Steam Generation Heavy Water Reactor undergoing decommissioning
Owners	Owned by United Kingdom Atomic Energy Authority
Wastes	Gaseous wastes from reactor building and stacks, mostly tritium Liquid waste disposed of via pipeline to Weymouth Bay, mostly tritium



STANDARDS

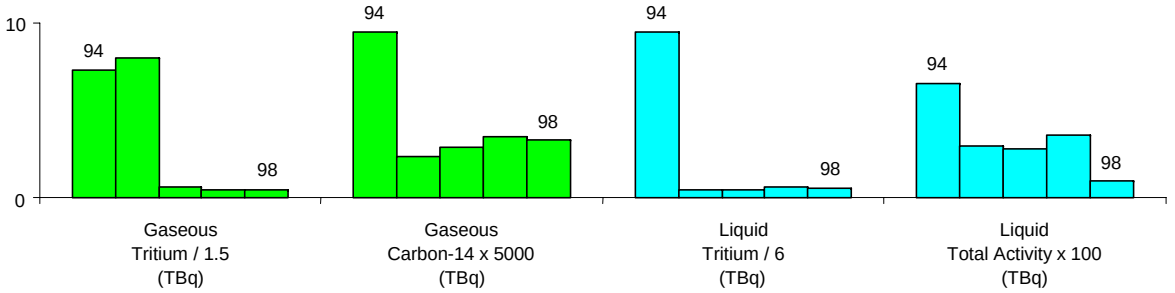
Discharges decreased during this period as nuclear-related activities on the site decreased.

Very low levels of radioactivity are detected in food and the local environment. These are due to the site and normal background sources of natural radioactivity and fallout from weapons testing and Chernobyl. Decreases in carbon-14 in apples and cobalt-60 in crab are evident. Reductions in tritium levels in milk are due to the introduction of more accurate methods of measurement which have lower detection levels

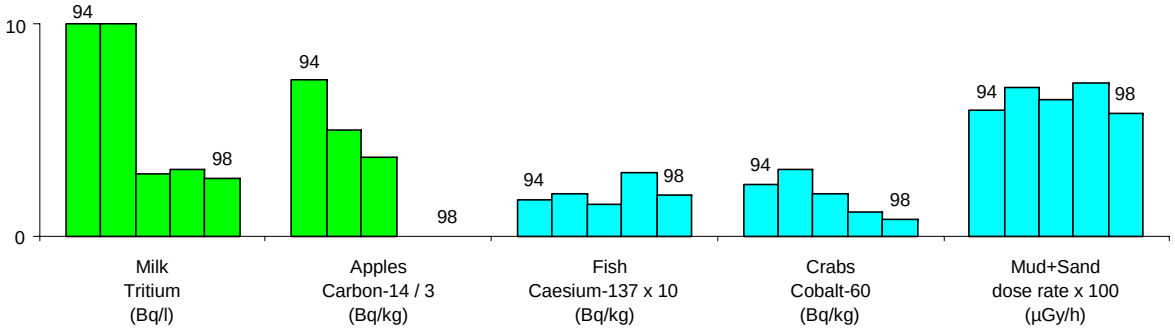
Doses to local people are less than 10 microsieverts in a year or **less than 1% of the limit**.

TRENDS

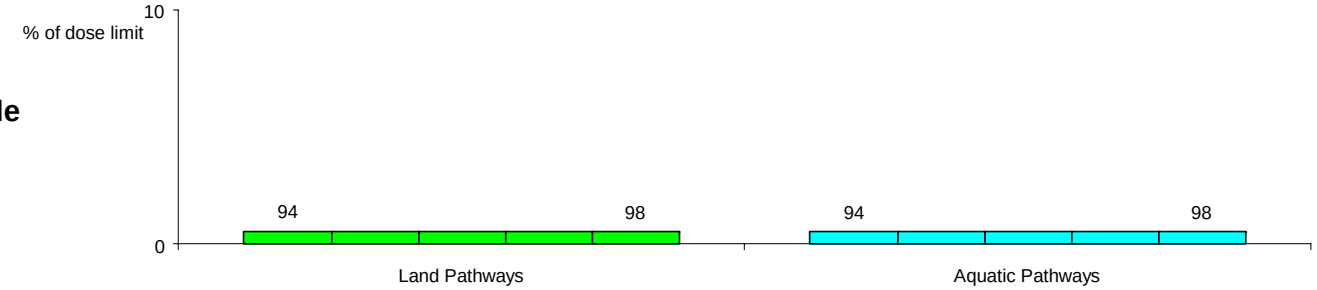
Waste discharge



Food and environment



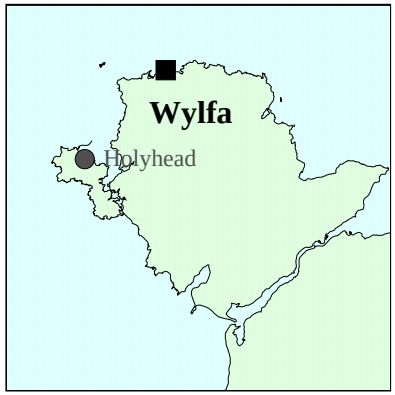
Dose to people



Wylfa

FACTS

Operations	A nuclear power station powered by Magnox reactors; capacity 980 Megawatts
Owners	Currently owned by BNFL plc
Wastes	Gaseous wastes from reactor buildings and stacks, mostly tritium and carbon-14 Liquid wastes discharged via pipeline to the Irish Sea, mostly tritium



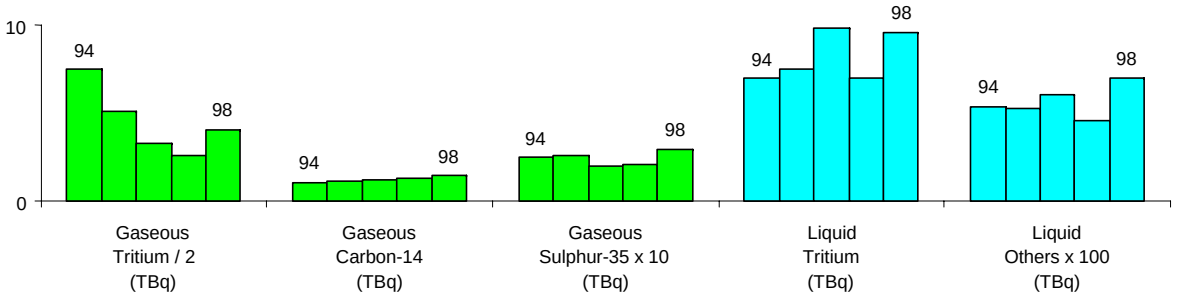
STANDARDS

In gaseous wastes, decreases in tritium and small increases in carbon-14 and sulphur-35 are evident.
Small increases in radioactivity in food and the local environment are found due to the power station.
The normal background sources of radioactivity, Sellafield radioactivity in samples from the sea and fallout from weapons testing and Chernobyl are also detected.
No major trends in contamination are evident, though there were general reductions of caesium-137 in crab and americium-241 in winkles and a general increase in sulphur-35 in blackberries and carbon-14 in plaice. Reductions in tritium levels in milk are due to the introduction of more accurate methods of measurement which have lower detection levels.

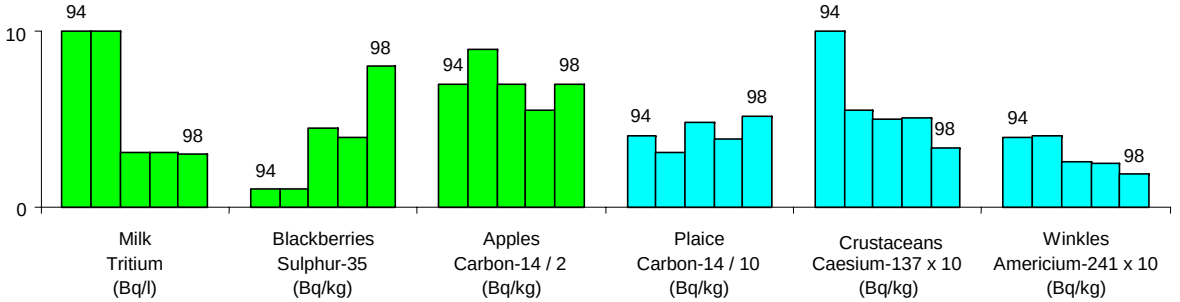
Doses to local people are less than 20 microsieverts in a year or **less than 2% of the limit**.

TRENDS

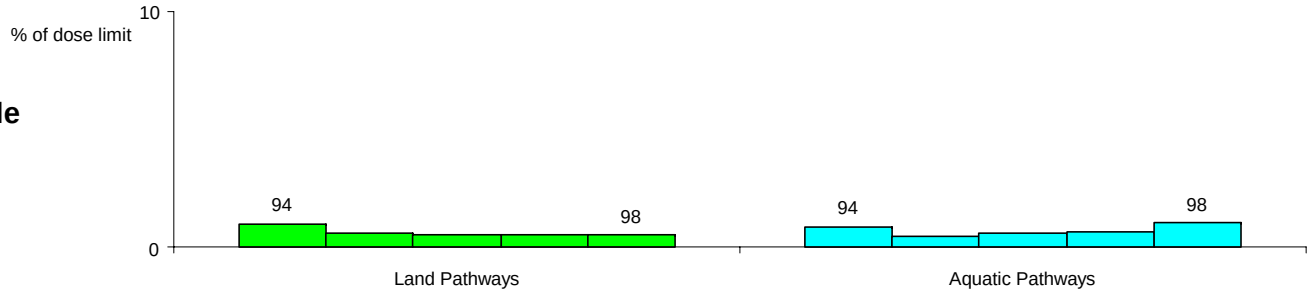
Waste Discharge



Food and Environment



Dose To People



APPENDIX 2

Liquid and Gaseous discharges and related environmental data by site.

ALDERMASTON: Liquid discharges and related environmental data 1994-1998

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1}* or gamma dose rate, μGy h^{-1}				
			1994	**1995**	**1996**	**1997**	**1998**
Liquid waste	Pipeline	Alpha	$9.07\ 10^{-6}$	$6.60\ 10^{-6}$	$1.28\ 10^{-5}$	$1.85\ 10^{-5}$	$1.89\ 10^{-5}$
		Tritium	0.0284	0.0104	0.00164	0.00175	0.00143
		Plutonium-241	$3.63\ 10^{-5}$	$2.64\ 10^{-5}$	$5.10\ 10^{-5}$	$7.42\ 10^{-5}$	$7.57\ 10^{-5}$
		Other Radionuclides	$9.55\ 10^{-6}$	$6.13\ 10^{-6}$	$1.33\ 10^{-5}$	$1.11\ 10^{-5}$	$1.19\ 10^{-5}$
	Silchester	Alpha	0.0000137	$1.45\ 10^{-5}$	$6.71\ 10^{-6}$	$7.28\ 10^{-6}$	$5.59\ 10^{-6}$
		Beta	0.0000477	$5.86\ 10^{-5}$	$4.45\ 10^{-5}$	$3.64\ 10^{-5}$	$2.45\ 10^{-5}$
Pike	Outfall	Tritium					< 120
		Caesium-137	0.60	0.59	0.54	0.84	0.61
		Plutonium-238		0.000085	0.000039	0.000019	0.000010
		Plutonium-239+240	0.000055	0.00039	0.00017	0.00011	0.000025
		Americium-241	0.000097	0.00036	0.00027	0.00032	0.00010
Clay	Outfall	Cobalt-60	0.27	0.51		< 0.30	< 0.21
		Caesium-137	2.3	12	3.6	0.53	0.77
		Americium-241				< 0.81	< 0.93
		Europium-155	1.9	1.0	1.8	1.6	< 0.95
Grass	Pangbourne	Gamma dose	0.056	0.058	0.064	0.057	

* Wet concentrations except for sediment where dry concentrations apply

ALDERMASTON: Gaseous discharges and related environmental data 1994-1998

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	**1995**	**1996**	**1997**	**1998**
Gaseous waste		Alpha		$1.29\ 10^{-7}$	$1.65\ 10^{-7}$	$1.44\ 10^{-7}$	$1.31\ 10^{-7}$
		Beta		$1.21\ 10^{-7}$	$1.14\ 10^{-7}$	$1.91\ 10^{-7}$	$1.51\ 10^{-7}$
		Tritium		4.47	9.48	4.09	3.65
		Krypyon-85		$4.8\ 10^{-3}$	$3.0\ 10^{-3}$	$5.66\ 10^{-3}$	$2.56\ 10^{-3}$
Milk	Near farms	Tritium	< 10	< 10	< 3.0	< 3.3	< 2.9
		Total Uranium	< 0.0067	< 0.0068	< 0.0065	< 0.0065	< 0.0067
		Plutonium-238	< 0.00020	< 0.00020	< 0.00010	< 0.00013	< 0.00016
		Plutonium-239+240	< 0.00020	< 0.00020	< 0.00012	< 0.00013	< 0.00018
		Americium-241	< 0.00020	< 0.00020	< 0.00019	< 0.00032	< 0.00034
	Max	Tritium	< 10	< 10	< 3.0	< 3.5	< 3.3
		Total Uranium	< 0.0093	< 0.0078	< 0.0065	< 0.067	< 0.0076
		Plutonium-238	< 0.00020	< 0.00020	< 0.00010	< 0.00015	< 0.00018
		Plutonium-239+240	< 0.00020	< 0.00020	< 0.00013	< 0.00018	< 0.00025
		Americium-241	< 0.00020	< 0.00020	< 0.00020	< 0.00040	< 0.00043
Carrots		Tritium	< 10	< 10	< 3.0	< 3.0	< 3.0
		Total Uranium	0.080	0.050	0.040	0.040	0.041
		Plutonium-238	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020
		Plutonium-239+240	0.00050	0.00020	< 0.00020	< 0.00020	0.00010
		Americium-241	0.00040	0.00030	< 0.00020	< 0.0010	< 0.00040

ALDERMASTON: Gaseous discharges and related environmental data 1994-1998 (cont.)

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	**1995**	**1996**	**1997**	**1998**
Honey		Tritium	< 10	< 10	< 4.0	< 4.0	< 4.0
		Total Uranium	< 0.020	< 0.011	< 0.028	0.0058	< 0.011
		Plutonium-238	< 0.00020	< 0.00020	< 0.00020	0.00010	< 0.00030
		Plutonium-239+240	0.00030	< 0.00020	< 0.00020	< 0.00020	< 0.00030
		Americium-241	0.00040	< 0.00030	0.00040	< 0.00070	0.00040
Lettuce		Tritium	< 10	25	< 3.0	< 3.0	< 3.0
		Total Uranium	0.33	0.56	0.47	0.98	1.0
		Plutonium-238	< 0.00020	< 0.00020	< 0.00020	0.00020	0.00020
		Plutonium-239+240	0.0013	0.0012	0.0018	0.0030	0.0040
		Americium-241	0.0013	0.00040	0.0012	0.0070	0.0023
Potatoes		Tritium	< 10	< 10	< 3.0	< 3.0	4.0
		Total Uranium	0.34	0.044	< 0.028	< 0.020	< 0.023
		Plutonium-238	< 0.00020	< 0.00020	0.00010	< 0.00030	< 0.00020
		Plutonium-239+240	0.0016	< 0.00020	< 0.00020	< 0.00020	0.00030
		Americium-241	0.00090	0.00030	< 0.00020	< 0.00040	0.00050

* Bq l^{-1} for milk

AMERSHAM: Liquid discharges and related environmental data 1994-1998

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1}* or gamma dose, μGy h^{-1}				
			1994	1995	1996	1997	1998
Liquid waste		Alpha	0.0000725	$5.32\ 10^{-5}$	$6.75\ 10^{-5}$	$4.63\ 10^{-5}$	$4.20\ 10^{-5}$
		Beta>0.4 MeV	0.0103	0.00936	0.0159	0.00798	0.00766
		Tritium	0.0115	0.00983	0.00284	0.0032	0.00229
		Iodine-125	0.0444	0.00117	0.00127	0.00106	0.00215
		Caesium-137	0.0000435	$1.38\ 10^{-5}$	$2.67\ 10^{-5}$	$1.26\ 10^{-5}$	$3.56\ 10^{-5}$
		Other radionuclides	0.112	0.164	0.128	0.0514	0.0563
Pike	Outfall	Tritium					< 130
	Grand Union Canal	Carbon-14	61	43	30	20	26
		Cobalt-57	0.11		0.07	0.06	0.05
		Cobalt-58		0.05		< 0.06	< 0.05
		Zinc-65				0.22	0.21
		Caesium-134	0.08		0.08	0.09	< 0.04
		Caesium-137	0.36	0.34	0.24	0.25	0.27
Mud	Outfall	Cobalt-57	5.7	11	9.3	2.9	2.0
	Grand Union Canal	Cobalt-58	1.6	2.9	1.9	< 1.0	< 0.60
		Cobalt-60		0.54		< 0.38	< 0.27
		Zinc-65	2.3	6.6	4.0	4.9	3.0
		Iodine-131			14		
		Caesium-134			0.47	< 0.57	< 0.39
		Caesium-137	8.7	8.9	2.1	21	13
		Europium-155	1.8		1.4	2.1	1.5

AMERSHAM: Liquid discharges and related environmental data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1}* or gamma dose, μGy h^{-1}				
			1994	**1995**	**1996**	**1997**	**1998**
Soil or Grass and concrete	Grand Union Canal	Gamma dose	0.047	0.049	0.050	0.046	

* Wet concentrations except for sediments where dry concentrations apply

AMERSHAM: Gaseous discharges and related environmental data 1994-1998

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	**1995**	**1996**	**1997**	**1998**
Gaseous waste		Alpha	$7.5\ 10^{-7}$	$6.1\ 10^{-7}$	$3.49\ 10^{-7}$	$2.40\ 10^{-7}$	$1.70\ 10^{-7}$
		Other (penetrating)	$1.3\ 10^{-4}$	$1.7\ 10^{-4}$	$1.59\ 10^{-4}$	$1.30\ 10^{-4}$	$1.30\ 10^{-4}$
		Other (non penetrating)	$5.7\ 10^{-3}$	0.018	0.0236	0.026	0.013
		Tritium	0.37	0.18	$6.52\ 10^{-4}$	$5.70\ 10^{-4}$	
		Selenium-75	$1.2\ 10^{-3}$	0.0011	$6.72\ 10^{-4}$	$3.50\ 10^{-4}$	$2.80\ 10^{-4}$
		Iodine-125	$1.3\ 10^{-2}$		0.0215	0.0011	0.014
		Iodine-131	$6.1\ 10^{-3}$	0.0014	0.00693	0.0018	$5.50\ 10^{-4}$
		Radon-222	1.8	1.6	1.74	1.4	1.6
Milk	Near farms	Tritium	< 10	< 10	< 3.0	< 3.4	< 2.8
		Sulphur-35	< 1.0	< 1.0	< 0.40	< 0.54	< 0.40
		Selenium-75	< 0.60	< 0.54	< 0.55	< 0.51	< 0.50
		Iodine-125	< 0.20	< 0.050	< 0.031	< 0.025	< 0.031
		Iodine-131	< 0.20	< 0.20	< 0.036	< 0.036	< 0.026

AMERSHAM: Gaseous discharges and related environmental data 1994-1998 (cont.)

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	1995	1996	1997	1998
	Max	Tritium	< 10	< 10	< 3.0	< 3.8	< 3.0
		Sulphur-35	< 1.0	< 1.0	< 0.45	0.58	< 0.60
		Selenium-75	< 0.60	< 0.55	< 0.65	< 0.53	< 0.45
		Iodine-125	< 0.20	< 0.050	< 0.033	< 0.026	< 0.037
		Iodine-131	< 0.20	< 0.20	< 0.037	< 0.039	< 0.042
	Far farms	Tritium	< 10	< 10	< 3.0		
		Sulphur-35	< 1.0	< 1.0	< 0.40		
		Selenium-75	< 0.50	< 0.55	< 0.70		
		Iodine-125	< 0.20	< 0.050	< 0.045		
		Iodine-131	< 0.20	< 0.20	< 0.022		
Apples[1]		Tritium	< 10	< 10	< 3.0	< 3.0	< 3.0
		Sulphur-35	< 1.0	< 1.0	0.90	< 0.20	1.2
		Selenium-75	< 0.30	< 0.40	< 0.50	< 0.40	< 0.4
		Iodine-125	< 0.20	< 0.069	< 0.096	< 0.10	< 0.091
Wheat		Tritium		< 10	< 3.0	< 4.0	< 4.0
		Sulphur-35		4.4	1.5	0.80	0.40
		Selenium-75		< 0.40	< 0.30	< 0.50	< 0.30
		Iodine-125		0.30	< 0.075	< 0.15	< 0.16

* Bq l^{-1} for milk

1 Strawberries in 1998

BARROW: Liquid discharges and related environmental data 1994-1998

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1} dry or gamma dose rate, μGy h^{-1}				
			1994	**1995**	**1996**	**1997**	**1998**
Liquid waste		Tritium	$9.54\ 10^{-4}$	$4.90\ 10^{-4}$	$2.09\ 10^{-3}$		
		Manganese-54	$1.39\ 10^{-8}$	$5.57\ 10^{-9}$	$5.56\ 10^{-9}$		
		Cobalt-58	$1.17\ 10^{-8}$	$3.71\ 10^{-9}$	$2.70\ 10^{-9}$		
		Cobalt-60	$3.11\ 10^{-8}$	$8.56\ 10^{-9}$	$1.29\ 10^{-8}$		
		Tin-113	$1.46\ 10^{-8}$	$6.47\ 10^{-9}$	$5.48\ 10^{-9}$		
		Antimony-124	$8.31\ 10^{-9}$	$3.99\ 10^{-9}$	$8.84\ 10^{-9}$		
		Other Radionuclides	$6.38\ 10^{-8}$	$1.03\ 10^{-8}$	$1.96\ 10^{-7}$		
Mud and sand	Walney channel	Manganese-54				< 0.74	< 0.63
		Cobalt-58				< 1.4	< 1.0
		Cobalt-60	1.8	3.9	5.0	8.7	13
		Zirconium-95	2.6		0.70	< 3.4	< 2.2
		Niobium-95	2.4		0.79	< 5.8	< 2.8
		Ruthenium-106	29	32	35	38	59
		Silver-110m	0.36			< 1.4	< 1.2
		Antimony-124				< 2.5	< 1.8
		Antimony-125	4.2	1.8	2.7	< 3.1	< 3.1
		Caesium-134	0.38			< 0.87	< 0.77
		Caesium-137	180	190	190	200	190
		Cerium-144	0.84		1.5	< 6.6	< 7.5
		Europium-154	3.7	2.4	3.5	4.1	< 3.1
		Europium-155	2.7	2.1	1.7	< 2.4	< 2.7
		Americium-241	200	210	220	270	240

BARROW: Liquid discharges and related environmental data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1} dry or gamma dose rate, μGy h^{-1}				
			1994	**1995**	**1996**	**1997**	**1998**
Mud and sand	Vickerstown church	Gamma dose	0.099	0.089	0.093	0.089	0.089

BERKELEY AND OLDBURY: Liquid discharges and related environmental data 1994-1998

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1}* or gamma dose rate, μGy h^{-1}				
			1994	**1995**	**1996**	**1997**	**1998**
Liquid waste	Berkeley	Tritium	0.0292	0.0395	0.0372	0.0552	0.0342
		Caesium-137	0.0463	0.0403	0.0103	0.0173	0.0143
		Other radionuclides	0.0974	0.0934	0.0387	0.0544	0.0734
	Oldbury	Tritium	0.263	0.232	0.186	0.178	0.173
		Caesium-137	0.045	0.048	0.051	0.0417	0.0620
		Other radionuclides	0.345	0.315	0.311	0.231	0.175
Dover sole[1]	Lydney	Tritium[3]	**250**	**220**	**250**	**220**	< 130
		Carbon-14		210	270	240	37
		Caesium-137	0.43	0.42	0.42	0.26	0.28

BERKELEY AND OLDBURY: Liquid discharges and related environmental data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1}* or gamma dose rate, μGy h^{-1}				
			1994	**1995**	**1996**	**1997**	**1998**
Shrimps[2]	Lydney	Tritium[3]	**9300**	**7900**	**9400**	**8200**	4800
		Carbon-14	150	120	140	130	160
		Caesium-137	0.29	0.28	0.37	0.29	0.37
		Plutonium-238	0.00036	0.00018	0.00054	0.00040	0.00015
		Plutonium-239+240	0.0021	0.0010	0.0027	0.0024	0.00077
		Americium-241	0.0026	0.0010	0.0044	0.0020	0.00090
		Curium-243+244	0.000029	0.0000087	0.000030	0.000048	0.000018
Mud	1km south of Oldbury	Cobalt-60	0.44	0.22	0.18	< 0.33	< 0.36
		Caesium-134	0.57	0.21	0.71	0.79	0.97
		Caesium-137	37	30	36	34	29
		Europium-155	2.3	2.5	1.9	1.7	1.6
Mud	1km south of Oldbury	Gamma Dose	0.072	0.086	0.075	0.075	0.071
Mud	2km south west of Berkeley	Gamma Dose	0.067	0.065	0.070	0.074	0.071

* Wet concentrations except for sediments where dry concentrations apply

1 Salmon from Beachley in 1998

2 Guscar in 1998

3 Bold entries are estimated

BERKELEY AND OLDBURY: Gaseous discharges and related environmental data 1994-1998

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1} wet*				
			1994	**1995**	**1996**	**1997**	**1998**
Gaseous waste	Berkeley	Alpha and beta	$1.7\ 10^{-6}$	$2.10\ 10^{-6}$	$3.76\ 10^{-6}$	$3.72\ 10^{-6}$	$1.87\ 10^{-6}$
	Power station	Tritium	0.051	0.0109	0.00959	0.0107	0.013
		Carbon-14	$1.9\ 10^{-4}$	$5.26\ 10^{-4}$	$2.66\ 10^{-4}$	$3.05\ 10^{-4}$	$2.31\ 10^{-4}$
		Sulphur-35	$3.2\ 10^{-5}$	$6.47\ 10^{-8}$			
	Berkeley	Alpha and beta	$5.6\ 10^{-6}$	$2.0\ 10^{-6}$	$3.14\ 10^{-6}$	$1.59\ 10^{-6}$	$1.53\ 10^{-6}$
	Technology Centre	Carbon-14	$2.6\ 10^{-3}$				
	Oldbury	Beta	$8.2\ 10^{-5}$	$1.01\ 10^{-4}$	$9.06\ 10^{-5}$	$1.01\ 10^{-4}$	$1.03\ 10^{-4}$
		Tritium	1.9	1.89	1.73	1.48	2.39
		Carbon-14	4.0	3.75	3.85	3.87	3.72
		Sulphur-35	0.27	0.261	0.25	0.266	0.311
		Argon-41	170	250	112	111	180
Milk	Near farms	Tritium	< 10	< 10	< 3.0	< 3.3	< 3.8
		Carbon-14	19	17	15	16	18
		Sulphur-35	< 1.0	< 1.0	< 0.48	< 0.49	< 0.59
	Max	Tritium	< 10	< 10	< 3.0	< 4.0	< 4.3
		Carbon-14	22	20	18	19	22
		Sulphur-35	< 1.0	< 1.0	< 0.60	< 0.60	< 0.90
	Far farms	Tritium					< 4.0
		Carbon-14					15
		Sulphur-35					< 0.57

BERKELEY AND OLDBURY: Gaseous discharges and related environmental data 1994-1998 (cont.)

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1} wet*				
			1994	1995	1996	1997	1998
Apples		Tritium	< 10	< 10	< 3.0	< 3.0	< 3.0
		Carbon-14	23	< 15	13	13	14
		Sulphur-35	< 1.0	< 1.0	0.30	< 0.20	< 0.40
Blackberries[1]		Tritium	< 10	< 10	5.0	4.0	< 3.0
		Carbon-14	< 15	29	10	27	38
		Sulphur-35	< 1.0	< 1.0	3.1	< 0.70	0.50
Cabbage		Tritium	< 10	< 10	< 3.0	< 3.0	< 3.0
		Carbon-14	< 15	< 15	8.0	8.0	6.0
		Sulphur-35	< 1.0	< 1.0	0.60	0.50	< 0.40
Potatoes		Tritium	< 10	< 10	< 3.0	6.0	< 3.0
		Carbon-14	30	22	16	20	23
		Sulphur-35	< 1.0	< 1.0	< 0.50	0.60	1.3

* Bq l^{-1} for milk

1 Strawberries in 1994

BRADWELL: Liquid discharges and related environmental data 1994-1998

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1}* or gamma dose rate, μGy h^{-1}				
			1994	**1995**	**1996**	**1997**	**1998**
Liquid waste		Tritium	2.17	2.08	1.36	1.46	1.793
		Caesium-137	0.316	0.366	0.393	0.466	0.323
		Other radionuclidides	0.406	0.44	0.363	0.383	0.359
Sole	Bradwell	Caesium-134	0.08		0.25	< 0.13	< 0.09
		Caesium-137	0.6	0.84	1.2	0.69	0.64
Bass	Pipeline	Caesium-134	0.4	0.48	0.26	0.34	0.43
		Caesium-137	2.9	2.2	2.1	2.6	2.6
Native Oysters	Tollesbury N Channel	Carbon-14		13	16	15	21
		Cobalt-60		0.04		< 0.06	< 0.05
		Zinc-65	0.84	1.5	1.0	0.48	0.39
		Caesium-134	0.09	0.10	0.07	0.14	< 0.08
		Caesium-137	0.48	0.35	0.35	0.49	0.26
		Plutonium-238	0.00062	0.00042	0.00035	0.00058	0.00043
		Plutonium-239+240	0.0027	0.0017	0.0015	0.0027	0.0019
		Americium-241	0.0056	0.0048	0.0051	0.0055	0.0044
		Curium-242	0.000051	0.000041		0.000046	0.000046
		Curium-243+244	0.00028	0.0003	0.00027	0.00021	0.00020

BRADWELL: Liquid discharges and related environmental data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1*} or gamma dose rate, μGy h^{-1}				
			1994	**1995**	**1996**	**1997**	**1998**
Winkles	Pipeline	Cobalt-60	0.85	0.78	0.32	0.46	< 0.32
		Zinc-65	0.26	0.98	0.83	< 0.51	< 0.48
		Caesium-134	0.05	0.14	0.46	< 0.21	< 0.23
		Caesium-137	0.86	0.59	1.8	0.66	0.72
Mud	Maldon	Cobalt-60	3.3	4.9	1.7	2.2	< 1.2
		Caesium-134	9.4	6.7	7.3	9.4	6.9
		Caesium 137	80	64	66	67	62
		Europium-155	2.2	1.9		1.9	< 1.5
		Americium-241		0.48		< 1.5	< 2.0
Mud	West Mersea	Gamma dose	0.063	0.064	0.066	0.062	0.070
	Maldon	Gamma dose	0.059	0.057	0.060	0.056	0.064

* Wet concentrations except for sediments where dry concentrations apply

BRADWELL: Gaseous discharges and related environmental data 1994-1998

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1} wet*				
			1994	**1995**	**1996**	**1997**	**1998**
Gaseous waste		Beta	$2.7\ 10^{-4}$	$1.56\ 10^{-4}$	$2.10\ 10^{-4}$	$1.98\ 10^{-4}$	$2.62\ 10^{-4}$
		Tritium	0.68	1.27	0.786	1.1	0.839
		Carbon-14	0.42	0.363	0.357	0.276	0.379
		Sulphur-35	0.092	0.0427	0.0765	0.0751	0.058
		Argon-41	770	662	647	510	724
Milk	Near farms	Tritium	< 10	< 10	< 3.0	< 3.0	< 2.6
		Carbon-14	19	17	15	15	15
		Sulphur-35	< 1.0	< 1.0	< 0.41	< 0.67	< 0.41
	Max	Tritium	< 10	< 10	< 3.0	< 3.0	< 3.0
		Carbon-14	20	18	17	15	18
		Sulphur-35	< 1.0	< 1.0	< 0.48	< 0.85	< 0.43
	Far farms	Tritium	< 10	< 10	< 3.0	< 3.0	< 2.0
		Carbon-14	18	17	15	20	16
		Sulphur-35	< 1.0	< 1.0	< 0.42	< 0.57	< 0.41
	Max	Tritium	< 10	< 10	< 3.0	< 3.0	< 2.0
		Carbon-14	20	19	16	26	18
		Sulphur-35	< 1.0	< 1.0	< 0.43	< 0.60	< 0.45
Apples		Tritium	< 10	< 10	< 3.0	< 3.0	< 2.0
		Carbon-14	19	< 18	15	15	5.0
		Sulphur-35	< 1.0	1.6	< 0.50	1.5	0.50
	Max	Tritium		< 10			
		Carbon-14		20			

BRADWELL: Gaseous discharges and related environmental data 1994-1998 (cont.)

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1} wet*				
			1994	**1995**	**1996**	**1997**	**1998**
		Sulphur-35		2.1			
Blackberries		Tritium	< 10	< 10	< 3.0	< 3.0	< 3.0
		Carbon-14	27	28	20	16	15
		Sulphur-35	< 1.0	< 1.0	< 0.30	0.30	0.90
	Max	Tritium	< 10				
		Carbon-14	38				
		Sulphur-35	< 1.0				
Potatoes		Tritium	< 10	< 10	< 3.0	< 3.0	< 3.0
		Carbon-14	26	25	21	14	19
		Sulphur-35	< 1.0	< 1.0	< 0.40	0.40	0.70
	Max	Tritium			< 3.0		
		Carbon-14			21		
		Sulphur-35			< 0.50		
Cabbage[1]		Tritium	< 10	< 10	6.0	< 3.0	5.0
		Carbon-14	< 15	< 15	11	9.0	14
		Sulphur-35	< 1.0	< 1.0	1.1	1.0	0.60

* Bq l^{-1} for milk

1 Kale in 1996

CAPENHURST: Liquid discharges and related environmental data 1994-1998

Material or ground type	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	1995	1996	1997	1998
Liquid waste	Rivacre Brook	Uranium	0.00106	0.00181	0.00136	$5.6\ 10^{-4}$	$1.2\ 10^{-3}$
		Uranium daughters	0.0066	0.0068	0.00309	0.0029	< 0.0028
		Non-uranic alpha	$4.61\ 10^{-5}$	$1.01\ 10^{-4}$	$6.76\ 10^{-5}$	$1.4\ 10^{-5}$	$1.5\ 10^{-5}$
		Technetium-99	0.00335	0.00528	0.0032	0.00133	0.00134
Shrimp	Hoylake	Technetium-99	0.25	4.7	4.9	2.3	1.0
		Caesium-137	3.5	2.8	4.5	3.6	3.3
Cockles	Dee estuary	Cobalt-60	0.07	0.13	0.17	< 0.13	0.17
		Technetium-99	3.1	60	29	92	36
		Antimony-125	0.07		0.06	< 0.16	< 0.13
		Caesium-137	2.3	2.9	2.4	2.4	1.1
		Europium-155			0.02	< 0.14	< 0.12
		Protactinium-233	0.21		0.25		
		Thorium-234	2.6	0.85	3.6	11	< 5.7
		Plutonium-238	0.099	0.16	0.14	0.13	0.099
		Plutonium-239+240	0.54	0.85	0.74	0.69	0.56
		Americium-241	1.5	2.1	2.0	1.9	1.5
		Curium-242		0.0046		0.0039	
		Curium-243+244	0.0027	0.0074	0.0039	0.0026	0.0027

CAPENHURST: Liquid discharges and related environmental data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	1995	1996	1997	1998
Elodea Canadensis	Rivacre Brook	Cobalt-60		0.06		< 0.14	< 0.06
		Technetium-99	110	270	340	88	7.2
		Caesium-137	0.78	0.98	1.1	0.97	< 0.31
		Europium-155	0.27	0.18	0.28	< 0.27	< 0.10
		Protactinium-233	8.8	20	9.4	18	1.2
		Thorium-234	150	140	93	120	2.1
		Uranium-234	25		30	24	5.4
		Uranium-235+236	1.8		1.8	1.4	0.30
		Uranium-238	19		22	17	5.3
		Neptunium-237	8.4	8.5	8.2	2.2	0.24
		Americium-241			0.19	< 0.30	< 0.09
Mud	Rivacre Brook	Technetium-99	1100	1700	1900	1300	2000
		Caesium-137	16	13	17	15	18
		Europium-155			2.4	< 1.5	< 1.6
		Protactinium-233	59	130	110	140	440
		Thorium-234	320	590	360	270	990
		Uranium-234	250	350	350	260	200
		Uranium-235+236	17	23	23	17	12
		Neptunium-237	35		99	33	46
		Uranium-238	160	270	300	180	160
		Americium-241				1.8	< 2.6

* Wet concentrations except for sediment where dry concentrations apply

CAPENHURST: Gaseous discharges and related environmental data 1994-1998

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	**1995**	**1996**	**1997**	**1998**
Gaseous waste		Uranium	$1.0\ 10^{-5}$	$5.04\ 10^{-6}$	$5.17\ 10^{-6}$	$1.16\ 10^{-6}$	$6.15\ 10^{-6}$
Milk	Near farms	Tritium			9.8		
		Technetium-99	< 0.04	< 0.040	< 0.0075	< 0.0045	< 0.0050
		Uranium-238					< 0.0018
		Total Uranium	< 0.0062	< 0.0064	< 0.0065	< 0.0064	< 0.0063
	Far farms	Tritium				< 3.7	< 2.3
		Technetium-99	< 0.04	< 0.040			
		Total Uranium	< 0.0058	< 0.0064	< 0.0065		
Silage		Technetium-99			< 0.057	< 0.018	< 0.022
		Total Uranium	0.70	0.45	0.21	< 0.22	0.16
	Max	Technetium-99			< 0.058		
		Total Uranium	1.9	1.3	0.32	0.43	0.28
Grass		Uranium-234			0.40	0.060	0.61
		Uranium-235			0.017	0.0030	0.13
		Uranium-238			0.35	0.062	0.60
		Total Uranium	0.50	< 0.10	< 0.53	< 0.38	< 0.23
	Max	Total Uranium	2.6	0.16	1.5	1.3	1.1
Soil		Uranium-234			9.8	9.5	7.9
		Uranium-235			0.36	0.40	0.30
		Uranium-238			10	9.5	7.4
		Total Uranium	45	53	48	49	44

CAPENHURST: Gaseous discharges and related environmental data 1994-1998 (cont.)

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	**1995**	**1996**	**1997**	**1998**
	Max	Total Uranium	49	57	52	50	58
Bovine faeces		Technetium-99	< 0.05		< 0.041	0.021	< 0.021
		Uranium-234			2.0	0.28	0.87
		Uranium-235			0.077	0.011	0.034
		Uranium-238			2.0	0.25	0.86
		Total Uranium	1.4	2.0	1.5	1.1	2.2
	Max	Technetium-99			< 0.052		< 0.022
		Total Uranium		5.2	4.0	2.0	3.2
Potatoes		Technetium-99		< 0.10	< 0.039	< 0.019	< 0.025
		Total Uranium		0.12	< 0.020	< 0.022	0.034

* Bq l^{-1} for milk

CARDIFF: Liquid discharges and related environmental data 1994-1998

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1} * or gamma dose rate, μGy h^{-1}				
			1994	**1995**[1]	**1996**	**1997**	**1998**
Liquid waste		Beta/gamma	0.0173	0.00208			
		Tritium	535	458	542	473	277
		Carbon-14	1.06	1.25	1.60	1.33	1.15

CARDIFF: Liquid discharges and related environmental data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1} * or gamma dose rate, μGy h^{-1}				
			1994	**1995**[1]	**1996**	**1997**	**1998**
		Phosphorus-32/33		$7.3\ 10^{-5}$	$1.33\ 10^{-4}$	$3.26\ 10^{-5}$	$4.44\ 10^{-6}$
		Iodine-125		0.0145	0.0155	0.0115	0.00812
		Others		$1.8\ 10^{-4}$	$1.46\ 10^{-4}$	$8.23\ 10^{-5}$	$1.20\ 10^{-5}$
Flounder	East of new pipeline	Tritium[2]	**41000**	**35000**	**41000**	19000	31000
		Carbon-14	670	650	610	490	640
		Caesium-137	0.42	0.42	0.39	0.40	0.33
Mussels	Orchard Ledges	Tritium[2]	**79000**	**68000**	**80000**	**70000**	41000
		Carbon-14	530	510	730	570	580
		Caesium-137		0.42	0.27	0.30	0.38
Mud	West of new pipeline	Carbon-14	17	31	21	34	42
		Caesium-134	0.86	0.33		< 0.73	< 0.56
		Caesium-137	21	20	3.0	25	16
		Europium-155	1.6	1.6		< 1.4	< 1.1
Mud	East of new pipeline	Gamma dose	0.071	0.079	0.079	0.070	0.077

* Wet concentrations except for sediments where dry concentrations apply

1 Authorisation revised

2 Bold entries are estimated

CARDIFF: Gaseous discharges and related environmental data 1994-1998

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	1995[1]	1996	1997	1998
Gaseous waste		Soluble Tritium	170	179	173	160	153
		Insoluble Tritium		359	522	480	407
		Carbon-14	2.3	3.65	3.84	3.02	2.63
		Phosphorus-32/33	$9.2\ 10^{-5}$	$7.93\ 10^{-5}$	$5.33\ 10^{-6}$	$2.94\ 10^{-6}$	$3.07\ 10^{-6}$
		Cobalt-57	$2.1\ 10^{-4}$				
		Iodine-125	$5.3\ 10^{-3}$	0.00180	$1.20\ 10^{-4}$	$1.11\ 10^{-4}$	$1.17\ 10^{-4}$
		Other activity		$1.9\ 10^{-4}$	$1.22\ 10^{-3}$	$8.17\ 10^{-5}$	
Milk	Near farms	Tritium(organic)	< 27	< 36	< 24	< 36	< 24
		Tritium	< 44	72	< 44	< 63	< 46
		Carbon-14	28	28	22	28	23
		Phosphorus-32	< 2.0	< 0.69	< 0.45	< 0.39	< 0.45
		Sulphur-35	< 1.0	< 1.0	< 0.52	< 0.58	< 0.44
		Calcium-45	< 2.0	< 2.0	< 0.39	< 0.30	< 0.38
		Cobalt-57	< 0.30	< 0.31	< 0.27	< 0.30	< 0.31
		Iodine-125	< 0.20	< 0.050	< 0.030	< 0.027	< 0.035
	Max	Tritium(organic)	< 40	56	44	74	41
		Tritium	64	110	79	130	85
		Carbon-14	38	34	26	41	28
		Phosphorus-32	< 2.0	< 0.75	< 0.48	< 0.43	< 0.45
		Sulphur-35	< 1.0	< 1.0	< 0.73	0.93	< 0.48
		Calcium-45	< 2.0	< 2.0	< 0.45	< 0.30	< 0.38
		Cobalt-57	< 0.30	< 0.33	< 0.28	< 0.35	< 0.33
		Iodine-125	< 0.20	< 0.050	< 0.035	< 0.030	< 0.037

CARDIFF: Gaseous discharges and related environmental data 1994-1998 (cont.)

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	1995[1]	1996	1997	1998
	Far farms	Tritium(organic)	< 10	10	< 4.8	< 4.3	< 3.9
		Tritium	< 11	< 11	< 8.0	< 7.4	< 6.5
		Carbon-14	21	< 19	15	17	19
		Phosphorus-32	< 2.0				
		Sulphur-35	< 1.0	< 1.0	< 0.65	< 0.51	< 0.49
		Calcium-45	< 2.0	< 2.0	< 0.43	< 0.30	< 0.49
		Cobalt-57	< 0.40	< 0.30	< 0.29	< 0.30	< 0.33
		Iodine-125	< 0.20	< 0.050	< 0.033	< 0.029	< 0.035
	Max	Tritium(organic)		< 11	< 6.0	< 4.8	< 4.7
		Tritium		< 14	11	< 8.4	< 8.3
		Carbon-14		23	15	17	19
		Sulphur-35		< 1.1	< 0.83	< 0.58	< 0.55
		Calcium-45		< 2.0	< 0.43	< 0.30	< 0.60
		Cobalt-57		< 0.30	< 0.30	< 0.33	< 0.33
		Iodine-125		< 0.050	< 0.033	< 0.032	< 0.036
Barley		Tritium	29	84	40	17	180
		Carbon-14	123	160	100	110	85
		Sulphur-35		< 1.0	2.0	1.4	1.2
		Calcium-45	2.6	< 2.0	2.5	4.2	5.4
		Cobalt-57		< 0.40	< 0.30	< 0.30	< 0.30
		Iodine-125	< 1.0	< 0.092	< 0.072	< 0.31	< 0.13

CARDIFF: Gaseous discharges and related environmental data 1994-1998 (cont.)

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	1995[1]	1996	1997	1998
Cabbage		Tritium(organic)		< 23	< 5.0	< 3.0	< 3.0
		Tritium	11	< 59	9.5	< 3.0	< 3.0
		Carbon-14	13	< 16	8.0	13	5.0
		Sulphur-35	< 1.0	< 2.2	0.50	2.1	0.40
		Calcium-45	< 2.0	< 2.0	< 1.7	1.0	1.1
		Cobalt-57	< 0.10	< 0.20	< 0.20	< 0.30	< 0.20
		Iodine-125	< 0.20	< 0.11	< 0.084	< 0.16	0.11
Honey		Tritium	64	83	55	55	92
		Carbon-14	91	100	96	120	73
		Sulphur-35		< 1.0	< 1.3	< 0.60	< 0.50
		Calcium-45	< 2.0	< 2.0	< 0.80	< 0.20	1.0
		Cobalt-57		< 0.20	< 0.20	< 0.20	< 0.40
		Iodine-125	< 0.20	< 0.10	< 0.042	< 0.093	< 0.12
Potatoes		Tritium(organic)		17	< 3.0	< 3.0	< 3.0
		Tritium	12	50	12	9.0	3.0
		Carbon-14	27	26	24	18	19
		Sulphur-35		< 1.0	0.40	< 0.30	0.70
		Calcium-45	< 2.0	< 2.0	< 0.20	< 0.30	< 0.40
		Cobalt-57	< 0.10	< 0.20	< 0.20	< 0.40	< 0.30
		Iodine-125	< 0.40	< 0.20	< 0.095	< 0.14	< 0.19

* Bq l^{-1} for milk

1 Authorisation revised

DEVONPORT: Liquid discharges and related environmental data 1994-1998

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1} * or gamma dose rate, μGy h^{-1}				
			1994	**1995**	**1996**	**1997**	**1998**
Liquid waste	Sewer[1]	Beta	$1.88\ 10^{-6}$			$1.97\ 10^{-6}$	$6.54\ 10^{-6}$
		Tritium	$1.60\ 10^{-6}$			$2.22\ 10^{-6}$	$5.71\ 10^{-6}$
		Cobalt-60	$5.37\ 10^{-7}$			$5.60\ 10^{-7}$	$3.03\ 10^{-7}$
	Sewer[2]	Total Activity	0.000933	$6.13\ 10^{-4}$	$4.77\ 10^{-4}$	$5.33\ 10^{-4}$	$4.66\ 10^{-4}$
		Cobalt-60	0.000684	$5.20\ 10^{-4}$	$4.24\ 10^{-4}$	$4.82\ 10^{-4}$	$4.31\ 10^{-4}$
	Pipeline	Total activity	0.000184	$3.91\ 10^{-5}$	$4.03\ 10^{-5}$	$2.67\ 10^{-5}$	$2.31\ 10^{-5}$
		Tritium	0.0669	0.0603	0.0765	0.0656	0.113
		Cobalt-60	0.000184	$1.35\ 10^{-4}$	$5.16\ 10^{-5}$	$5.36\ 10^{-5}$	$1.24\ 10^{-4}$
Dogfish	Plymouth Sound	Cobalt-60				< 0.09	< 0.17
		Caesium-137	0.39	0.37	0.38	0.30	< 0.16
		Cerium-144				< 0.45	< 0.95
Crabs	Plymouth Sound	Carbon-14		28	28	30	38
		Cobalt-60				< 0.06	< 0.07
		Zinc-65	0.13			< 0.17	< 0.16
		Caesium-137			0.10	< 0.05	< 0.06
Mud	Kinterbury	Cobalt-60	0.51	0.16		< 0.30	< 0.24
		Caesium-137	4.5	5.0	5.4	5.1	3.5

DEVONPORT: Liquid discharges and related environmental data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1} * or gamma dose rate, μGy h^{-1}				
			1994	**1995**	**1996**	**1997**	**1998**
		Europium-155	2.0	2.2	2.1	1.9	2.2
		Plutonium-238	0.018	0.023	0.030	0.031	0.018
		Plutonium-239+240	0.49	0.39	0.63	0.56	0.38
		Americium-241	0.16	0.13	0.22	0.22	0.15
		Curium-243+244		0.0012		0.0016	
Mud	Kinterbury	Gamma dose	0.070	0.073	0.074	0.070	0.079

* Wet concentrations except for sediment where dry concentrations apply

1 Discharges made by Ministry of Defence

2 Discharges made by Devonport Royal Dockyard Ltd.

DUNGENESS: Liquid discharges and related environmental data 1994-1998

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1*} or gamma dose rate, μGy h^{-1}				
			1994[1]	**1995**	**1996**	**1997**	**1998**
Liquid waste	A Station	Total activity	0.401				
		Tritium	0.0878				
		Tritium	0.0828	0.217	1.38	0.135	0.421

DUNGENESS: Liquid discharges and related environmental data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1*} or gamma dose rate, μGy h^{-1}				
			1994[1]	1995	1996	1997	1998
		Caesium-137	0.185	0.508	0.554	0.520	0.708
		other Radionuclides	0.143	0.294	0.282	0.272	0.386
	B Station	Total activity	0.0359				
		Tritium	342				
		Sulphur-35	0.738				
		Tritium	65.7	15.1	252	247	172
		Sulphur-35	0.163	0.0203	0.316	0.357	0.202
		Cobalt-60	0.0024	0.00259	0.00166	0.00159	0.00126
		other Radionuclides	0.0225	0.0249	0.0167	0.025	0.0165
Cod	Pipeline	Tritium					< 120
		Cobalt-60				< 0.05	< 0.06
		Caesium-137	0.41	0.28	0.36	0.39	0.37
Shrimps	Pipeline	Carbon-14		28	29	25	49
		Cobalt-60	0.19	0.12	0.05	< 0.08	< 0.08
		Caesium-134	0.03	0.06		< 0.09	< 0.14
		Caesium-137	0.27	0.31	0.32	0.37	0.45
Mud and sand [2]	Rye Harbour	Cobalt-60	5.6	3.7	3.6	2.4	1.9
		Caesium-137	2.3	1.8	3.1	1.9	1.1

DUNGENESS: Liquid discharges and related environmental data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1*} or gamma dose rate, μGy h^{-1}				
			1994[1]	**1995**	**1996**	**1997**	**1998**
		Europium-155	1.5		1.3	< 1.7	1.9
		Plutonium-238	0.099	0.080	0.11	0.076	0.16
		Plutonium-239+240	0.43	0.38	0.46	0.35	0.29
		Americium-241	0.35	0.27	0.42	0.30	0.25
		Curium-242		0.0018			0.0034
		Curium-243+244	0.029	0.019	0.029	0.018	0.014
Mud and sand	Rye Harbour	Gamma dose	0.062	0.064	0.063	0.064	0.064

* Wet concentrations except for sediment where dry concentrations apply

1 Authorisations revised

2 Mud in 1998

DUNGENESS: Gaseous discharges and related environmental data 1994-1998

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1} wet*				
			1994	**1995**	**1996**	**1997**	**1998**
Gaseous waste	A Station	Beta	< 2.6 10^{-4}	3.8 10^{-4}	3.25 10^{-4}	3.00 10^{-4}	3.6 10^{-4}
		Tritium	0.15	0.62	1.03	0.57	0.57
		Carbon-14	1.5	3.6	2.5	3.2	3.0
		Sulphur-35	0.030	0.093	0.0496	0.0715	0.063
		Argon-41	690	1200	1190	977	1300

DUNGENESS: Gaseous discharges and related environmental data 1994-1998 (cont.)

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1} wet*				
			1994	**1995**	**1996**	**1997**	**1998**
	B Station	Beta	4.4 10^{-5}	1.2 10^{-5}	4.86 10^{-5}	3.45 10^{-5}	1.61 10^{-5}
		Tritium	2.5	2.4	1.52	4.78	3.32
		Carbon-14	0.20	0.16	0.49	0.473	0.405
		Sulphur-35	7.6 10^{-3}	0.0074	0.0133	0.0119	0.023
		Argon-41	23	6.9	27.9	19.3	23.1
		Iodine-131	< 3.7 10^{-6}	3.3 10^{-6}	4.14 10^{-6}	4.40 10^{-6}	4.22 10^{-6}
Milk	Far farms	Tritium	< 10	< 10	< 3.0	< 3.1	< 2.8
		Carbon-14	< 22	< 23	15	16	15
		Sulphur-35	< 1.0	< 1.0	< 0.48	< 0.46	< 0.36
		Iodine-131	< 0.20	< 0.33	< 0.022		
	Max	Tritium	< 10	< 10	< 3.0	< 3.3	< 2.8
		Carbon-14	23	< 24	16	17	16
		Sulphur-35	< 1.0	< 1.0	< 0.48	< 0.55	< 0.38
		Iodine-131	< 0.20	< 0.33	< 0.024		
Blackberries		Tritium	< 10	< 10	< 3.0	< 3.0	< 3.0
		Carbon-14	35	27	17	22	19
		Sulphur-35	< 1.0	< 1.0	1.2	0.50	< 0.30
Green beans		Tritium	< 10	< 10	< 3.0	< 3.0	3.0
		Carbon-14	22	< 15	95	84	13
		Sulphur-35	< 1.0	< 1.0	1.8	2.4	< 0.30

DUNGENESS: Gaseous discharges and related environmental data 1994-1998 (cont.)

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1} wet*				
			1994	1995	1996	1997	1998
Potatoes		Tritium	< 10	< 10	< 3.0	< 3.0	< 3.0
		Carbon-14	17	14	18	15	16
		Sulphur-35	< 1.0	< 1.0	< 0.30	< 0.40	< 0.40
Sea kale		Tritium	< 10	< 10	6.0	14	< 3.0
		Carbon-14	12	14	10	5.0	7.0
		Sulphur-35	4.5	2.2	2.0	< 0.60	< 3.0
		Caesium-137	0.60	1.1	0.50	0.50	0.50

* Bq l^{-1} for milk

HARTLEPOOL: Liquid discharges and related environmental data 1994-1998

Material or ground type	Location	Radionuclide or dose measurement	Discharges, TBq, concentration of activity, Bq kg^{-1*} or gamma dose rate, μGy h^{-1}				
			1994	1995[1]	1996	1997	1998
Liquid waste		Tritium	289	237	353	367	329
		Sulphur-35	0.446	0.355	0.899	0.804	0.325
		Cobalt-60		0.00300	0.0145	0.00483	0.00327
		Other radionuclides	0.0104	0.00331	0.00548	0.00637	0.00255

HARTLEPOOL: Liquid discharges and related environmental data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Discharges, TBq, concentration of activity, Bq kg^{-1*} or gamma dose rate, μGy h^{-1}				
			1994	**1995**[1]	**1996**	**1997**	**1998**
Plaice	Pipeline	Carbon-14	47	31	39	36	46
		Cobalt-60				< 0.05	< 0.05
		Caesium-137	0.29	0.38	0.38	0.41	0.41
Crabs	Pipeline	Carbon-14			38	47	57
		Cobalt-60				< 0.06	< 0.07
		Caesium-137	0.18	0.26	0.22	0.18	0.19
		Plutonium-238	0.00038	0.00030	0.00047	0.0011	0.0017
		Plutonium-239+240	0.0019	0.0018	0.0026	0.0062	0.0087
		Americium-241	0.0018	0.0015	0.0031	0.0063	0.015
		Curium-243+244	0.000013			0.000022	0.0024
Winkles		Cobalt-60				< 0.11	< 0.07
		Caesium-137	0.33	0.40	0.39	0.44	0.54
		Plutonium-238	0.0041	0.0093	0.0080	0.0093	0.0090
		Plutonium-239+240	0.023	0.051	0.047	0.052	0.052
		Americium-241	0.015	0.034	0.026	0.040	0.026
		Curium-242		0.000054		0.00029	
		Curium-243+244	0.000042	0.000056	0.000047	0.00012	
Mud	Paddy's Hole	Cobalt-60				< 0.26	< 0.36
		Caesium-137	22	22	23	15	16
		Europium-155	3.1	1.0	2.3	2.5	< 1.2

HARTLEPOOL: Liquid discharges and related environmental data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Discharges, TBq, concentration of activity, Bq kg^{-1}* or gamma dose rate, μGy h^{-1}				
			1994	**1995**[1]	**1996**	**1997**	**1998**
Mud	Paddy's Hole	Gamma dose	0.097	0.086	0.097	0.10	0.088

* Wet concentrations except for sediment where dry concentrations apply

1 Authorisation revised

HARTLEPOOL: Gaseous discharges and related environmental data 1994-1998

Material	Location or selection	Radionuclide	Discharges, TBq, concentration of activity, Bq kg^{-1}*				
			1994	**1995**[1]	**1996**	**1997**	**1998**
Gaseous waste		Beta	$3.50\ 10^{-5}$	$1.46\ 10^{-5}$	$3.49\ 10^{-5}$	$2.53\ 10^{-5}$	$4.43\ 10^{-6}$
		Tritium	$3.00\ 10^{-2}$	0.426	1.56	1.61	1.5
		Carbon-14		0.452	1.51	1.61	1.91
		Sulphur-35	0.0300	0.0297	0.0447	0.0312	0.022
		Argon-41	44	10.6	23.9	37.8	12.4
		Iodine-131	$2.60\ 10^{-4}$	$1.92\ 10^{-4}$	$2.75\ 10^{-4}$	$1.93\ 10^{-4}$	$8.87\ 10^{-5}$
Milk	Near farms	Tritium	< 10	< 10	< 3.0		
		Carbon-14	23	20	18		
		Sulphur-35	< 1.0	< 1.0	< 0.73		
		Iodine-131	< 0.20	< 0.20	< 0.019		

HARTLEPOOL: Gaseous discharges and related environmental data 1994-1998 (cont.)

Material	Location or selection	Radionuclide	Discharges, TBq, concentration of activity, Bq kg^{-1}*				
			1994	1995[1]	1996	1997	1998
Milk	Far farms	Tritium	< 10	< 10	< 3.0	< 3.0	< 2.0
		Carbon-14	22	< 18	< 17	24	16
		Sulphur-35	< 1.0	< 1.0	< 0.68	< 0.36	< 0.60
		Iodine-131	< 0.20	< 0.20	< 0.018		
	Max	Tritium	< 10	< 10	< 3.0	< 3.0	< 2.0
		Carbon-14	27	20	19	28	21
		Sulphur-35	< 1.0	< 1.0	< 0.78	0.40	< 0.75
		Iodine-131	< 0.20	< 0.20	< 0.022		
Cabbage		Tritium	< 10	< 10	< 3.0	< 3.0	< 2.5
		Carbon-14	12	< 15	12	8.0	7.5
		Sulphur-35	< 1.0	< 1.0	0.50	< 0.50	< 0.45
	Max	Tritium	< 10	< 10		< 3.0	< 3.0
		Carbon-14	13	< 15		10	8.0
		Sulphur-35	< 1.0	< 1.0		< 0.70	0.50
Honey		Tritium	< 10	< 10	< 4.0	< 4.0	3.0
		Carbon-14	120	78	80	79	83
		Sulphur-35	< 1.0	< 1.0	< 1.0	< 0.80	< 0.60
		Caesium-137	< 0.40	< 0.60	0.20	< 0.60	< 0.40
Potatoes		Tritium	< 10	< 10	< 3.0	< 3.0	< 3.0
		Carbon-14	30	21	18	19	29

HARTLEPOOL: Gaseous discharges and related environmental data 1994-1998 (cont.)

Material	Location or selection	Radionuclide	Discharges, TBq, concentration of activity, Bq kg^{-1}*				
			1994	**1995**[1]	**1996**	**1997**	**1998**
		Sulphur-35	< 1.0	< 1.0	0.50	< 0.80	0.70

*Bq l^{-1} for milk

1 Authorisation revised

HARWELL: Liquid discharges and related environmental data 1994-1998

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1}* or gamma dose rate, μGy h^{-1}				
			1994	**1995**	**1996**	**1997**	**1998**
Liquid waste	Pipeline	Alpha	1.03 10^{-4}	5.02 10^{-5}	4.14 10^{-5}	2.11 10^{-5}	5.12 10^{-5}
		Beta	0.00467	0.00357	0.00182	0.00101	0.00298
		Tritium	0.503	0.0612	0.0520	0.0305	0.0879
		Cobalt-60	9.10 10^{-4}	4.81 10^{-4}	8.57 10^{-5}	9.53 10^{-5}	4.57 10^{-5}
		Caesium	5.50 10^{-4}	4.04 10^{-4}	3.11 10^{-4}	2.23 10^{-4}	4.90 10^{-4}
	Lydebank Brook	Alpha	8.58 10^{-5}	4.59 10^{-5}	4.56 10^{-5}	2.54 10^{-5}	2.56 10^{-5}
		Beta	5.07 10^{-4}	3.21 10^{-4}	3.00 10^{-4}	2.09 10^{-4}	2.12 10^{-4}
		Tritium	0.054	0.0302	0.0187	0.0195	0.0263
Pike	Outfall	Tritium					270
		Strontium-90		0.0083	0.0093		
		Caesium-134	0.05	0.08	0.05	< 0.08	0.28

HARWELL: Liquid discharges and related environmental data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1*} or gamma dose rate, μGy h^{-1}				
			1994	**1995**	**1996**	**1997**	**1998**
		Caesium-137	2.8	7.1	5.0	3.6	26
		Plutonium-238	0.000011	0.000027	0.000039		
		Plutonium-239+240	0.000051	0.00016	0.00020		
		Americium-241	0.000070	0.00015	0.00033	< 0.24	0.13
Mud and sand	Outfall	Cobalt-60	17	11	12	7.7	3.4
		Caesium-137	1000	570	470	1200	270
		Americium-241	4.3			< 3.4	1.8
Soil	Outfall	Gamma dose	0.067	0.085	0.075	0.091	0.08

* Wet concentrations except for sediments where dry concentrations apply

HARWELL: Gaseous discharges and related environmental data 1994-1998

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	**1995**	**1996**	**1997**	**1998**
Gaseous waste		Alpha	$3.3\ 10^{-7}$	$2.1\ 10^{-7}$	$3.18\ 10^{-7}$	$2.39\ 10^{-7}$	$1.80\ 10^{-7}$
		Beta	$2.3\ 10^{-5}$	$6.3\ 10^{-6}$	$6.56\ 10^{-6}$	$5.20\ 10^{-6}$	$4.00\ 10^{-6}$
		Tritium	9.6	8.43	7.16	2.50	2.60

HARWELL: Gaseous discharges and related environmental data 1994-1998 (cont.)

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	**1995**	**1996**	**1997**	**1998**
Milk	Near farms	Tritium	< 10	< 10	< 3.1	< 3.1	< 3.8
	max	Tritium	< 10	< 10	< 3.3	< 3.50	< 4.0
	Far farms	Tritium	< 10	< 10	< 3.0		
Apples		Tritium		33	49	4.0	< 3.0
Honey		Tritium		< 10	< 5.0	< 4.0	< 4.0
			10	5	4	4	

* Bq l^{-1} for milk

HEYSHAM: Liquid discharges and related environmental data 1994-1998

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1}* or gamma dose rate, μGy h^{-1}				
			1994	**1995**[1]	**1996**	**1997**	**1998**
Liquid waste	Station 1	Tritium	376	251	341	465	396
		Sulphur-35	0.557	0.113	0.223	0.262	0.241
		Cobalt-60		4.57 10^{-4}	0.00102	6.87 10^{-4}	0.00100
		other Radionuclides	0.00866	0.00700	0.00782	0.00698	0.00917
	Station 2	Tritium	356	333	379	351	307
		Sulphur-35	0.0836	0.0545	0.0358	0.0486	0.0339
		Cobalt-60	0.000777	8.82 10^{-4}	6.89 10^{-4}	5.64 10^{-4}	0.00109

HEYSHAM: Liquid discharges and related environmental data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1*} or gamma dose rate, μGy h^{-1}				
			1994	**1995**[1]	**1996**	**1997**	**1998**
		other Radionuclides	0.0428	0.00875	0.0114	0.0101	0.0171
Flounder	Flookburgh	Carbon-14	58	87	110	95	98
		Cobalt-60				< 0.14	< 0.15
		Caesium-134	0.12	0.02		< 0.16	< 0.15
		Caesium-137	36	32	26	22	17
		Plutonium-238	0.00054	0.00064	0.00023	0.00061	0.00031
		Plutonium-239+240	0.0029	0.0033	0.0013	0.0038	0.0019
		Americium-241	0.0046	0.0045	0.0027	0.0056	0.0034
		Curium-242					0.000041
		Curium-243+244	0.0000082	0.000011		0.000011	
Mussels	Morecambe	Carbon-14	47	110	150	84	87
		Cobalt-60	0.22	0.44	0.68	0.69	0.66
		Tc-99	54	250	400	500	250
		Ruthenium-106	1.7	1.6	3.6	2.5	1.6
		Antimony-125	0.40	0.35	0.24	< 0.24	< 0.16
		Caesium-134				< 0.07	0.06
		Caesium-137	4.1	3.0	3.5	3.0	3.3
		Plutonium-238	0.35	0.29	0.35	0.32	0.33
		Plutonium-239+240	1.8	1.5	1.8	1.8	1.8
		Americium-241	3.1	2.6	3.2	3.2	3.1
		Curium-242	0.0063				
		Curium-243+244	0.0030	0.0072	0.0052	0.0034	0.0042

HEYSHAM: Liquid discharges and related environmental data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1*} or gamma dose rate, μGy h^{-1}				
			1994	**1995**[1]	**1996**	**1997**	**1998**
Mud and sand	Morecambe Central Pier	Cobalt-60	1.2	2.9	2.0	1.5	4.0
		Zirconium-95	0.50			< 1.8	< 1.3
		Niobium-95	0.45			< 2.7	< 1.3
		Ruthenium-106	13	19	12	< 8.3	< 8.7
		Antimony-125	1.9	1.5	1.6	< 1.8	< 1.6
		Caesium-134	0.10			< 0.53	< 0.58
		Caesium-137	230	230	180	140	150
		Europium-154	1.8	2.4	1.0	< 1.2	< 1.3
		Europium-155	1.9	2.0	2.0	< 1.6	< 1.6
		Americium-241	92	150	90	81	87
		Manganese-54		0.20		< 0.68	< 0.64
Mud and sand	Half Moon Bay	Cobalt-60	0.9	4.6	5.4	3.6	8.5
		Ruthenium-106	5.6	17	30	< 14	13
		Antimony-125	1.3	2.7	3.4	< 2.6	< 1.6
		Caesium-134	0.2	0.29	0.26	< 0.78	< 0.76
		Caesium-137	170	250	320	220	190
		Europium-154	1.3	2.3	3.0	< 2.0	< 2.2
		Europium-155	1.8	2.7	0.74	< 1.9	< 2.0
		Plutonium-238	10	14	28	9.6	11
		Plutonium-239+240	54	71	160	51	63
		Americium-241	84	110	240	85	100
		Curium-242					0.093
		Curium-243+244	0.20	0.099	0.55	0.16	0.12

HEYSHAM: Liquid discharges and related environmental data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1}* or gamma dose rate, μGy h^{-1}				
			1994	**1995**[1]	**1996**	**1997**	**1998**
Mud and sand	Half Moon Bay	Gamma dose	0.083	0.082	0.086	0.084	0.083
Mud and sand	Morecambe Pier	Gamma dose	0.081	0.086	0.081	0.078	0.081
Mussel bed	Morecambe Pier	Gamma dose	0.075	0.078	0.080	0.078	0.081

1 Authorisations changed

HEYSHAM: Gaseous discharges and related environmental data 1994-1998

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	**1995**[1]	**1996**	**1997**	**1998**
Gaseous waste	Station 1	Alpha	2.2 10^{-6}				
		Beta	4.7 10^{-5}	1.99 10^{-5}	4.74 10^{-5}	4.76 10^{-5}	3.60 10^{-5}
		Tritium		0.72	0.0923	0.636	1.42
		Carbon-14		0.37	1.02	1.30	1.16
		Sulphur-35	0.016	0.0167	0.0137	0.0144	0.014
		Argon-41	9.2	27.1	10.7	7.92	12.6
		Iodine-131	0.0012	0.00122	0.0012	0.00111	7.47 10-4
	Station 2	Alpha	1.0 10^{-6}				
		Beta	2.4 10^{-5}	2.69 10^{-5}	2.20 10^{-5}	5.17 10^{-5}	1.46 10^{-5}

HEYSHAM: Gaseous discharges and related environmental data 1994-1998 (cont.)

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	**1995**[1]	**1996**	**1997**	**1998**
		Tritium	1.2	2.11	2.14	2.08	2.18
		Carbon-14	0.63	0.909	0.849	0.817	1.05
		Sulphur-35	0.0083	0.0105	0.0173	0.0147	0.0153
		Argon-41	13	22.5	12.9	21.0	16.3
		Iodine-131	2.6 10^{-4}	2.86 10^{-4}	2.32 10^{-4}	2.46 10^{-4}	1.89 10^{-4}
Milk	Near farms	Tritium	< 10	< 10	< 3.2	< 3.2	< 3.9
		Carbon-14	20	< 18	15	15	18
		Sulphur-35	< 1.0	< 1.0	< 0.69	< 0.39	< 0.55
		Iodine-131	< 0.20	< 0.20	< 0.020		
	Max	Tritium	< 10	< 11	4.0	< 4.0	< 4.5
		Carbon-14	23	21	18	18	21
		Sulphur-35	< 1.0	< 1.0	1.7	< 0.65	< 0.63
		Iodine-131	< 0.20	< 0.20	< 0.026		
Milk	Far farms	Tritium	< 10	< 10	< 3.0		
		Carbon-14	19	< 16	14		
		Sulphur-35	< 1.0	< 1.0	< 0.55		
		Iodine-131	< 0.20				
	Max	Tritium	< 10	< 10	3.0		
		Carbon-14	19	< 17	16		
		Sulphur-35	< 1.0	< 1.0	0.70		
		Iodine-131	< 0.20				

HEYSHAM: Gaseous discharges and related environmental data 1994-1998 (cont.)

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	1995[1]	1996	1997	1998
Apples		Tritium	< 10	< 10	< 3.0	< 3.0	< 3.0
		Carbon-14	13	16	13	13	13
		Sulphur-35	< 1.0	< 1.0	0.60	< 0.70	0.40
Cabbage[2]		Tritium	< 10	< 10	< 3.0	3.0	7.0
		Carbon-14	17	13	10	7.0	5.0
		Sulphur-35	< 1.0	< 1.0	0.60	1.8	0.80
		Caesium-137	0.90	< 0.30	< 0.40	< 0.40	< 0.50
Potatoes		Tritium	< 10	< 10	< 3.0	< 3.0	< 2.5
		Carbon-14	20	17	30	16	20
		Sulphur-35	< 1.0	< 1.0	1.2	0.30	< 0.45

* Bq l^{-1} for milk

1 Authorisations changed

2 Broccoli in 1996

HINKLEY: Liquid discharges and related environmental data 1994-1998

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1*} or gamma dose rate, μGy h^{-1}				
			1994	**1995**[1]	**1996**	**1997**	**1998**
Liquid waste	A Station	Tritium	0.712	0.756	0.67	0.81	0.708
		Caesium-137	0.486	0.605	0.406	0.484	0.493
		Other radionuclides	0.237	0.376	0.164	0.223	0.284
	B Station	Tritium	336	432	319	385	387
		Sulphur-35	1.36	1.35	0.795	0.868	0.578
		Cobalt-60	$1.26\ 10^{-3}$	$4.04\ 10^{-4}$	$4.00\ 10^{-4}$	$7.1\ 10^{-4}$	$4.40\ 10^{-4}$
		Other radionuclides	0.0201	0.0162	0.00864	0.0149	0.0193
Flounder	Stolford	Tritium[2]	**6200**	**5300**	**6300**	**5500**	3200
		Carbon-14	130	110	99	99	110
		Cobalt-60				< 0.06	< 0.03
		Caesium-134	0.09	0.05	0.13	< 0.12	0.06
		Caesium-137	0.94	0.66	0.55	0.78	0.54
Shrimp	Stolford	Tritium					1900
		Carbon-14	96	83	88	89	110
		Cobalt-60				< 0.05	< 0.06
		Caesium-134	0.19	0.13	0.18	< 0.07	< 0.09
		Caesium-137	0.70	0.65	0.69	0.44	0.55
		Plutonium-238	0.00035	0.00044	0.0005	0.00021	0.00025
		Plutonium-239-240	0.0015	0.0017	0.0018	0.0010	0.00078
		Americium-241	0.0023	0.0021	0.0021	0.0011	0.0012
		Curium-242	0.00029	0.00038	0.00023		0.000078
		Curium-243-244	0.000028	0.000063	0.000085	0.000025	0.000042

HINKLEY: Liquid discharges and related environmental data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1*} or gamma dose rate, μGy h^{-1}				
			1994	**1995**[1]	**1996**	**1997**	**1998**
Mud	1.6km east of Pipeline	Manganese-54	0.51			< 0.67	< 0.59
		Cobalt-60	0.86	0.52	0.48	< 1.3	< 0.53
		Zirconium-95		0.90		< 1.7	< 2.4
		Ruthenium-106			2.2	< 6.0	< 5.2
		Caesium-134	4.9	3.4	5.3	3.5	5.2
		Caesium-137	40	31	31	32	29
		Europium-155	1.9	1.9	0.79	< 1.9	< 1.8
Mud	1.6km east of Pipeline	Gamma Dose	0.068	0.068	0.079	0.098	0.066
Mud	River Parrett	Gamma Dose	0.070	0.079	0.077	0.070	0.077

* Wet concentrations except for sediments where dry concentrations apply

1 B Station authorisation revised

2 Bold entries are estimated

HINKLEY: Gaseous discharges and related environmental data 1994-1998

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1} wet*				
			1994	1995	1996	1997	1998
Gaseous waste	A Station	Beta	$2.3\ 10^{-4}$	$1.57\ 10^{-4}$	$7.68\ 10^{-5}$	$1.68\ 10^{-4}$	$1.05\ 10^{-4}$
		Tritium	2.6	2.62	2.10	2.98	2.59
		Carbon-14	1.7	1.06	1.88	1.91	1.42
		Sulphur-35	0.089	0.0973	0.069	0.0707	0.058
		Argon-41	3100	3200	33.2	3030	2700
	B Station	Beta	$3.0\ 10^{-4}$	$7.68\ 10^{-5}$	$7.68\ 10^{-5}$	$7.53\ 10^{-5}$	$5.16\ 10^{-5}$
		Tritium	1.8	2.46	2.10	1.96	1.72
		Carbon-14	1.1	0.843	1.88	1.41	1.92
		Sulphur-35	0.077	0.0991	0.069	0.0731	0.101
		Argon-41	39	41.8	33.2	16.7	36.6
		Iodine-131	$8.3\ 10^{-5}$	$1.95\ 10^{-5}$	$2.09\ 10^{-5}$	$2.05\ 10^{-5}$	$1.25\ 10^{-5}$
Milk	Near farms	Tritium	< 10	< 10	< 3.0	< 3.0	< 3.1
		Carbon-14	22	< 19	16	16	20
		Sulphur-35	< 1.0	< 1.0	< 0.69	< 0.51	< 0.68
		Iodine-131	< 0.20	< 0.20	< 0.025		
	Max	Tritium	< 10	< 10	< 3.3	< 3.3	< 3.8
		Carbon-14	24	< 28	21	19	27
		Sulphur-35	< 1.0	< 1.0	< 1.3	< 0.75	1.2
		Iodine-131	< 0.20	< 0.20	< 0.031		
	Far farms	Tritium	< 10	< 10	< 3.0	< 3.0	< 2.0
		Carbon-14	< 21	< 18	18	19	13

HINKLEY: Gaseous discharges and related environmental data 1994-1998 (cont.)

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1} wet*				
			1994	**1995**	**1996**	**1997**	**1998**
		Sulphur-35	< 1.0	< 1.0	< 0.40	< 0.50	< 0.43
		Iodine-131	< 0.20				
	Max	Tritium	< 10	< 10	< 3.0		
		Carbon-14	23	< 20	20		
		Sulphur-35	< 1.0	< 1.0	< 0.40		
		Iodine-131	< 0.20				
Apples		Tritium	< 10	< 10	< 3.0	< 3.0	< 3.0
		Carbon-14	14	16	9.0	10	12
		Sulphur-35	< 1.0	< 1.0	< 0.30	< 0.20	< 0.50
Blackberries		Tritium	< 10	< 10	< 3.0	5.0	5.0
		Carbon-14	15	28	15	22	23
		Sulphur-35	< 1.0	< 1.0	1.1	1.4	< 0.40
Kale[1]		Tritium	< 10	< 10	< 3.0	3.0	< 3.0
		Carbon-14	16	16	14	9.0	5.0
		Sulphur-35	< 1.0	< 1.0	< 0.40	2.6	2.8
Potatoes		Tritium	< 10	< 10	< 3.0	< 3.0	4.0
		Carbon-14	36	39	34	37	52
		Sulphur-35	< 1.0	2.5	2.1	1.0	1.5

* Bq l^{-1} for milk

1 Cabbage in 1998

SELLAFIELD: Liquid discharges and related environmental data 1989-1998

Liquid Discharges 1989-1998

Material	Location	Radionuclide	Discharge, TBq*				
			1989	1990[1]	1991	1992	1993
Liquid discharge	Sea pipelines	Total beta	101.04	70.93	62.2	57.2	97.0
		Total alpha	2.7	2.16	2.13	1.55	2.59
		Tritium	2144.02	1698.62	1800	1200	2310
		Carbon-14	2.03	1.97	2.44	0.804	2.03
		Cobalt-60	0.17	0.17	0.087	0.071	0.087
		Strontium-90	9.17	4.22	4.09	4.14	17.1
		Zirconium-95+Niobium-95	11.11	6.82	12.4	10.2	9.61
		Technetium-99	6.07	3.82	3.86	3.18	6.06
		Ruthenium-106	24.96	16.54	18.7	12.6	17.1
		Iodine-129	0.17	0.11	0.159	0.068	0.161
		Caesium-134	1.73	1.15	0.765	0.834	1.19
		Caesium-137	28.6	23.46	15.6	15.2	21.9
		Cerium-144	3.78	2.01	1.73	1.73	2.51
		Plutonium alpha	1.21	1.14	1.08	0.935	1.33
		Plutonium-241	30.24	31.61	29.5	25.3	37.5
		Americium-241	1.06	0.75	0.744	0.542	0.873
		Uranium					
	Seaburn sewer	Total activity	0.0012	0.0013	0.00108	0.000723	0.000517
	Factory sewer	Total alpha					
		Total beta					
		Tritium					

Liquid Discharges 1989-1998 (cont.)

Material	Location	Radionuclide	Discharge, TBq*				
			1994[1]	1995[1]	1996	1997	1998
Liquid discharge	Sea pipelines	Total beta	126	188	143	138	85.9
		Total alpha	1.04	0.397	0.275	0.185	0.174
		Tritium	1680	2670	3009	2560	2310
		Carbon-14	8.16	12.4	10.6	4.42	3.74
		Cobalt-60	0.113	1.28	0.429	1.47	2.41
		Strontium-90	28.9	27.7	16.0	37.3	17.7
		Zirconium-95+Niobium-95	3.24	0.743	1.15	0.364	0.647
		Technetium-99	72.0	192	155	84.2	52.7
		Ruthenium-106	6.75	7.26	9.01	9.81	5.58
		Iodine-129	0.157	0.253	0.412	0.519	0.553
		Caesium-134	0.611	0.511	0.271	0.299	0.319
		Caesium-137	13.8	12.2	10.3	7.94	7.54
		Cerium-144	0.836	1.10	0.779	0.494	0.762
		Plutonium alpha	0.663	0.311	0.209	0.147	0.140
		Plutonium-241	14.4	7.69	4.35	3.26	3.54
		Americium-241	0.381	0.112	0.0736	0.0505	0.0472
		Uranium	1388	1345	1158	759	554
	Seaburn sewer	Total activity					
	Factory sewer	Total alpha	0.000067	0.000043	0.000032	0.000081	0.000032
		Total beta	0.00061	0.00082	0.00071	0.00054	0.00049
		Tritium	0.0177	0.0179	0.0125	0.0124	0.0174

* Uranium in kg

1 Authorisation revised

Environmental Data 1989-1993

Material or ground type	Location	Radionuclide or dose measurement	Concentration of activity, Bq kg^{-1} wet* gamma dose rate, μGy h^{-1} or beta dose rate, μSv h^{-1}				
			1989	1990	1991	1992	1993
Cod	Offshore Area	Carbon-14	86	95	74	75	41
		Cobalt-60			< 0.14		
		Strontium-90	0.087	0.12	0.072	0.096	0.044
		Zirconium-95					
		Niobium-95					
		Technetium-99	0.27	0.39	0.22	0.28	0.13
		Ruthenium-106					
		Caesium-134	0.45	0.50	0.67		< 0.17
		Caesium-137	26	27	30	19	18
		Cerium-144					
		Promethium-147	0.020	0.013	0.0080	0.092	
		Neptunium-237	0.00031	0.00043	0.00049	0.00026	
		Plutonium-238	0.0017	0.0028	0.0037	0.0024	0.0023
		Plutonium-239+240	0.0074	0.012	0.016	0.011	0.010
		Americium-241	0.016	0.022	0.032	0.027	0.017
		Curium-242		0.00012			
		Curium-243+244	0.000036	0.00079	0.000096	0.000060	0.000026
Cod	Iceland Area	Carbon-14		19	16	13	23
		Cobalt-60					
		Zirconium-95					
		Niobium-95					
		Ruthenium-106					

Environmental Data 1989-1993 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Concentration of activity, Bq kg^{-1} wet* gamma dose rate, μGy h^{-1} or beta dose rate, μSv h^{-1}				
			1989	**1990**	**1991**	**1992**	**1993**
		Caesium-134					
		Caesium-137	0.29	0.32	0.22	0.28	0.22
		Cerium-144					
		Americium-241					
Cod	Mid-North Sea	Carbon-14		7.8	15	21	26
		Cobalt-60			< 0.05		
		Strontium-90				0.0045	0.0030
		Zirconium-95					
		Niobium-95					
		Ruthenium-106					
		Caesium-134	< 0.08	< 0.04	< 0.01		
		Caesium-137	2.4	1.9	2.0	1.2	0.86
		Cerium-144					
		Americium-241					
Crabs	Coastal area	Carbon-14	120	100	100	110	76
		Cobalt-60	6.7	3.4	0.06	1.5	0.61
		Strontium-90	1.5	1.2	0.97	0.52	1.1
		Zirconium-95			0.16		0.06
		Niobium-95					
		Technetium-99	8.4	5.8	3.5	1.8	3.4
		Ruthenium-103					0.08
		Ruthenium-106	37	11	10	6.9	4.9

Environmental Data 1989-1993 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Concentration of activity, Bq kg^{-1} wet* gamma dose rate, μGy h^{-1} or beta dose rate, μSv h^{-1}				
			1989	**1990**	**1991**	**1992**	**1993**
		Silver-110m	8.3	4.4	6.0	27	15
		Antimony-125		0.70	0.29		0.10
		Caesium-134					0.08
		Caesium-137	7.6	10	8.5	6.2	5.4
		Cerium-144					0.11
		Promethium-147	4.1	2.7	2.2	1.0	1.0
		Europium-154					
		Neptunium-237	0.11	0.060	0.044	0.021	0.041
		Plutonium-238	0.39	0.25	0.16	0.11	0.012
		Plutonium-239+240	1.6	1.0	0.7	0.48	0.49
		Plutonium-241	34	29	14	7.1	8.9
		Americium-241	3.5	3.6	2.9	2.1	1.9
		Curium-242		0.00045	0.0057	0.0017	0.0010
		Curium-243+244	0.0097	0.011	0.011	0.0059	0.0053
Winkles	Nethertown	Carbon-14	79	65	71	62	59
		Cobalt-60	7.6	5.6	4.2	3.4	3.0
		Strontium-90	12	13	12	12	16
		Zirconium-95	7.9	2.7	20	5.0	8.5
		Niobium-95	11	3.2	16	3.8	9.0
		Technetium-99	36	72	21	22	57
		Ruthenium-103	0.90	0.20	0.86	0.27	0.30
		Ruthenium-106	170	87	130	55	94
		Silver-110m	12	8.0	32	62	56

Environmental Data 1989-1993 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Concentration of activity, Bq kg^{-1} wet* gamma dose rate, μGy h^{-1} or beta dose rate, μSv h^{-1}				
			1989	**1990**	**1991**	**1992**	**1993**
		Antimony-125	4.8	5.5	5.1	2.9	4.0
		Caesium-134	0.60	0.40	0.24	0.1	0.05
		Caesium-137	34	31	29	25	24
		Cerium-144	7.8	4.0	6.3	1.9	6.1
		Promethium-147	29	14	11	6.4	8.7
		Europium-154	1.4	1.3	1.3	0.93	0.57
		Europium-155	0.90	0.70	0.52	0.23	0.37
		Neptunium-237	0.58	0.32	0.62	0.19	0.67
		Plutonium-238	6.6	5.6	5.8	4.9	5.2
		Plutonium-239+240	28	25	25	22	23
		Plutonium-241	540	430	450	350	370
		Americium-241	45	41	42	38	40
		Curium-242	0.13	0.11	0.12	0.046	0.078
		Curium-243+244	0.15	0.10	0.14	0.10	0.11
Sand	Sellafield	Cobalt-60	4.5	3.7	3.2	2.4	2.0
		Zirconium-95 Niobium-95	< 1.8	1.7	1.7		
		Ruthenium-106	18	11	8.5	4.2	3.2
		Antimony-125		0.80	0.68	0.87	0.48
		Caesium-134	1.8	1.4	0.52	0.55	0.53
		Caesium-137	270	230	210	170	160
		Cerium-144	2.8	1.7	0.58		
		Europium-154	6.9	6.9	5.8	3.1	3.4

Environmental Data 1989-1993 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Concentration of activity, Bq kg^{-1} wet* gamma dose rate, μGy h^{-1} or beta dose rate, μSv h^{-1}				
			1989	1990	1991	1992	1993
		Europium-155	4.0	3.2	2.2	2.0	1.7
		Americium-241	230	250	220	220	170
Mud	Whitehaven yacht basin	Cobalt-60	18	19	10	9.8	7.9
		Zirconium-95	27	50	120	38	120
		Niobium-95	64	62	130	36	150
		Ruthenium-103	2.1				
		Ruthenium-106	430	380	450	320	540
		Silver-110m			2.7	8.0	4.0
		Antimony-125	21	22	23	18	20
		Caesium-134	18	12	7.1	5.4	5.9
		Caesium-137	1900	1500	1400	1300	1300
		Cerium-144	47	58	50	36	110
		Europium-154	34	31	29	27	24
		Europium-155	22	20	14	14	13
		Plutonium-238	180	150	160	160	180
		Plutonium-239+240	810	740	730	730	810
		Americium-241	1100	1100	1100	1100	1200
		Curium-242		2.9	3.2	1.5	
		Curium-243+244	2.6	2.8	3.1	2.3	2.4
Sand	Sellafield	Gamma dose	0.096	0.087	0.083	0.086	0.079
Mud	Whitehaven yacht basin	Gamma dose	0.33	0.32	0.30	0.29	0.27

Environmental Data 1989-1993 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Concentration of activity, Bq kg^{-1} wet* gamma dose rate, μGy h^{-1} or beta dose rate, μSv h^{-1}				
			1989	**1990**	**1991**	**1992**	**1993**
Salt marsh	Newbiggin	Gamma dose	0.43	0.41	0.41	0.36	0.33
Nets	Vessel A	Beta dose	0.053	0.22	0.25	0.17	0.13

* Except for sediment where dry concentrations apply

Environmental Data 1994-1998

Material or ground type	Location	Radionuclide or dose measurement	Concentration of activity, Bq kg^{-1} wet* gamma dose rate, μGy h^{-1} or beta dose rate, μSv h^{-1}				
			1994	**1995**	**1996**	**1997**	**1998**
Cod	Offshore Area	Carbon-14	98	87	94	96	84
		Cobalt-60				< 0.17	< 0.22
		Strontium-90	0.16	0.10	0.052	0.089	0.094
		Zirconium-95				< 0.90	< 0.29
		Niobium-95				< 1.7	< 0.24
		Technetium-99	1.8	4.6	1.5	4.0	2.5
		Ruthenium-106				< 1.8	< 1.2
		Caesium-134				< 0.17	< 0.13
		Caesium-137	10	14	10	7.9	8.6
		Cerium-144				< 0.90	< 0.65
		Promethium-147					
		Neptunium-237					

Environmental Data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Concentration of activity, Bq kg^{-1} wet* gamma dose rate, μGy h^{-1} or beta dose rate, μSv h^{-1}				
			1994	1995	1996	1997	1998
		Plutonium-238	0.0027	0.0033	0.0059	0.0027	0.0016
		Plutonium-239+240	0.013	0.016	0.029	0.013	0.0081
		Americium-241	0.021	0.028	0.045	0.025	0.013
		Curium-242		0.000046	0.00012		
		Curium-243+244	0.000046	0.000047	0.000062	0.000052	
Cod	Iceland Area	Carbon-14	29				
		Cobalt-60				< 0.06	< 0.04
		Zirconium-95				< 0.20	< 0.1
		Niobium-95				< 0.26	< 0.09
		Ruthenium-106				< 0.57	< 0.36
		Caesium-134				< 0.06	< 0.04
		Caesium-137	0.15	0.26	0.21	0.23	0.17
		Cerium-144			< 0.28		< 0.2
		Americium-241			< 0.15		< 0.07
Cod	Mid-North Sea	Carbon-14	29		28	19	32
		Cobalt-60			< 0.06		< 0.06
		Strontium-90	0.0028	0.015	0.0024	0.0088	< 0.014
		Zirconium-95			< 0.22		< 0.15
		Niobium-95			< 0.35		< 0.14

Environmental Data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Concentration of activity, Bq kg^{-1} wet* gamma dose rate, μGy h^{-1} or beta dose rate, μSv h^{-1}				
			1994	1995	1996	1997	1998
		Ruthenium-106				< 0.52	< 0.51
		Caesium-134			<	< 0.06	< 0.06
		Caesium-137	0.75	0.75	1.1	0.80	0.63
		Cerium-144				< 0.26	< 0.27
		Americium-241				< 0.10	< 0.17
Crabs	Coastal area	Carbon-14	90	140	150	120	160
		Cobalt-60	0.57	1.1	1.7	1.8	3.7
		Strontium-90	1.3	7.4	1.2	1.5	1.8
		Zirconium-95				< 0.40	< 0.22
		Niobium-95				< 0.57	< 0.29
		Technetium-99	21	140	110	70	51
		Ruthenium-103				< 0.41	< 0.19
		Ruthenium-106	3.3	1.2	2.3	< 1.5	< 2.7
		Silver-110m	12	8.3	4.3	2.9	4.0
		Antimony-125	0.13	0.09	0.11	< 0.28	< 0.23
		Caesium-134				< 0.12	< 0.09
		Caesium-137	4.3	3.6	3.0	2.8	2.8
		Cerium-144	0.11	0.04		< 0.51	< 0.37
		Promethium-147	0.63	0.46	0.25	0.26	0.41
		Europium-154		0.01		< 0.32	< 0.22
		Neptunium-237	0.033	0.010	0.0097	0.0057	0.0062
		Plutonium-238	0.092	0.094	0.077	0.069	0.071
		Plutonium-239+240	0.42	0.43	0.37	0.34	0.34

Environmental Data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Concentration of activity, Bq kg^{-1} wet* gamma dose rate, μGy h^{-1} or beta dose rate, μSv h^{-1}				
			1994	1995	1996	1997	1998
		Plutonium-241	8.1	8.1	5.1	4.5	4.5
		Americium-241	1.8	1.9	1.4	1.3	1.5
		Curium-242	0.0036	0.0011			
		Curium-243+244	0.0045	0.0010	0.0010	0.0035	0.0027
Winkles	Nethertown	Carbon-14	110	170	170	110	130
		Cobalt-60	2.7	9.2	8.9	14	21
		Strontium-90	7.1	10	6.0	10	7.3
		Zirconium-95	2.5	0.22	0.15	< 0.49	< 0.64
		Niobium-95	2.2	0.29	0.36	< 0.67	< 0.86
		Technetium-99	440	1600	1600	730	490
		Ruthenium-103	0.12	0.05	0.30	< 0.44	< 0.35
		Ruthenium-106	47	44	71	33	69
		Silver-110m	51	31	22	13	15
		Antimony-125	3.0	2.3	1.7	< 1.1	< 1.3
		Caesium-134	0.01			< 0.19	< 0.19
		Caesium-137	18	21	17	17	15
		Cerium-144	1.6	1.6	1.1	< 0.88	< 2.1
		Promethium-147	3.4	3.3	2.9	2.3	3.1
		Europium-154	0.24	0.53	0.52	< 0.60	< 0.57
		Europium-155	0.07	0.11	0.07	< 0.38	< 0.48
		Neptunium-237	0.28	0.087	0.066	0.028	0.048
		Plutonium-238	3.5	4.5	3.9	3.7	3.4
		Plutonium-239+240	16	21	19	17	17

Environmental Data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Concentration of activity, Bq kg^{-1} wet* gamma dose rate, μGy h^{-1} or beta dose rate, μSv h^{-1}				
			1994	1995	1996	1997	1998
		Plutonium-241	240	280	240	220	200
		Americium-241	29	37	33	31	31
		Curium-242	0.0086	0.095	0.0073	< 0.021	< 0.030
		Curium-243+244	0.064	0.064	0.048	0.061	0.054
Sand	Sellafield	Cobalt-60	2.0	2.2	2.1	3.6	3.4
		Zirconium-95			<	< 1.5	< 1.3
		Niobium-95				< 2.1	< 1.5
		Ruthenium-106	2.8	2.9	3.9	< 4.6	< 6.3
		Antimony-125	0.56	0.80		< 1.4	< 1.3
		Caesium-134				< 0.43	< 0.39
		Caesium-137	150	130	100	110	110
		Cerium-144				< 2.6	< 2.6
		Europium-154	3.6	3.8	2.8	< 1.8	< 1.6
		Europium-155	1.9	1.2	0.32	< 1.2	< 1.6
		Americium-241	210	210	180	190	190
Mud	Whitehaven yacht basin	Cobalt-60	5.4	9.0	20	14	28
		Zirconium-95	13			< 7.7	< 5.2
		Niobium-95	20			< 15	< 9.3
		Ruthenium-103				< 16	< 7.7
		Ruthenium-106	220	110	140	< 74	330
		Silver-110m			1.7	< 2.9	< 3.2
		Antimony-125	13	7.6	11	< 7.3	< 8.2

Environmental Data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Concentration of activity, Bq kg^{-1} wet* gamma dose rate, μGy h^{-1} or beta dose rate, μSv h^{-1}				
			1994	1995	1996	1997	1998
		Caesium-134	2.6	2.2	1.0	< 1.8	< 1.5
		Caesium-137	1100	1100	920	830	840
		Cerium-144	25	3.5	16	< 13	< 30
		Europium-154	17	16	15	14	15
		Europium-155	4.7	8.6	6.3	< 7.7	7.6
		Plutonium-238	100	100	120	100	130
		Plutonium-239+240	480	510	620	500	710
		Americium-241	760	800	1000	820	1100
		Curium-242					
		Curium-243+244	1.8	1.9	1.3	1.6	1.7
Sand	Sellafield	Gamma dose	0.076	0.074	0.077	0.073	0.076
Mud	Whitehaven yacht basin	Gamma dose	0.26	0.26	0.23	0.21	0.17
Salt marsh	Newbiggin	Gamma dose	0.30	0.27	0.27	0.25	0.24
Nets	Vessel A	Beta dose	0.17	0.19	0.20	0.029	0.090

* Except for sediment where dry concentrations apply

Additional Environmental Data 1994-1998

Sellafield Crustaceans

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1} wet				
			1994	1995	1996	1997	1998
Lobsters	Sellafield Coastal Area	Carbon-14	120	190	260	270	240
		Cobalt-60	0.31	1.1	1.3	2.9	3.1
		Zinc-65				< 0.52	< 0.41
		Strontium-90	0.53	0.75	0.47	0.64	0.42
		Technetium-99	2400	8300	13000	16000	7700
		Ruthenium-106	0.81	1.9	1.5	< 2.1	< 2.4
		Silver-110m	19	15	7.1	7.2	8.1
		Antimony-125	0.05	0.05	0.02	< 0.44	< 0.39
		Caesium-134	0.03			< 0.19	< 0.17
		Caesium-137	6.9	5.5	5.0	4.6	4.5
		Cerium-144	0.10			< 0.81	< 0.66
		Promethium-147	1.5	1.0	0.88	1.2	0.73
		Europium-154			0.03	< 0.53	< 0.45
		Europium-155				< 0.34	< 0.3
		Neptunium-237	0.11	0.044	0.041	0.074	0.027
		Plutonium-238	0.072	0.095	0.068	0.094	0.067
		Plutonium-239+240	0.34	0.43	0.33	0.46	0.30
		Plutonium-241	4.6	6.3	4.7	9.4	3.3
		Americium-241	5.6	6.3	4.2	6.5	4.2
		Curium-242	0.010			< 0.0070	
		Curium-243+244	0.012	0.014	0.010	0.011	0.0095

Additional Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1} wet				
			1994	**1995**	**1996**	**1997**	**1998**
Nephrops	Whitehaven	Carbon-14	53	67	67	48	65
		Cobalt-60				< 0.13	< 0.11
		Strontium-90	0.11	0.14	0.13	0.078	< 0.15
		Technetium-99	170	620	920	540	590
		Silver-110m	0.74	0.31	0.14	< 0.24	< 0.14
		Caesium-134				< 0.13	< 0.07
		Caesium-137	11	7.7	6.1	3.0	5.3
		Plutonium-238	0.049	0.030	0.029	0.014	0.023
		Plutonium-239+240	0.24	0.16	0.15	0.083	0.12
		Americium-241	1.3	0.65	1.5	0.19	0.41
		Curium-243+244	0.0035	0.0015	0.0030		0.00078
Nephrops	Northern North Sea	Technetium-99			14	24	16
		Silver-110m				< 0.15	< 0.09
		Caesium-137	0.39	0.19	0.29	0.31	0.25
		Plutonium-238	0.00018	0.00015	0.00014	0.00045	0.00042
		Plutonium-239+240	0.0014	0.0014	0.0012	0.0030	0.027
		Americium-241	0.0026	0.0016	0.0018	0.0042	0.0036
		Curium-242	0.000016			0.000034	
		Curium-243+244	0.000021			0.000038	

Additional Environmental Data 1994-1998 (cont.)

Sellafield Molluscs

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1} wet				
			1994	1995	1996	1997	1998
Cockles	Morecambe Bay	Carbon-14		110	130	76	84
	Flookburgh	Cobalt-60	0.58	0.98	1.3	1.4	1.4
		Strontium-90		0.71	0.55	0.43	0.44
		Technetium-99		26	73	71	25
		Ruthenium-106	1.2	2.0	1.0	< 1.1	< 1.5
		Silver-110m	0.06			< 0.12	< 0.11
		Antimony-125	0.30	0.24	0.15	< 0.23	< 0.16
		Caesium-134				< 0.06	< 0.06
		Caesium-137	6.1	6.1	5.7	4.5	5.7
		Europium-154	0.12	0.24	0.03	< 0.16	< 0.16
		Europium-155			0.03	< 0.14	< 0.11
		Plutonium-238	0.48	0.65	0.46	0.32	0.43
		Plutonium-239+240	2.4	3.4	2.5	1.8	2.4
		Plutonium-241		41	28	19	25
		Americium-241	6.5	8.4	6.0	4.8	6.0
		Curium-242					
		Curium-243+244	0.011	0.015	0.015	0.013	0.0094
Mussels	Mid North Sea	Cobalt-60				< 0.06	< 0.05
		Antimony-125				< 0.15	< 0.12
		Caesium-137	0.10		0.15	0.19	< 0.10
		Plutonium-238	0.00015	0.00019	0.00025	0.00023	0.00053
		Plutonium-239+240	0.0025	0.0023	0.0031	0.0035	0.0021

Additional Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1} wet				
			1994	**1995**	**1996**	**1997**	**1998**
		Americium-241	0.0016	0.0011	0.0012	0.0012	0.0011
		Curium-242					
		Curium-243+244		0.0000080			

Sellafield Seaweeds

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1} wet				
			1994	**1995**	**1996**	**1997**	**1998**
Porphyra	St Bees	Carbon-14	48	83	62	30	47
		Cobalt-60	0.31	0.81	0.59	1.5	1.3
		Strontium-90	0.84	0.18	1.0	0.24	0.13
		Zirconium-95	0.26			< 0.21	< 0.17
		Niobium-95	0.15			< 0.27	< 0.15
		Technetium-99	4.8	17	19	11	9.1
		Ruthenium-103	0.21		0.04	< 0.21	< 0.12
		Ruthenium-106	39	19	19	6.5	13
		Silver-110m	1.0	0.07	0.23	< 0.14	< 0.19
		Antimony-125	1.2	1.4	1.2	< 0.57	< 0.30
		Caesium-134				< 0.07	< 0.07
		Caesium-137	6.6	2.3	2.8	2.1	1.7
		Cerium-144	0.07		0.18	< 0.35	< 0.30
		Europium-154	0.13		0.09	< 0.22	< 0.24
		Europium-155	0.08			< 0.15	< 0.13

Additional Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1} wet				
			1994	1995	1996	1997	1998
		Plutonium-238	0.85	0.47	0.80	0.38	0.34
		Plutonium-239+240	4.0	2.3	4.0	1.8	1.7
		Plutonium-241	52	29	49	23	19
		Americium-241	6.8	4.2	6.8	3.8	3.4
		Curium-242	0.0093				
		Curium-243+244	0.017	0.0066	0.014	0.0059	0.0063
Fucus Vesiculosus	Sellafield	Cobalt-60	1.7	7.0	7.2	23	34
		Strontium-90	19	4.1	6.2	29	4.5
		Zirconium-95	1.1	0.11	0.35	< 0.46	< 0.49
		Niobium-95	0.67		0.19	< 0.50	< 0.49
		Technetium-99	16000	56000	62000	60000	20000
		Ruthenium-106	7.7	6.3	12	< 3.7	< 12
		Silver-110m	15	4.6	9.1	3.7	8.5
		Antimony-125	1.6	2.2	1.5	1.1	< 0.97
		Caesium-134	0.08	0.12		< 0.17	< 0.19
		Caesium-137	14	13	13	13	9.3
		Cerium-144	0.31	0.26		< 0.77	< 0.75
		Europium-155	0.09			< 0.42	< 0.41
		Plutonium-238	3.1	3.1	2.5	2.8	3.1
		Plutonium-239+240	14	14	11	14	14
		Americium-241	6.6	6.3	6.3	5.3	5.7
		Curium-242	0.0087	0.0099		0.0054	0.012
		Curium-243+244	0.0097	0.011	0.018	0.013	0.014

Additional Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1} wet				
			1994	1995	1996	1997	1998
Laverbread	Manufacturer A	Cobalt-60				< 0.10	< 0.08
		Zirconium-95				< 0.66	< 0.38
		Niobium-95				< 1.6	< 0.78
		Ruthenium-106				< 1.2	< 0.83
		Antimony-125			0.06	< 0.22	< 0.17
		Caesium-134				< 0.11	< 0.08
		Caesium-137	0.04	0.04	0.09	< 0.13	< 0.16
		Cerium-144				< 0.47	< 0.34
		Americium-241				< 0.17	< 0.19

Sellafield Sediments

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1} dry				
			1994	1995	1996	1997	1998
Saltmarsh	Kippford Merse	Cobalt-60	4.5	3.6	11	6.2	4.0
		Zirconium-95	3.0			< 5.7	< 0.90
		Niobium-95	5.6			< 9.9	< 0.85
		Ruthenium-106	83	37	42	< 21	< 12
		Antimony-125	7.7	2.9	3.8	< 4.0	< 1.4
		Caesium-134	2.8	0.25	0.36	< 1.1	< 0.37
		Caesium-137	680	550	640	580	510
		Cerium-144	5.1			< 9.2	1.3
		Europium-154	7.6	6.8	8.0	< 7.4	5.0

Additional Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1} dry				
			1994	**1995**	**1996**	**1997**	**1998**
		Europium-155	4.3	2.9	4.2	< 4.1	< 1.5
		Plutonium-238	63	54	67	57	54
		Plutonium-239+240	320	260	340	290	280
		Americium-241	510	400	540	530	410
		Curium-243+244	0.80	0.96	1.2	1.0	

Sellafield Gamma Dose Rates

Ground type	Location	Dose measurement	Gamma dose rate, μGy h^{-1}				
			1994	**1995**	**1996**	**1997**	**1998**
Saltmarsh	Kippford merse	Gamma dose	0.16	0.15	0.15	0.13	0.11

Sellafield Beta Dose Rates

Material	Location	Dose measurement	Beta dose rate, μSv h^{-1}				
			1994	**1995**	**1996**	**1997**	**1998**
Nets	Vessel R	Beta dose	0.039	0.091	0.13	0.10	
Pots	Vessel T	Beta dose	0.25	0.23	0.29	0.088	0.058

SELLAFIELD: Gaseous discharges and related environmental data 1989-1998

Sellafield Gaseous Discharges 1989-1998

Material	Radionuclide	Discharge, TBq				
		1989	1990	1991	1992	1993
Gaseous discharge	Alpha	$7.2\ 10^{-4}$	$6.4\ 10^{-4}$	$7.4\ 10-^{4}$	$7.5\ 10^{-4}$	$1.5\ 10^{-3}$
	Beta	$1.1\ 10^{-2}$	$9.0\ 10^{-3}$	$8.8\ 10^{-3}$	$9.0\ 10^{-3}$	$6.5\ 10^{-3}$
	Tritium		600	620	330	860
	Carbon-14		4.1	5.8	2.5	7.4
	Sulphur-35		$2.4\ 10^{-2}$	$2.7\ 10^{-2}$	$3.0\ 10^{-2}$	$4.95\ 10^{-2}$
	Argon-41		2500	2500	2600	2700
	Cobalt-60		$5.2\ 10^{-4}$	$4.9\ 10^{-4}$	$5.1\ 10^{-4}$	$3.9\ 10^{-4}$
	Krypton-85	52000	38000	44000	27000	57000
	Strontium-90		$2.6\ 10^{-4}$	$3.6\ 10^{-4}$	$3.1\ 10^{-4}$	$2.9\ 10^{-4}$
	Ruthenium-106		$2.5\ 10^{-3}$	$1.5\ 10^{-3}$	$1.1\ 10^{-3}$	$6.4\ 10^{-4}$
	Antimony-125		$1.3\ 10^{-4}$	$6.9\ 10^{-5}$	$4.0\ 10^{-5}$	$4.5\ 10^{-5}$
	Iodine-129		$1.2\ 10^{-2}$	$1.2\ 10^{-2}$	$1.9\ 10^{-2}$	$3.9\ 10^{-2}$
	Iodine-131		$1.2\ 10^{-3}$	$2.1\ 10^{-3}$	$2.6\ 10^{-3}$	$2.0\ 10^{-3}$
	Caesium-137		$1.9\ 10^{-3}$	$1.4\ 10^{-3}$	$7.6\ 10^{-4}$	$6.8\ 10^{-4}$
	Plutonium (alpha)		$1.6\ 10^{-4}$	$1.6\ 10^{-4}$	$1.8\ 10^{-4}$	$9.2\ 10^{-4}$
	Plutonium-241		$1.2\ 10^{-3}$	$1.1\ 10^{-3}$	$1.2\ 10^{-3}$	$3.4\ 10^{-3}$
	Americium-241+ Curium-242		$7.3\ 10^{-5}$	$3.4\ 10^{-4}$	$7.4\ 10^{-5}$	$1.6\ 10^{-4}$

Sellafield Gaseous Discharges 1989-1998 (cont.)

Material	Radionuclide	Discharge, TBq				
		1994[1]	1995[1]	1996	1997	1998
Gaseous discharge	Alpha	$2.1\ 10^{-4}$	$1.7\ 10^{-4}$	$1.53\ 10^{-4}$	$1.20\ 10^{-4}$	$1.1\ 10^{-4}$
	Beta	$4.9\ 10^{-3}$	0.00536	0.00214	0.00172	0.00154
	Tritium	550	590	529	164	250
	Carbon-14	1.0	0.71	0.63	1.57	2.62
	Sulphur-35	$1.0\ 10^{-1}$	0.14	0.14	0.09	0.15
	Argon-41	2500	2400	2570	2540	2530
	Cobalt-60	$4.2\ 10^{-5}$	$5.5\ 10^{-5}$	$4.8\ 10^{-5}$	$8.20\ 10^{-5}$	$5.30\ 10^{-5}$
	Krypton-85	38000	97000	94000	96000	99000
	Strontium-90	$1.6\ 10^{-4}$	$9.5\ 10^{-5}$	$1.2\ 10^{-4}$	$9.8\ 10^{-5}$	$6.0\ 10^{-5}$
	Ruthenium-106	$9.1\ 10^{-4}$	$8.0\ 10^{-4}$	$8.80\ 10^{-4}$	$7.07\ 10^{-3}$	$1.1\ 10^{-3}$
	Antimony-125	$6.9\ 10^{-4}$	0.001	$7.60\ 10^{-4}$	$2.20\ 10^{-4}$	$1.90\ 10^{-4}$
	Iodine-129	$2.4\ 10^{-2}$	0.020	0.0246	0.0252	0.0268
	Iodine-131	$1.7\ 10^{-3}$	0.0012	0.00230	0.00262	0.00317
	Caesium-137	$6.8\ 10^{-4}$	$6.1\ 10^{-4}$	$8.4\ 10^{-4}$	$6.20\ 10^{-4}$	$4.41\ 10^{-4}$
	Plutonium (alpha)	$1.1\ 10^{-4}$	$5.3\ 10^{-5}$	$6.4\ 10^{-5}$	$1.0\ 10^{-4}$	$3.4\ 10^{-5}$
	Plutonium-241	$9.7\ 10^{-4}$	$7.6\ 10^{-4}$	$5.8\ 10^{-4}$	$7.90\ 10^{-4}$	$2.67\ 10^{-4}$
	Americium-241+ Curium-242	$7.5\ 10^{-5}$	$3.8\ 10^{-5}$	$4.9\ 10^{-5}$	$6.40\ 10^{-5}$	$4.98\ 10^{-5}$

1 Authorisation revised

Sellafield Environmental Data 1989-1998

Material	Location	Radionuclide	Concentration of activity, Bq l^{-1}									
			1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Milk	Near farms	Tritium (Organic)							< 10	< 4.9	< 3.2	< 3.2
		Tritium		< 20	< 20	< 20	< 20	< 11	< 10	< 9.3	< 4.3	< 5.3
		Carbon-14	< 27	< 21	20	17	24	24	19	17	17	18
		Sulphur-35	< 2.0	< 2.0	< 2.0	< 1.7	< 1.2	< 1.2	< 2.1	< 1.1	< 0.79	< 0.73
		Cobalt-60					< 0.44	< 0.40	< 0.44	< 0.43	< 0.41	< 0.40
		Strontium-90	< 0.20	< 0.20	< 0.20	< 0.20	< 0.22	< 0.20	< 0.22	0.13	0.12	0.10
		Technetium-99			< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	< 0.0095	< 0.0055	< 0.0055
		Ruthenium-106	< 5.6	< 4.0	< 3.8	< 2.9	< 2.7	< 2.7	< 2.9	< 2.8	< 2.8	< 2.8
		Antimony-125					< 0.83	< 0.80	< 0.83	< 0.84	< 0.81	< 0.79
		Iodine-129	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.016	< 0.012	< 0.012	< 0.014
		Iodine-131	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.032	< 0.032	< 0.030
		Caesium-137						< 0.43	< 0.50	< 0.50	< 0.45	< 0.44
		Total Caesium	< 0.59	< 0.40	< 0.40	< 0.30	< 0.30	< 0.26	< 0.27	0.28	0.23	0.19
		Polonium-210							< 0.010			
		Plutonium-238	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.0002	< 0.0002	< 0.0004
		Plutonium-239+240	< 0.00023	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00022	< 0.0002	< 0.0002	< 0.0002	< 0.0002
		Plutonium-241	<			< 0.10	< 0.10	< 0.10	< 0.10	< 0.074	< 0.11	< 0.16
		Americium-241	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.0002	< 0.0004	< 0.0003

Sellafield Environmental Data 1994-1998

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1} *				
			1994	1995	1996	1997	1998
Milk	Near	Tritium (Organic)		< 10	< 9.0	< 3.5	< 4.5
	farms	Tritium	< 13	< 13	15	6.8	11
	max	Carbon-14	36	29	26	21	23
		Sulphur-35	< 3.1	< 9.2	3.7	< 2.5	< 2.2
		Cobalt-60	< 0.48	< 0.48	< 0.47	< 0.45	< 0.44
		Strontium-90	0.54	0.39	0.33	0.33	0.15
		Technetium-99	< 0.040	< 0.040	< 0.0095	< 0.0055	< 0.0055
		Ruthenium-106	< 3.0	< 3.1	< 3.0	< 3.1	< 3.0
		Antimony-125	< 1.0	< 0.90	< 0.93	< 0.85	< 0.89
		Iodine-129	< 0.20	< 0.018	0.024	< 0.021	< 0.020
		Iodine-131	< 0.20	< 0.20	< 0.037	< 0.035	< 0.032
		Caesium-137	< 0.53	< 0.55	< 0.58	< 0.53	< 0.47
		Total Caesium	0.48	0.50	0.55	0.34	0.28
		Polonium-210		< 0.011			
		Plutonium-238	< 0.00020	< 0.00020	< 0.00020	< 0.00028	< 0.00063
		Plutonium-239+240	< 0.00028	< 0.00023	< 0.00020	< 0.00025	< 0.00030
		Plutonium-241	< 0.10	< 0.10	< 0.087	< 0.16	< 0.19
		Americium-241	< 0.00020	< 0.00020	< 0.00020	< 0.00050	< 0.00040
Milk	Far farms	Tritium (Organic)		< 10	< 3.0	< 3.1	< 3.0
		Tritium	< 10	< 10	< 3.3	< 3.4	< 2.8
		Carbon-14	19	17	15	15	15
		Sulphur-35	< 1.0	< 1.0	< 0.82	< 0.46	< 0.54
		Cobalt-60	< 0.40	< 0.43	< 0.43	< 0.41	< 0.40
		Strontium-90	< 0.20	< 0.20	0.068	0.060	0.057

Sellafield Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1} *				
			1994	1995	1996	1997	1998
		Technetium-99	< 0.040	< 0.040	< 0.014	< 0.0055	< 0.0040
		Ruthenium-106	< 2.7	< 2.9	< 2.9	< 2.9	< 2.8
		Antimony-125	< 0.74	< 0.86	< 0.82	< 0.80	< 0.80
		Iodine-129	< 0.20	< 0.017	< 0.0097	< 0.011	< 0.011
		Iodine-131					
		Caesium-137	< 0.40	< 0.47	< 0.46	< 0.42	< 0.43
		Total Caesium	< 0.21	< 0.21	0.15	0.11	0.12
		Polonium-210					
		Plutonium-238			< 0.00020	< 0.00028	< 0.0030
		Plutonium-239+240			< 0.00018	< 0.00023	< 0.00020
		Plutonium-241			< 0.094	< 0.087	< 0.13
		Americium-241			< 0.00023	< 0.00043	< 0.00020
	Max	Tritium (Organic)		< 10	< 3.0	< 3.5	< 3.0
		Tritium	< 11	< 10	< 3.7	< 4.3	< 3.0
		Carbon-14	20	18	16	17	16
		Sulphur-35	< 1.0	< 1.0	0.93	< 0.68	< 0.55
		Cobalt-60	< 0.43	< 0.48	< 0.50	< 0.42	< 0.41
		Strontium-90	< 0.20	< 0.20	0.082	0.067	0.066
		Technetium-99	< 0.040	< 0.040	< 0.014	< 0.0055	< 0.0040
		Ruthenium-106	< 2.8	< 3.3	< 3.1	< 3.1	< 3.0
		Antimony-125	< 0.81	< 0.90	< 0.94	< 0.86	< 0.90
		Iodine-129	< 0.20	< 0.018	< 0.10	< 0.014	< 0.013
		Iodine-131					

Sellafield Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1} *				
			1994	1995	1996	1997	1998
		Caesium-137	< 0.43	< 0.48	< 0.50	< 0.43	< 0.44
		Total Caesium	< 0.23	< 0.23	0.17	0.17	0.15
		Polonium-210					
		Plutonium-238			< 0.00020	< 0.00028	< 0.00030
		Plutonium-239+240			< 0.00018	< 0.00023	< 0.00020
		Plutonium-241			< 0.094	< 0.087	< 0.13
		Americium-241			< 0.00023	< 0.00043	< 0.00020
Apples		Tritium (Organic)			< 3.0	< 3.0	< 2.8
		Tritium		< 10	8.0	6.5	< 3.8
		Carbon-14		19	15	13	13
		Sulphur-35		< 1.3	1.4	0.80	< 0.78
		Cobalt-60		< 0.45	< 0.40	< 0.45	< 0.42
		Strontium-90		< 0.20	0.17	0.21	0.17
		Technetium-99	< 0.50	< 0.10		< 0.029	< 0.025
		Ruthenium-106		< 2.6	< 2.5	< 3.2	< 2.8
		Antimony-125		< 0.85	< 1.0	< 0.75	< 0.74
		Iodine-129		< 0.0500	< 0.0090	< 0.045	< 0.045
		Iodine-131					
		Caesium-137					
		Total Caesium		0.32	0.32	0.28	< 0.13
		Polonium-210	0.14	0.028			
		Plutonium-238		< 0.00030	< 0.00050	< 0.00035	< 0.00058
		Plutonium-239+240		0.00065	0.0011	0.0016	< 0.0016
		Plutonium-241		< 0.10	< 0.084	< 0.064	< 0.15

Sellafield Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1} *				
			1994	1995	1996	1997	1998
		Americium-241		0.0011	0.0030	0.0028	< 0.0032
	Max	Tritium (Organic)				< 3.0	< 3.0
		Tritium		< 10		7.0	7.0
		Carbon-14		24		13	17
		Sulphur-35		1.6		1.1	1.6
		Cobalt-60		< 0.50		< 0.50	< 0.50
		Strontium-90		< 0.20		0.24	0.33
		Technetium-99		< 0.10		< 0.029	< 0.025
		Ruthenium-106		< 3.1		< 3.3	< 3.6
		Antimony-125		< 0.90		< 1.0	< 0.90
		Iodine-129		< 0.050		< 0.056	< 0.072
		Iodine-131					
		Caesium-137					
		Total Caesium		0.43		0.39	0.24
		Polonium-210		0.028			
		Plutonium-238		0.00040		0.00040	0.0007
		Plutonium-239+240		0.00070		0.0025	0.0032
		Plutonium-241		< 0.10		< 0.067	< 0.23
		Americium-241		0.00017		0.0040	0.0067
Blackberries		Tritium (Organic)			< 3.0	< 3.0	< 3.0
		Tritium	< 19	41	28	35	23
		Carbon-14	58	66	31	30	35
		Sulphur-35	< 9.0	6.4	7.7	7.5	22

Sellafield Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1} *				
			1994	1995	1996	1997	1998
		Cobalt-60	< 0.55	< 0.50	< 0.60	< 0.55	< 0.80
		Strontium-90	6.3	7.8	10	4.8	5.8
		Ruthenium-106	< 2.9	< 2.9	< 3.6	< 3.6	< 3.4
		Antimony-125	< 1.2	< 1.1	< 1.0	< 1.0	< 0.70
		Iodine-129	< 0.20	< 0.050	< 0.037	< 0.044	< 0.033
		Iodine-131					
		Caesium-137					
		Total Caesium	1.9	2.5	7.4	3.9	5.0
		Plutonium-238	0.00090	0.0058	0.0021	0.0014	0.0015
		Plutonium-239+240	0.0058	0.042	0.015	0.019	0.0074
		Plutonium-241	< 0.10	0.47	< 0.31	< 0.093	< 0.14
		Americium-241	0.0054	0.025	0.0085	0.0099	0.0069
Cabbage[1]		Tritium (Organic)			< 3.0	< 3.0	< 3.0
		Tritium	< 10	< 10	< 10	< 4.0	4.0
		Carbon-14	16	< 15	9.0	6.5	5.0
		Sulphur-35	< 1.0	1.0	1.3	0.65	< 0.40
		Cobalt-60	< 0.37	< 0.30	< 0.40	< 0.50	< 0.50
		Strontium-90	1.5	1.1	1.5	3.5	0.94
		Ruthenium-106	< 0.27	< 3.8	< 3.3	< 3.2	< 2.5
		Antimony-125	< 0.67	< 0.90	< 0.90	< 0.70	< 1.0
		Iodine-129	< 0.20	< 0.050	< 0.044	< 0.043	< 0.042
		Total Caesium	< 0.21	1.9	0.088	0.26	< 0.029
		Polonium-210	0.010	0.71			
		Plutonium-238	< 0.00047	0.00050	0.00030	< 0.00025	< 0.00050

Sellafield Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1} *				
			1994	1995	1996	1997	1998
		Plutonium-239+240	< 0.0029	0.0082	< 0.00030	< 0.00035	0.00050
		Plutonium-241	< 0.10	< 0.10	< 0.20	< 0.11	0.15
		Americium-241	0.0038	0.0045	0.0012	< 0.0008	0.0015
Ovine muscle		Tritium (Organic)			5.0	< 6.0	< 3.5
		Tritium	< 10	< 14	14	< 12	6.0
		Carbon-14	38	36	50	31	31
		Sulphur-35	< 1.3	< 3.0	< 5.5	8.5	5.7
		Cobalt-60	< 0.45	< 0.40	< 0.50	< 0.45	< 0.40
		Strontium-90	< 0.50	< 0.20	0.12	< 0.025	0.040
		Technetium-99		< 0.10	< 0.036	< 0.028	< 0.034
		Ruthenium-106	< 3.6	< 3.0	< 3.2	< 3.2	< 2.6
		Antimony-125	< 0.80	< 0.85	< 0.75	< 1.1	< 0.75
		Iodine-129	< 0.20	< 0.058	< 0.058	< 0.041	< 0.037
		Total Caesium	1.2	1.4	1.7	1.0	0.90
		Polonium-210	< 0.026	0.015			
		Plutonium-238	< 0.00020	< 0.00020	< 0.00030	< 0.00030	< 0.00035
		Plutonium-239+240	< 0.00020	< 0.00025	< 0.00030	< 0.00045	< 0.00050
		Plutonium-241		< 0.10	< 0.075	< 0.090	< 0.12
		Americium-241	< 0.00020	< 0.00020	< 0.00045	< 0.00055	< 0.00055
	Max	Tritium (Organic)			7.0	9.0	4.0
		Tritium	< 10	< 14	18	20	9.0
		Carbon-14	51	36	68	31	34
		Sulphur-35	1.5	< 3.0	9.0	10	5.7

Sellafield Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1} *				
			1994	1995	1996	1997	1998
		Cobalt-60	< 0.50	< 0.40	< 0.50	< 0.50	< 0.40
		Strontium-90	< 0.20	< 0.20	0.15	0.025	0.064
		Technetium-99		< 0.10	0.039	< 0.035	< 0.034
		Ruthenium-106	< 4.0	< 3.0	< 3.5	< 3.9	< 3.0
		Antimony-125	< 0.90	< 0.85	< 1.0	< 1.4	< 1.0
		Iodine-129	< 0.20	< 0.058	< 0.070	< 0.045	< 0.041
		Total Caesium	1.9	1.6	2.2	1.5	1.1
		Polonium-210	< 0.030	0.015			
		Plutonium-238	< 0.00020	< 0.00020	< 0.00030	< 0.00040	< 0.00050
		Plutonium-239+240	< 0.00020	< 0.00030	< 0.00030	0.00050	0.00070
		Plutonium-241		< 0.10	< 0.084	< 0.11	< 0.13
		Americium-241	< 0.00020	< 0.00020	0.00060	< 0.00060	0.00060
Ovine offal		Tritium (Organic)			9.5	< 3.0	< 4.0
		Tritium	< 10	< 10	16	< 5.5	< 7.5
		Carbon-14	35	28	33	39	48
		Sulphur-35	< 1.8	< 3.0	< 5.4	11	7.9
		Cobalt-60	< 0.40	< 0.50	< 0.35	< 0.50	< 0.45
		Strontium-90	< 0.50	< 0.20	0.27	0.069	0.26
		Technetium-99			< 0.032	< 0.029	< 0.033
		Ruthenium-106	< 3.9	< 4.0	< 2.9	< 3.4	< 3.0
		Antimony-125	< 1.0	< 1.5	< 0.75	< 1.7	< 1.5
		Iodine-129	< 0.20		< 0.036		
		Total Caesium	1.5	1.4	1.1	0.50	0.62
		Polonium-210	1.5	0.56			

Sellafield Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1} *				
			1994	1995	1996	1997	1998
		Plutonium-238	0.00050	0.00030	< 0.00040	0.00050	< 0.0028
		Plutonium-239+240	0.0036	0.0012	0.0022	0.0030	0.040
		Plutonium-241			< 0.18	< 0.12	< 0.25
		Americium-241	0.0026	< 0.00	0.0022	0.0011	< 0.0092
	Max	Tritium (Organic)			13	< 3.0	< 5.0
		Tritium	< 10		21	7.0	10
		Carbon-14	52		45	51	49
		Sulphur-35	2.6		8.7	16	12
		Cobalt-60	< 0.50		< 0.40	< 0.60	< 0.50
		Strontium-90	0.80		0.47	0.069	0.26
		Technetium-99			< 0.032	< 0.029	< 0.033
		Ruthenium-106	< 3.9		< 3.7	< 3.5	< 3.7
		Antimony-125	< 1.1		< 1.0	< 2.0	< 1.5
		Iodine-129	< 0.20		< 0.036		
		Total Caesium	2.2		1.7	0.50	0.62
		Polonium-210	2.1				
		Plutonium-238	0.00080		< 0.00050	0.00050	0.0052
		Plutonium-239+240	0.0049		0.00030	0.0030	0.080
		Plutonium-241			0.24	< 0.12	0.37
		Americium-241	0.0039		0.0026	0.0011	0.018
Potatoes		Tritium (Organic)			< 3.0	< 3.0	< 3.3
		Tritium	12	17	22	< 3.0	6.0
		Carbon-14	23	20	21	18	23

Sellafield Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1} *				
			1994	**1995**	**1996**	**1997**	**1998**
		Sulphur-35	< 1.0	< 1.0	1.5	< 0.20	< 0.40
		Cobalt-60	< 0.30	< 0.40	< 0.50	< 0.60	< 0.40
		Strontium-90	0.39	0.72	0.25	0.13	0.51
		Ruthenium-106	< 1.8	< 3.4	< 2.5	< 3.8	< 3.3
		Antimony-125	< 0.40	< 0.90	< 0.85	< 0.80	< 0.90
		Iodine-129	< 0.20	< 0.060	< 0.046	< 0.041	< 0.036
		Total Caesium	0.27	< 0.34	0.47	0.068	0.20
		Polonium-210	0.014	0.021			
		Plutonium-238	0.00080	< 0.00040	0.0011	0.0011	< 0.00040
		Plutonium-239+240	0.016	0.010	0.018	0.0047	< 0.0028
		Plutonium-241	< 0.10	< 0.10	0.23	< 0.089	< 0.091
		Americium-241	0.0045	0.0031	0.0077	< 0.00030	< 0.0015
	Max	Tritium (Organic)			< 3.0		4.0
		Tritium		22	30		11
		Carbon-14		25	28		29
		Sulphur-35		< 1.0	1.7		0.60
		Cobalt-60		< 0.40	< 0.50		< 0.50
		Strontium-90		1.2	0.34		1.5
		Ruthenium-106		< 3.4	< 2.5		< 3.8
		Antimony-125		< 0.90	< 1.0		< 1.0
		Iodine-129		< 0.070	< 0.051		< 0.039
		Total Caesium		0.49	0.76		0.29
		Polonium-210		0.021			
		Plutonium-238		0.00060	0.0015		0.0005

Sellafield Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1} *				
			1994	**1995**	**1996**	**1997**	**1998**
		Plutonium-239+240		0.020	0.030		0.0056
		Plutonium-241		< 0.10	0.33		< 0.11
		Americium-241		0.0059	0.011		0.0033

* Bq l^{-1} for milk

1 Lettuce in 1995

Drigg Disposals and Environmental Data 1994-1998

Material	Location	Radionuclide	Disposals, TBq, concentration of activity, Bq kg^{-1}*				
			1994	**1995**	**1996**	**1997**	**1998**
Solid waste		Tritium		0.191	0.493	0.266	8.65
		Carbon-14		0.00735	0.00872	0.00455	0.025
		Cobalt-60		0.297	0.304	0.165	0.551
		Iodine-129		0.00169	1.7 10^{-4}	4.0 10^{-5}	1.0 10^{-4}
		Radium-226 & Thorium-232		0.00356	0.00691	0.00589	0.017
		Uranium		0.0214	0.104	0.0658	0.10
		Other alpha[1]		0.0836	0.104	0.064	0.212
		Others[2]		4.22	3.93	3.16	9.54

Drigg Disposals and Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Disposals, TBq, concentration of activity, Bq kg^{-1}*				
			1994	1995	1996	1997	1998
Milk	Near farms	Tritium	< 10	< 10	< 5.5	< 3.0	< 3.3
		Carbon-14	20	16	14	15	15
		Sulphur-35	< 1.1	< 1.0	< 0.65	< 0.40	< 0.48
		Cobalt-60	< 0.43	< 0.47	< 0.40	< 0.48	< 0.43
		Strontium-90	< 0.20	< 0.20	0.096	0.080	0.086
		Technetium-99		< 0.040	< 0.0050	< 0.0053	< 0.0083
		Ruthenium-103			< 0.56		
		Ruthenium-106	< 2.9	< 3.1	< 3.0	< 3.2	< 3.0
		Antimony-125	< 0.88	< 0.93	< 0.83	< 0.83	< 0.76
		Iodine-129	< 0.20	< 0.020	< 0.0095	< 0.011	< 0.011
		Caesium-137		< 0.53	< 0.46	< 0.47	< 0.43
		Total Caesium	0.24	0.30	0.28	0.20	0.19
		Promethium-147		< 0.50	< 0.40	< 0.55	< 0.35
		Plutonium-238	< 0.00020	< 0.00020	< 0.00023	< 0.00015	< 0.00015
		Plutonium-239+240	< 0.00040	< 0.00020	< 0.00025	< 0.00020	< 0.00025
		Plutonium-241	< 0.10	< 0.10	< 0.074	< 0.096	< 0.096
		Americium-241	< 0.00060	< 0.00027	< 0.00033	< 0.00033	< 0.00058
Cabbage		Tritium		< 10	< 3.0	< 3.0	2.0
		Carbon-14		< 15	7.0	7.0	18
		Sulphur-35		< 1.0	0.90	1.1	1.0
		Cobalt-60		< 0.60	< 0.50	< 0.50	0.30
		Strontium-90		0.26	0.59	0.59	0.81
		Technetium-99		< 0.10	< 0.023	0.11	< 0.055
		Ruthenium-106		< 3.6	< 2.9	< 2.2	< 3.0

Drigg Disposals and Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Disposals, TBq, concentration of activity, Bq kg^{-1}*				
			1994	1995	1996	1997	1998
		Antimony-125		< 1.2	< 0.70	< 0.70	< 0.50
		Iodine-129		< 0.05	< 0.040	< 0.038	< 0.058
		Total Caesium		< 0.20	1.2	0.24	0.56
		Promethium-147			< 0.30	0.20	0.30
		Total Uranium		< 0.023			
		Plutonium-238		< 0.00020	< 0.00030	< 0.00020	0.00050
		Plutonium-239+240		< 0.00020	0.00070	0.00030	0.00070
		Plutonium-241		< 0.10	< 0.10	< 0.071	< 0.090
		Americium-241		< 0.00030	0.0010	0.00050	0.0020
Ovine muscle		Tritium	22	< 10	< 3.0	< 3.0	5.0
		Carbon-14	44	31	37	30	46
		Sulphur-35	< 1.0	< 3.0	< 2.0	1.3	5.3
		Cobalt-60	< 0.50	< 0.60	< 0.50	< 0.40	< 0.40
		Strontium-90	< 0.20	< 0.20	< 0.031	< 0.023	< 0.032
		Technetium-99		< 0.10	< 0.023	< 0.019	< 0.023
		Ruthenium-106		< 3.8	< 2.6	< 3.3	< 1.7
		Antimony-125	< 0.50	< 0.90	< 0.90	< 0.60	< 0.40
		Iodine-129	< 0.20	< 0.050	< 0.028	< 0.036	< 0.037
		Total Caesium	1.1	5.8	0.53	2.3	0.75
		Plutonium-238	< 0.00020	< 0.00030	< 0.00030	< 0.00020	< 0.00020
		Plutonium-239+240	< 0.00020	0.00040	< 0.00040	0.00060	0.00040
		Plutonium-241		< 0.10	< 0.077	< 0.079	< 0.077
		Americium-241	< 0.00020	< 0.00040	< 0.00030	0.00070	< 0.00040

Drigg Disposals and Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Disposals, TBq, concentration of activity, Bq kg^{-1}*				
			1994	1995	1996	1997	1998
Potatoes		Tritium		< 10	6.0	< 3.0	< 3.0
		Carbon-14		19	17	14	14
		Sulphur-35		< 1.0	< 0.30	0.20	< 0.40
		Cobalt-60		< 0.40	< 0.30	< 0.40	< 0.50
		Strontium-90		< 0.20	0.074	0.080	< 0.041
		Technetium-99		< 0.10	< 0.024	< 0.033	< 0.024
		Ruthenium-106		< 3.7	< 1.8	< 3.5	< 2.7
		Antimony-125		< 0.80	< 0.40	< 1.0	< 0.70
		Iodine-129		< 0.050	< 0.044	< 0.044	< 0.072
		Total Caesium		< 0.20	0.12	0.40	0.20
		Promethium-147			< 0.30	< 0.20	< 0.30
		Total Uranium		< 0.026			
		Plutonium-238		< 0.00020	< 0.00030	< 0.00020	< 0.00035
		Plutonium-239+240		0.0010	0.00050	0.0012	< 0.00045
		Plutonium-241		< 0.10	< 0.0073	< 0.077	< 0.11
		Americium-241		0.00080	0.00080	0.0021	0.00055
Rabbit		Tritium	13	< 10	22	11	
		Carbon-14	34	19	23	32	
		Sulphur-35	< 1.0	< 3.0	< 2.0	2.0	
		Cobalt-60	< 0.30	< 0.40	< 0.40	< 0.50	
		Strontium-90	< 0.20	< 0.20	0.045	0.071	
		Technetium-99		< 0.10	< 0.029	< 0.018	
		Ruthenium-106	< 1.5	< 3.4	< 2.7	< 2.4	
		Antimony-125	< 0.50	< 1.1	< 0.60	< 0.80	

Drigg Disposals and Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Disposals, TBq, concentration of activity, Bq kg^{-1}*				
			1994	**1995**	**1996**	**1997**	**1998**
		Iodine-129	< 0.20	< 0.050	< 0.036	< 0.078	
		Total Caesium	0.88	1.0	0.59	0.69	
		Plutonium-238	< 0.00020	< 0.00030	< 0.00030	< 0.00030	
		Plutonium-239+240	0.0010	0.00060	< 0.00040	0.00080	
		Plutonium-241		0.13	< 0.086	< 0.099	
		Americium-241	0.00090	0.0011	< 0.00030	0.0013	

* Bq l^{-1} for milk

1 With half life greater than 3 months

2 Other beta emitting radionuclides including iron-55 and cobalt-60

Ravenglass Environmental Data 1994-1998

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1}wet*				
			1994	**1995**	**1996**	**1997**	**1998**
Milk		Tritium	< 10	< 10	< 3.4	< 3.2	< 3.8
		Carbon-14	18	17	15	15	16
		Sulphur-35	< 1.0	< 1.0	< 0.66	< 0.42	< 0.53
		Cobalt-60	< 0.46	< 0.44	< 0.42	< 0.43	< 0.42
		Strontium-90	< 0.20	< 0.20	0.075	0.075	0.070
		Zirconium-95	< 1.0	< 0.88	< 0.82	< 0.91	< 0.86
		Niobium-95	< 0.80	< 0.77	< 0.70	< 0.89	< 0.84
		Technetium-99	< 0.040	< 0.040	< 0.0076	< 0.0058	< 0.0089

Ravenglass Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1}wet*				
			1994	1995	1996	1997	1998
		Ruthenium-106	< 2.9	< 3.0	< 2.8	< 3.0	< 2.8
		Antimony-125	< 0.83	< 0.86	< 0.84	< 0.83	< 0.85
		Iodine-129	< 0.20	< 0.016	< 0.0093	< 0.0098	< 0.010
		Caesium-134	< 0.31	< 0.29	< 0.33	< 0.31	< 0.35
		Caesium-137	< 0.42	< 0.49	< 0.47	< 0.45	< 0.45
		Total Caesium	< 0.22	< 0.22	0.22	0.20	0.19
		Cerium-144	< 1.6	< 1.9	< 1.8	< 1.7	< 1.9
		Promethium-147		< 0.53	< 0.33	< 0.50	< 0.35
		Polonium-210	< 0.010	< 0.010			
		Plutonium-238	< 0.00020	< 0.00021	< 0.00018	< 0.00019	< 0.00024
		Plutonium-239+240	< 0.00020	< 0.00021	< 0.00019	< 0.00021	< 0.00029
		Plutonium-241	< 0.10	< 0.10	< 0.069	< 0.087	< 0.14
		Americium-241	< 0.00020	< 0.00023	< 0.00020	< 0.00054	< 0.00038
	Max	Tritium	< 10	< 10	3.8	< 3.3	< 3.8
		Carbon-14	19	18	16	16	17
		Sulphur-35	< 1.0	< 1.0	< 0.70	< 0.53	< 0.55
		Cobalt-60	< 0.48	< 0.55	< 0.43	< 0.45	< 0.44
		Strontium-90	< 0.20	< 0.20	0.083	0.088	0.079
		Zirconium-95	< 1.1	< 0.95	< 0.85	< 0.95	< 0.92
		Niobium-95	< 0.85	< 0.90	< 0.75	< 0.97	< 0.85
		Technetium-99	< 0.040	< 0.040	< 0.0085	< 0.0068	< 0.011
		Ruthenium-106	< 2.9	< 3.5	< 2.9	< 3.2	< 2.8
		Antimony-125	< 0.84	< 0.96	< 0.90	< 0.85	< 0.95
		Iodine-129	< 0.20	< 0.020	< 0.0095	< 0.010	< 0.011

Ravenglass Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1} wet*				
			1994	1995	1996	1997	1998
		Caesium-134	< 0.34	< 0.33	< 0.36	< 0.32	< 0.36
		Caesium-137	< 0.44	< 0.51	< 0.48	< 0.47	< 0.45
		Total Caesium	0.26	< 0.24	0.25	0.26	0.23
		Cerium-144	< 1.7	< 2.2	< 1.9	< 1.8	< 1.9
		Promethium-147		< 0.60	< 0.33	< 0.50	< 0.35
		Polonium-210	< 0.010	< 0.010			
		Plutonium-238	< 0.00020	< 0.00025	< 0.00020	< 0.00020	< 0.00028
		Plutonium-239+240	< 0.00020	< 0.00023	< 0.00023	< 0.00023	< 0.00033
		Plutonium-241	< 0.10	< 0.10	< 0.072	< 0.095	< 0.21
		Americium-241	< 0.00020	< 0.00030	< 0.00020	< 0.00075	< 0.00040
Barley		Tritium	< 10	< 10	< 3.0	< 4.0	< 4.0
		Carbon-14	150	79	100	87	97
		Sulphur-35	2.8	1.3	1.7	1.6	1.1
		Cobalt-60	< 0.30	< 0.50	< 0.50	< 0.40	< 0.50
		Strontium-90	0.52	0.58	0.47	0.40	0.047
		Zirconium-95	< 0.30	< 1.1	< 1.0	< 0.60	< 0.40
		Niobium-95	< 0.30	< 0.70	< 0.80	< 0.80	< 0.60
		Technetium-99					< 0.045
		Ruthenium-106	< 0.70	< 2.7	< 3.2	< 3.2	< 2.6
		Antimony-125	< 0.40	< 1.1	< 1.0	< 0.50	< 0.60
		Iodine-129	< 0.20	< 0.050	0.041	< 0.13	< 0.049
		Total Caesium	0.37	0.37	0.32	0.30	0.10
		Cerium-144	< 0.90	< 1.4	< 2.0	< 1.4	< 1.5
		Promethium-147	2.4				

Ravenglass Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1}wet*				
			1994	**1995**	**1996**	**1997**	**1998**
		Plutonium-238	0.00050	0.00020	0.00050	< 0.00050	0.0013
		Plutonium-239+240	0.00024	0.00080	0.0026	0.0015	0.0060
		Plutonium-241	< 0.10	< 0.10	0.32	< 0.076	< 0.22
		Americium-241	0.0035	0.0020	0.0076	0.0019	0.012
Blackberries		Tritium		< 10	< 3.0	< 3.0	< 3.0
		Carbon-14		22	16	26	16
		Sulphur-35		< 1.0	< 0.30	< 0.70	< 0.40
		Cobalt-60		< 0.50	< 0.50	< 0.30	< 0.30
		Strontium-90		0.75	0.39	0.58	0.53
		Zirconium-95		< 1.0	< 0.70	< 0.70	< 0.40
		Niobium-95		< 0.80	< 0.70	< 0.50	< 0.50
		Technetium-99					0.034
		Ruthenium-106		< 2.9	< 3.0	< 2.7	< 1.6
		Antimony-125		< 0.80	< 1.0	< 0.60	< 0.80
		Iodine-129		< 0.050	< 0.044	< 0.055	< 0.043
		Total Caesium		0.52	0.094	0.15	0.067
		Cerium-144		< 1.5	< 1.8	< 1.6	< 1.3
		Plutonium-238		0.00050	0.00050	0.0014	0.0013
		Plutonium-239+240		0.0037	0.00090	0.0048	0.0070
		Plutonium-241		< 0.10	< 0.093	0.22	0.13
		Americium-241		0.0047	0.0017	0.0072	0.016

Ravenglass Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1}wet*				
			1994	1995	1996	1997	1998
Ovine muscle		Tritium	< 10	< 10	< 3.5	< 3.5	< 4.5
		Carbon-14	44	41	26	36	37
		Sulphur-35	< 1.0	< 3.0	< 2.0	3.6	6.3
		Cobalt-60	< 0.40	< 0.40	< 0.55	< 0.30	< 0.30
		Strontium-90	< 0.20	< 0.20	< 0.034	0.024	< 0.019
		Zirconium-95	< 0.85	< 1.2	< 0.80	< 0.85	< 0.60
		Niobium-95	< 0.60	< 1.1	< 0.80	< 0.65	< 0.40
		Technetium-99		< 0.10	< 0.022	< 0.023	< 0.029
		Ruthenium-106	< 2.6	< 2.4	< 1.9	< 2.7	< 2.7
		Antimony-125	< 0.70	< 1.0	< 0.95	< 0.80	< 0.65
		Iodine-129	< 0.20	< 0.050	< 0.032	< 0.038	< 0.034
		Total Caesium	0.52	3.4	0.67	0.70	0.56
		Cerium-144	< 1.2	< 1.7	< 2.3	< 1.6	< 1.6
		Plutonium-238	< 0.00020	< 0.00020	< 0.00025	< 0.00025	< 0.00030
		Plutonium-239+240	< 0.00020	< 0.00055	< 0.00030	< 0.00050	< 0.00050
		Plutonium-241		< 0.10	< 0.072	< 0.083	< 0.081
		Americium-241	< 0.00035	0.0014	< 0.00045	0.00090	< 0.00075
	Max	Tritium	< 10	< 10	4.0	4.0	6.0
		Carbon-14	58	44	30	46	44
		Sulphur-35	< 1.0	< 3.0	< 2.0	5.3	7.3
		Cobalt-60	< 0.40	< 0.40	< 0.60	< 0.30	< 0.40
		Strontium-90	< 0.20	< 0.20	0.050	0.027	< 0.019
		Zirconium-95	< 0.90	< 1.4	< 0.90	< 1.2	< 0.80
		Niobium-95	< 0.60	< 1.5	< 0.080	< 0.70	< 0.40

Ravenglass Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1}wet*				
			1994	1995	1996	1997	1998
		Technetium-99		< 0.10	< 0.024	< 0.024	< 0.030
		Ruthenium-106	< 2.8	< 2.6	< 2.1	< 3.2	< 2.9
		Antimony-125	< 0.90	< 1.0	< 1.1	< 1.1	< 0.70
		Iodine-129	< 0.20	< 0.050	< 0.036	< 0.038	< 0.036
		Total Caesium	0.55	3.5	0.89	0.94	0.61
		Cerium-144	< 1.2	< 2.0	< 2.4	< 1.6	< 1.8
		Plutonium-238	< 0.00020	< 0.00020	< 0.00030	0.00030	0.00040
		Plutonium-239+240	< 0.00020	0.00090	< 0.00030	0.00070	0.00070
		Plutonium-241		< 0.10	< 0.074	< 0.088	< 0.089
		Americium-241	0.00050	0.0023	0.00060	0.0013	0.0011
Ovine offal		Tritium	< 10	< 10	7.0	< 4.0	< 5.0
		Carbon-14	36	36	35	30	39
		Sulphur-35	< 1.0	< 3.0	< 2.0	5.4	12
		Cobalt-60	< 0.55	< 0.55	< 0.30	< 0.45	< 0.90
		Strontium-90	0.94	< 0.20	0.16	0.037	0.38
		Zirconium-95	< 0.95	< 0.95	< 0.65	< 1.0	< 1.6
		Niobium-95	< 1.2	< 0.95	< 0.55	< 1.1	< 0.95
		Technetium-99			< 0.19	< 0.023	
		Ruthenium-106	< 3.7	< 3.7	< 2.5	< 2.8	< 3.9
		Antimony-125	< 1.1	< 0.90	< 0.95	< 1.1	< 1.3
		Iodine-129	< 0.30				
		Total Caesium	0.72	2.0	0.75	0.39	0.94
		Cerium-144	< 1.6	< 1.3	< 1.9	< 3.1	< 3.5
		Plutonium-238	0.00060	0.0029			0.015

Ravenglass Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1}wet*				
			1994	1995	1996	1997	1998
		Plutonium-239+240	0.0042	0.014			0.080
		Plutonium-241	0.0040	0.30			< 1.0
		Americium-241		0.013			0.060
	Max	Tritium	< 10	< 10	9.0	< 4.0	< 5.0
		Carbon-14	44	41	37	32	45
		Sulphur-35	< 1.0	< 3.0	< 2.0	5.7	16
		Cobalt-60	< 0.80	< 0.70	< 0.30	< 0.50	< 1.2
		Strontium-90	1.6	< 0.20	0.20	0.040	0.50
		Zirconium-95	< 1.1	< 1.1	< 0.70	< 1.1	< 2.1
		Niobium-95	< 1.3	< 1.1	< 0.60	< 1.1	< 1.2
		Technetium-99			0.33	< 0.023	
		Ruthenium-106	< 3.7	< 3.7	< 2.5	< 3.4	< 4.0
		Antimony-125	< 1.3	< 1.0	< 1.2	< 1.4	< 1.4
		Iodine-129	< 0.40				
		Total Caesium	1.0	2.5	0.87	0.39	1.0
		Cerium-144	< 2.0	< 1.5	< 1.9	< 4.4	< 4.8
		Plutonium-238	0.00090	0.0029			0.030
		Plutonium-239+240	0.0072	0.014			0.16
		Plutonium-241		0.30			2.0
		Americium-241	0.0066	0.013			0.12

Ravenglass Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1}wet*				
			1994	1995	1996	1997	1998
Potatoes		Tritium	< 11	< 10	< 3.0	< 3.0	< 3.0
		Carbon-14	< 23	21	17	12	21
		Sulphur-35	< 1.0	< 1.0	< 0.20	0.40	< 0.40
		Cobalt-60	< 0.30	< 0.40	< 0.50	< 0.40	< 0.30
		Strontium-90	0.24	< 0.20	0.16	0.14	0.071
		Zirconium-95	< 0.40	< 0.50	< 1.00	< 0.90	< 0.50
		Niobium-95	< 0.30	< 0.60	< 0.60	< 0.60	< 0.70
		Technetium-99	< 0.50				< 0.029
		Ruthenium-106	< 1.4	< 1.9	< 1.7	< 2.9	< 2.8
		Antimony-125	< 0.60	< 0.5	< 1.0	< 0.70	< 0.40
		Iodine-129	< 0.20	< 0.050	0.040	< 0.066	< 0.059
		Total Caesium	< 0.29	0.25	< 0.044	0.36	0.14
		Cerium-144	< 0.90	< 1.5	< 2.4	< 1.9	< 2.1
		Promethium-147	< 2.0		0.40	< 0.10	< 0.40
		Total Uranium					0.041
		Plutonium-238	0.00035	< 0.00020	0.00010	< 0.00070	< 0.00050
		Plutonium-239+240	0.0045	0.00090	< 0.00030	0.00030	0.00030
		Plutonium-241	< 0.10	< 0.10	0.13	< 0.12	0.18
		Americium-241	0.0037	0.0011	0.00040	0.00070	0.00070

* Bq l^{-1} for milk

Isle of Man Environmental Data 1994-1998

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1} wet *				
			1994	1995	1996	1997	1998
Milk		Tritium		< 10	< 3.0	< 3.0	< 2.8
		Carbon-14		< 15	16	15	14
		Sulphur-35		< 1.0	< 0.87	< 0.56	< 0.55
		Cobalt-60	< 0.38	< 0.48	< 0.45	< 0.41	< 0.44
		Strontium-90	< 0.12	< 0.19	< 0.12	0.077	0.077
		Zirconium-95	< 0.71	< 1.0	< 1.4	< 1.2	< 1.3
		Niobium-95	< 0.81	< 1.1	< 1.4	< 1.7	< 1.6
		Technetium-99		< 0.040	< 0.023	< 0.0060	< 0.0040
		Ruthenium-106	< 2.4	< 2.6	< 2.9	< 3.1	< 3.0
		Antimony-125	< 0.59	< 0.84	< 0.84	< 0.84	< 0.78
		Iodine-129		< 0.018	< 0.015	< 0.0090	< 0.011
		Total Caesium	< 0.21	< 0.20	< 0.20	0.18	0.15
		Cerium-144	< 1.4	< 0.20	< 1.8	< 2.1	< 1.8
		Promethium-147		< 0.38	< 0.30	< 0.040	< 0.20
		Plutonium-238	< 0.00020	< 0.00020	< 0.00020	0.00040	< 0.00030
		Plutonium-239+240	< 0.00020	< 0.00020	< 0.00015	< 0.00010	0.00010
		Plutonium-241		< 0.10	< 0.089	< 0.072	< 0.036
		Americium-241	< 0.00023	< 0.00023	< 0.00025	0.00050	0.00010
	Max	Tritium		< 10	< 3.0	< 3.0	< 2.8
		Carbon-14		17	18	17	14
		Sulphur-35		< 1.0	< 1.0	< 0.73	< 0.55
		Cobalt-60	< 0.40	< 0.53	< 0.50	< 0.43	< 0.45
		Strontium-90	< 0.15	< 0.20	< 0.20	0.11	0.094
		Zirconium-95	< 0.90	< 1.1	< 1.6	< 1.3	< 1.4

Isle of Man Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1} wet *				
			1994	1995	1996	1997	1998
		Niobium-95	< 0.90	< 1.4	< 2.0	< 1.8	< 1.8
		Technetium-99		< 0.040	< 0.40	< 0.0060	< 0.004
		Ruthenium-106	< 2.5	< 2.9	< 3.5	< 3.1	< 3.0
		Antimony-125	< 0.63	< 0.97	< 1.1	< 0.95	< 0.78
		Iodine-129		< 0.020	< 0.020	< 0.0090	< 0.011
		Total Caesium	< 0.22	< 0.21	< 0.22	0.26	0.20
		Cerium-144	< 1.5	< 2.2	< 2.2	< 2.1	< 1.9
		Promethium-147		< 0.60	< 0.30	< 0.40	< 0.20
		Plutonium-238	< 0.00020	< 0.00020	< 0.00020	0.00040	< 0.00030
		Plutonium-239+240	< 0.00020	< 0.00020	< 0.00020	< 0.00010	0.00010
		Plutonium-241		< 0.10	< 0.10	< 0.072	< 0.036
		Americium-241	0.00030	< 0.00030	< 0.00030	0.00050	0.00010
Apples		Tritium		< 10	< 3.0	< 3.0	9.0
		Carbon-14		14	13	9.0	7.0
		Sulphur-35		< 1.0	0.80	< 0.70	< 0.40
		Cobalt-60		< 0.40	< 0.30	< 0.50	< 0.50
		Strontium-90		< 0.20	< 0.061	0.10	0.047
		Zirconium-95		< 1.0	< 0.70	< 0.40	< 0.70
		Niobium-95		< 0.40	< 0.50	< 0.40	< 0.70
		Ruthenium-106		< 2.8	< 2.6	< 3.0	< 3.1
		Antimony-125		< 1.0	< 0.40	< 1.0	< 1.0
		Total Caesium		< 0.20	0.12	0.047	< 0.030
		Cerium-144		< 1.4	< 1.5	< 1.9	< 1.3

Isle of Man Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1} wet *				
			1994	1995	1996	1997	1998
Cabbage[1]		Tritium	< 10	< 10	< 3.0	< 3.0	< 3.0
		Carbon-14	14	< 15	3.0	8.0	4.0
		Sulphur-35		< 1.0	1.6	< 0.40	2.5
		Cobalt-60	< 0.40	< 0.60	< 0.50	< 0.50	< 0.40
		Strontium-90	2.2	1.3	0.95	0.13	0.097
		Zirconium-95	< 0.60	< 0.80	< 0.70	< 1.0	< 0.70
		Niobium-95	< 0.70	< 1.4	< 0.60	< 0.60	< 0.70
		Technetium-99		< 0.040	0.060	< 0.030	0.033
		Ruthenium-106	< 1.7	< 3.1	< 1.7	< 2.3	< 2.6
		Antimony-125	< 0.70	< 0.90	< 1.0	< 0.50	< 0.60
		Iodine-129		< 0.050	< 0.039	< 0.038	< 0.036
		Total Caesium	0.64	0.35	0.90	0.17	0.069
		Cerium-144	< 0.70	< 2.6	< 1.7	< 2.1	< 1.3
		Promethium-147		< 0.00030	< 1.0	0.10	< 0.50
		Plutonium-238	< 0.00020	< 0.00020	0.00020	< 0.00030	0.00020
		Plutonium-239+240	0.00020	< 0.00020	< 0.00030	< 0.00020	< 0.00010
		Plutonium-241		< 0.10	< 0.11	< 0.075	< 0.083
		Americium-241	0.00040	0.00030	0.00090	0.0012	0.00020
Potatoes		Tritium	< 10	< 10	< 3.0	< 3.0	4.0
		Carbon-14	29	16	15	14	16
		Sulphur-35		< 1.0	< 0.80	< 0.70	0.40
		Cobalt-60	< 0.40	< 0.20	< 0.40	< 0.30	< 0.20
		Strontium-90	0.12	< 0.20	< 0.012	0.014	0.14
		Zirconium-95	< 0.60	< 0.50	< 0.50	< 0.70	< 0.80

Isle of Man Environmental Data 1994-1998 (cont.)

Material	Location	Radionuclide	Concentration of activity, Bq kg^{-1} wet *				
			1994	1995	1996	1997	1998
		Niobium-95	< 0.50	< 0.30	< 0.50	< 0.60	< 0.50
		Technetium-99		< 0.040	< 0.029	< 0.030	< 0.040
		Ruthenium-106	< 1.6	< 1.7	< 1.2	< 3.4	< 3.0
		Antimony-125	< 0.50	< 0.30	< 0.40	< 0.90	< 0.80
		Iodine-129		< 0.040	< 0.032	< 0.030	< 0.043
		Total Caesium	< 0.20	< 0.20	0.21	0.12	0.061
		Cerium-144	< 0.80	< 1.20	< 0.90	< 2.5	< 1.6
		Promethium-147		< 0.30	< 0.30	< 0.10	< 0.20
		Plutonium-238	< 0.00020	< 0.00020	< 0.00030	0.00030	< 0.00050
		Plutonium-239+240	0.0012	0.00080	0.00040	0.00020	< 0.00050
		Plutonium-241		< 0.10	< 0.076	< 0.068	< 0.093
		Americium-241	0.00090	0.00040	< 0.00030	< 0.00040	< 0.00050

* Bq l^{-1} for milk

1 Broccoli in 1997

SIZEWELL: Liquid discharges and related environmental data 1994-1998

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1}* or gamma dose rate, μGy h^{-1}				
			1994[1]	1995	1996	1997	1998
Liquid waste	A Station	Tritium	3.57	6.69	1.13	5.06	2.91
		Caesium-137	0.057	0.171	0.36	0.0980	0.0706
		Other Radionuclides	0.129	0.223	0.229	0.135	0.145
	B Station	Tritium		10.7	37.6	44.2	48.3
		Other Radionuclides		0.0172	0.0199	0.0213	0.0178
Cod	Sizewell	Tritium					< 120
		Caesium-137	0.46	0.69	1.0	0.89	0.63
Crab	Sizewell	Tritium					< 120
		Carbon-14		30	39	37	46
		Cobalt-58		0.08		< 0.22	< 0.19
		Cobalt-60	0.13	0.13		< 0.11	< 0.15
		Caesium-137	0.17	0.26	0.20	0.23	< 0.20
		Plutonium-238	0.00026	0.00021	0.000075	0.00023	0.00096
		Plutonium-239+240	0.0013	0.0012	0.00048	0.0012	0.0053
		Amercium-241	0.0022	0.0025	0.00081	0.0023	0.0094
		Curium-242				0.000024	
		Curium-243+244	0.000063	0.000064	0.000072	0.000041	0.000049
Pacific Oyster	Blyth estuary	Zinc-65		0.13	0.08	0.07	< 0.08
		Caesium-134			0.02	< 0.02	< 0.03
		Caesium-137	0.07	0.21	0.12	0.07	0.08

SIZEWELL: Liquid discharges and related environmental data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1}* or gamma dose rate, μGy h^{-1}				
			1994[1]	1995	1996	1997	1998
Whelks	Dunwich	Cobalt-60	0.29	0.16	0.12	0.19	< 0.17
		Caesium-137	0.09		0.25	0.16	< 0.14
Mud	Southwold	Cobalt-58		0.52		< 1.0	< 0.95
		Cobalt-60	2.8	3.6	1.4	1.9	2.3
		Caesium-137	15	14	15	14	13
		Europium-155	1.9	0.83	1.9	< 1.4	< 1.4
Mud	Southwold	Gamma Dose	0.062	0.062	0.063	0.066	0.064
Sand and Gravel	Aldeburgh	Gamma Dose	0.045	0.045	0.045	0.044	0.048

* Wet concentrations except for sediments where dry concentrations apply

1 A Station authorisation revised

SIZEWELL: Gaseous discharges and related environmental data 1994-1998

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	1995	1996	1997	1998
Gaseous waste	A Station	Beta	5.3 10^{-4}	3.43 10^{-4}	2.22 10^{-5}	7.34 10^{-5}	5.62 10^{-5}
		Tritium	0.99	1.33	0.871	0.639	0.515
		Carbon-14	0.71	0.91	0.107	0.530	0.465

SIZEWELL: Gaseous discharges and related environmental data 1994-1998 (cont.)

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	**1995**	**1996**	**1997**	**1998**
		Sulphur-35	0.21	0.185	$9.60\ 10^{-3}$	0.0357	0.019
		Argon-41	2400	1950	295	1230	841
	B Station	Noble gases		4.15	6.11	4.36	15.7
		Halogens		$8.0\ 10^{-5}$	$4.92\ 10^{-5}$	$3.42\ 10^{-5}$	$5.95\ 10^{-5}$
		Beta		$1.92\ 10^{-5}$	$8.71\ 10^{-6}$	$4.97\ 10^{-6}$	$1.06\ 10^{-5}$
		Tritium		0.141	0.579	0.565	1.39
		Carbon-14		0.0123	0.0541	0.0759	0.23
Milk	Near farms	Tritium	< 10	< 10	< 3.0	< 3.0	< 2.9
		Carbon-14	22	< 17	14	16	15
		Sulphur-35	< 1.0	< 1.0	< 0.38	< 0.31	< 0.55
	Max	Tritium	< 10	< 10	< 3.0	< 3.0	< 3.3
		Carbon-14	31	< 18	15	18	16
		Sulphur-35	< 1.0	< 1.0	< 0.40	< 0.38	< 0.55
	Far farms	Tritium	< 10	< 10	< 3.3	< 3.0	< 2.0
		Carbon-14	19	< 18	16	20	24
		Sulphur-35	< 1.0	< 1.0	< 0.43	< 0.32	< 0.53
	Max	Tritium	< 10	< 10	< 3.8	< 3.0	< 2.0
		Carbon-14	19	20	17	23	27
		Sulphur-35	< 1.0	< 1.0	< 0.45	< 0.38	< 0.55

SIZEWELL: Gaseous discharges and related environmental data 1994-1998 (cont.)

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	**1995**	**1996**	**1997**	**1998**
Apples		Tritium	13	< 10	< 3.0	< 3.0	3.0
		Carbon-14	22	14	16	13	13
		Sulphur-35	< 1.0	< 1.0	< 0.20	< 0.20	0.90
Blackberries		Tritium	10	< 10	< 3.0	< 3.0	2.0
		Carbon-14	24	< 15	19	26	23
		Sulphur-35	< 1.0	1.1	< 0.30	0.60	< 0.30
		Caesium-137	0.40	< 0.40	0.20	< 0.40	< 0.40
Cabbage		Tritium	< 10	< 10	< 3.0	< 3.0	< 3.0
		Carbon-14	< 15	< 15	13	11	< 3.0
		Sulphur-35	< 1.0	< 1.0	1.1	1.7	4.1
Carrots		Tritium	< 10	< 10	< 3.0	< 3.0	< 3.0
		Carbon-14	19	12	12	5.0	9.0
		Sulphur-35	< 1.0	< 1.0	< 0.30	0.60	0.40
Potatoes		Tritium	12	< 10	< 3.0	< 3.0	< 3.0
		Carbon-14	35	22	20	19	20
		Sulphur-35	< 1.0	< 1.0	< 0.30	< 0.40	0.90

* Bq l^{-1} for milk

SPRINGFIELDS: Liquid discharges and related environmental data 1994-1998

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1}* or gamma dose rate, μGy h^{-1}				
			1994	**1995**	**1996**	**1997**	**1998**
Liquid waste		Alpha	0.158	0.115	0.124	0.121	0.195
		Beta	114	112	153	142	150
		Technetium-99	0.0159	0.0301	0.0329	0.0329	0.0273
		Thorium-230	0.0902	0.0565	0.0480	0.0522	0.0850
		Thorium-232	0.0014	0.00159	0.0014	0.0011	0.0012
		Neptunium-237	0.00019	$1.9\ 10^{-4}$	$2.0\ 10^{-4}$	$2.10\ 10^{-4}$	$2.0\ 10^{-4}$
		Uranium	0.0553	0.0477	0.061	0.0568	0.0467
Flounder	Ribble Estuary	Caesium-137	28	12	14	12	9.2
Shrimp	Ribble Estuary	Carbon-14				65	56
		Technetium-99	0.52	3.3	6.1	3.9	2.7
		Caesium-137	5.9	4.2	5.4	4.6	4.4
		Radium-226			0.15	< 0.53	0.033
		Thorium-228			0.0040	0.011	0.0078
		Thorium-230			0.025	0.013	0.010
		Thorium-232			0.0050	0.0047	0.0041
		Thorium-234	14		13	1.8	3.8
		Neptunium-237			0.00092	0.00043	0.00060
		Plutonium-238			0.0046	0.0029	0.0034
		Plutonium-239+240			0.025	0.016	0.017
		Americium-241			0.039	0.026	0.028
		Curium-243+244				0.000071	0.000072

SPRINGFIELDS: Liquid discharges and related environmental data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1}* or gamma dose rate, μGy h^{-1}				
			1994	1995	1996	1997	1998
Mud and Sand	Pipeline	Cobalt-60	0.68	0.36	1.3	1.8	< 0.87
		Ruthenium-106	6.5			< 13	< 14
		Antimony-125	3.3	3.6		< 4.3	< 3.9
		Caesium-137	270	160	280	330	140
		Europium-155	0.80			< 2.7	< 8.9
		Radium-226			69	27	17
		Thorium-228	22	11	24	23	16
		Thorium-230	290		55	75	150
		Thorium-232	21	9.2	20	19	13
		Thorium-234	340000	220000	12000	730	63000
		Uranium-234	53	93	13	19	31
		Uranium-235+236	2.4	5.5	0.32	0.63	1.2
		Uranium-238	47	76	12	16	23
		Americium-241	120			120	
Mud	Warton Marsh	Gamma Dose	0.14	0.14	0.15	0.14	0.14
	Hesketh Bank	Gamma Dose	0.12	0.12	0.14	0.13	0.13

* Wet concentrations except for sediments where dry concentrations apply

SPRINGFIELDS: Gaseous discharges and related environmental data 1994-1998

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	1995[1]	1996	1997	1998
Gaseous waste		Alpha	$5.5\ 10^{-4}$	$6.63\ 10^{-4}$			
		Uranium		$9.46\ 10^{-5}$	$2.11\ 10^{-3}$	$1.96\ 10^{-3}$	$1.54\ 10^{-3}$
Milk	Near farms	Total Uranium	< $5.8\ 10^{-3}$	< 0.0064	< 0.0065	< 0.0065	< 0.0062
Milk	Far farms	Total Uranium	< $5.8\ 10^{-3}$	< 0.0064	< 0.0065		
Duck		Tritium			7.0	< 3.0	< 3.0
		Carbon-14			29	27	35
		Strontium-90		< 0.20	< 0.025	< 0.018	0.28
		Total Caesium		3.2	3.9	2.1	3.1
		Thorium-230		< 0.0050	0.015	< 0.0060	0.014
		Thorium-232		< 0.0050	< 0.0030	< 0.0090	0.010
		Plutonium-238		0.00040	0.00090		0.00090
		Plutonium-239+240		0.0023	0.0043		0.0073
		Plutonium-241		< 0.10	< 0.11		< 0.061
		Americium-241		0.0030	0.0045		0.012
Potatoes		Tritium			< 3.0	< 3.0	< 3.0
		Carbon-14			18	14	15
		Strontium-90		< 0.20	0.052	0.046	0.077
		Total Caesium		< 0.20	0.092		< 0.034
		Thorium-230		< 0.0050	0.012	0.0030	0.0056
		Thorium-232		< 0.0050	0.0075	0.0030	0.0032

SPRINGFIELDS: Gaseous discharges and related environmental data 1994-1998 (cont.)

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	1995[1]	1996	1997	1998
		Plutonium-238		< 0.00030	< 0.00025	< 0.00020	< 0.00020
		Plutonium-239+240		< 0.00040	< 0.00030	< 0.00020	< 0.00020
		Plutonium-241		< 0.10	< 0.12	0.087	< 0.25000
		Americium-241		< 0.00050	< 0.00035	0.0013	0.00040
Grass		Uranium-234				0.29	0.67
		Uranium-235+236				0.015	0.042
		Uranium-238				0.29	0.52
		Total Uranium	2.9	2.8	0.88	2.1	1.8
Sileage		Total Uranium	1.0	0.72	1.6	0.92	0.89
Bovine Faeces		Total Uranium	2.3	1.8	1.6	2.1	3.8
Ovine Faeces		Uranium-234			6.7	3.0	
		Uranium-235+236			0.30	0.13	
		Uranium-238			6.3	0.27	
		Total Uranium	14	9.6	7.5	7.8	19
Soil		Uranium-234			49	31	72
		Uranium-235+236			2.3	1.5	3.0
		Uranium-238			45	30	68
		Total Uranium	106	150	90	83	81

* Bq l^{-1} for milk. Wet concentrations except for sediments where dry concentrations apply

1 Authorisation revised

TRAWSFYNYDD: Liquid discharges and related environmental data 1994-1998

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1}* or gamma dose rate, μGy h^{-1}				
			1994	**1995**	**1996**	**1997**	**1998**
Liquid waste		Total activity	0.0123	0.0114	0.0101	0.00902	0.0177
		Tritium	0.121	0.232	0.103	0.298	0.0628
		Strontium-90	0.00220	0.00198	0.00439	0.00194	0.0103
		Caesium-137	0.0094	0.0112	0.00631	0.00701	0.00651
Brown Trout	Lake	Carbon-14	36	30	47	37	50
		Strontium-90	16	7.8	6.1	4.3	3.1
		Caesium-134	19	9.1	9.2	5.0	2.1
		Caesium-137	220	140	180	150	120
		Plutonium-238	0.00017	0.00013	0.00038	0.000097	0.00023
		Plutonium-239+240	0.00039	0.00037	0.0016	0.00024	0.00094
		Americium-241	0.00062	0.00054	0.0029	0.00041	0.0016
		Curium-242	0.000022				
		Curium-243+244	0.000044	0.000019	0.000036	0.000023	0.000013
Perch	Lake	Strontium-90	6.5	4.7	2.4	2.5	1.8
		Caesium-134	36	20	15	7.7	3.9
		Caesium-137	430	330	330	250	180
		Plutonium-238	0.00019	0.00020	0.00016	0.00013	0.0003
		Plutonium-239+240	0.00056	0.00060	0.00045	0.00046	0.00012
		Amercium-241	0.0011	0.00099	0.00090	0.00081	0.0024
		Curium-242	0.000048	0.0000094			
		Curium-243+244	0.000069	0.000029	0.000019	0.000027	0.000014

TRAWSFYNYDD: Liquid discharges and related environmental data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1}* or gamma dose rate, μGy h^{-1}				
			1994	**1995**	**1996**	**1997**	**1998**
Mud	Barrier Wall	Cobalt-60	140	130	110	85	70
		Ruthenium-106	650	280	170	< 45	< 40
		Antimony-125	960	700	390	230	230
		Caesium-134	400	230	160	52	50
		Caesium-137	7100	6500	5800	5000	3500
		Cerium-144	170	76	26	< 21	< 20
		Europium-154	59	51	45	30	30
		Europium-155	40	31	27	12	20
		Amercium-241	150	180	150	170	130
Water	Bailey Bridge	Tritium	0.40	2.1	1.5	< 3.1	< 2.3
		Caesium-134	0.013	0.010	0.0042	0.0016	< 0.00076
		Caesium-137	0.065	0.091	0.068	0.070	0.033
Peat	South end of lake	Gamma dose	0.068	0.081	0.086	0.062	0.063
	Cae Adda boat mooring	Gamma dose	0.066	0.071	0.071	0.073	0.065

* Wet concentrations except for sediments where dry concentrations apply

TRAWSFYNYDD: Gaseous discharges and related environmental data 1994-1998

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	**1995**	**1996**	**1997**	**1998**
Gaseous waste		Beta	$5.4\ 10^{-6}$	$3.09\ 10^{-6}$	$1.63\ 10^{-6}$	$2.30\ 10^{-6}$	$1.51\ 10^{-6}$
		Tritium	0.13	0.156	0.0630	0.277	0.137
		Carbon-14	$5.4\ 10^{-4}$	0.00102	$7.02\ 10^{-4}$	$8.02\ 10^{-3}$	$1.55\ 10^{-3}$
		Sulphur-35	$5.1\ 10^{-4}$	$4.6\ 10^{-4}$			
Milk	Near farms	Tritium	< 10	< 10	< 3.0	< 3.0	< 2.8
		Carbon-14	20	16	17	15	16
		Sulphur-35	< 1.0	< 1.0	< 0.53		
		Strontium-90		< 0.20	0.086	0.076	0.082
		Total Caesium		< 0.22	0.13	0.15	0.14
		Plutonium-238		< 0.00020	< 0.00018		
		Plutonium-239+240		< 0.00020	< 0.00023		
		Plutonium-241		< 0.10	< 0.077		
		Americium-241		< 0.00020	< 0.00020		
	Far farms	Tritium	< 10	< 10	< 3.0	< 3.0	< 2.8
		Carbon-14	21	17	15	16	16
		Sulphur-35	< 1.0	< 1.0	< 0.80		
		Strontium-90		< 0.20	0.084	0.057	0.12
		Total Caesium	< 0.45	< 0.24	0.18	0.17	0.16
		Plutonium-238		< 0.00020	< 0.00013		
		Plutonium-239+240		< 0.00020	< 0.00018		
		Plutonium-241		< 0.10	< 0.068		
		Americium-241		< 0.00020	< 0.00020		

TRAWSFYNYDD: Gaseous discharges and related environmental data 1994-1998 (cont.)

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	1995	1996	1997	1998
Blackberries		Tritium	< 10	< 10	< 3.0	< 3.0	< 3.0
		Carbon-14	15	16	15	22	15
		Sulphur-35	< 1.0	< 1.0	< 0.40	0.20	< 0.40
		Cobalt-60		< 0.40		< 0.30	< 0.40
		Caesium-137	0.90	1.2		< 0.60	< 0.50
		Plutonium-238		< 0.00020	0.00020	0.00010	< 0.00030
		Plutonium-239+240		< 0.00020	< 0.00020	0.00020	0.00020
		Americium-241		0.00030	0.00030	0.00030	0.0024
Cabbage		Tritium	< 10	< 10	< 3.0	< 3.0	3.0
		Carbon-14	< 15	< 15	12	6.0	8.0
		Sulphur-35	< 1.0	< 1.0	2.3	< 0.30	0.70
		Caesium-137	< 0.20	< 0.50	< 0.50	< 0.50	< 0.50
		Plutonium-238		< 0.00020	< 0.00010	< 0.00010	
		Plutonium-239+240		0.00040	< 0.00020	0.00090	
		Americium-241		< 0.00070	< 0.00080	< 0.00050	
Hazelnuts		Tritium	< 10	< 10	< 3.0	< 4.0	< 4.0
		Carbon-14	41	66	41	61	23
		Sulphur-35	< 1.0	< 1.0	1.3	2.4	< 2.2
		Caesium-137		6.9	13		17
		Plutonium-238		< 0.00020	< 0.00030		
		Plutonium-239+240		< 0.00020	< 0.00030		
		Americium-241		< 0.00020	< 0.00060		

TRAWSFYNYDD: Gaseous discharges and related environmental data 1994-1998 (cont.)

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	1995	1996	1997	1998
Ovine muscle		Tritium	< 10	< 10	< 3.5	< 3.0	< 3.0
		Carbon-14	47	30	28	25	37
		Sulphur-35	< 1.1	< 3.0	< 2.0		
		Strontium-90		< 0.20	0.056	< 0.036	< 0.025
		Total Caesium	8.8	9.2	4.2	6.6	1.5
		Plutonium-238		< 0.00020	< 0.00015	< 0.00010	< 0.00010
		Plutonium-239+240		< 0.00020	< 0.00015	0.00010	< 0.00020
		Americium-241		< 0.00030	< 0.00030	< 0.00055	< 0.00045
Ovine offal		Tritium	< 10	< 10	< 4.0	< 4.0	< 5.0
		Carbon-14	53	43	29	27	37
		Sulphur-35	< 1.1	< 3.0	< 2.0	< 0.40	
		Strontium-90		0.44	0.26	< 3.8	0.69
		Total Caesium	4.5	14	2.1	1.9	0.90
		Plutonium-238			< 0.00010	< 0.00025	< 0.00025
		Plutonium-239+240			< 0.00015	0.00025	< 0.00040
		Americium-241			0.00030	< 0.00075	0.00060
Potatoes		Tritium	< 10	< 10	< 3.0	< 3.0	< 3.00
		Carbon-14	27	32	25	18	24
		Sulphur-35	< 1.0	< 1.0	< 0.70	< 0.30	< 0.40
		Caesium-137	0.30	0.30	< 0.50	< 0.40	< 0.50
		Plutonium-238		< 0.00020	< 0.00020	< 0.00010	0.00020
		Plutonium-239+240		0.0014	0.0011	0.00040	0.00040
		Americium-241		< 0.00060	0.00040	0.00040	0.00030

* Bq l^{-1} for milk

WINFRITH: Liquid discharges and related environmental data 1994-1998

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1}* or gamma dose rate, μGy h^{-1}				
			1994	**1995**	**1996**	**1997**	**1998**
Liquid waste	Inner pipeline	Total alpha	0.00209	0.00186	0.00183	0.00179	0.00133
		Tritium	57	0.77	1.59	3.9	3.42
		Cobalt-60	0.00697	0.00181	0.00199	$8.55\ 10^{-4}$	$3.11\ 10^{-4}$
		Zinc-65	0.00022	$1.51\ 10^{-4}$	$6.77\ 10^{-4}$	$4.10\ 10^{-4}$	$3.20\ 10^{-4}$
		Other Radionuclides	0.0556	0.0261	0.024	0.0342	0.00814
	Outer pipeline	Total alpha	0.000151	$1.54\ 10^{-4}$	$1.18\ 10^{-4}$	$9.50\ 10^{-5}$	$6.30\ 10^{-5}$
		Tritium	0.0387	0.0233	0.0177	0.0142	0.0095
		Other Radionuclides	0.000239	$2.41\ 10^{-4}$	$1.84\ 10^{-4}$	$1.49\ 10^{-4}$	$1.00\ 10^{-4}$
Plaice[1]	Weymouth	Cobalt-60				< 0.07	< 0.05
		Zinc-65				< 0.20	< 0.14
		Caesium-137	0.17	0.20	0.15	0.30	< 0.19
Crab	Lulworth Banks	Cobalt-60	2.4	3.1	2.0	1.1	0.76
		Zinc-65				< 0.14	< 0.15
		Caesium-137				< 0.06	< 0.05
		Plutonium-238			0.00096	0.00026	0.00024
		Plutonium-239+240			0.0036	0.0011	0.0011
		Americium-241			0.0045	0.0015	0.0018
		Curium-243+244			0.00075	0.000042	0.000021

WINFRITH: Liquid discharges and related environmental data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1}* or gamma dose rate, μGy h^{-1}				
			1994	1995	1996	1997	1998
Pacific Oyster	Poole	Cobalt-60	0.20	0.28	0.15	< 0.07	0.12
		Zinc-65	0.56			< 0.17	< 0.11
		Caesium-137		0.10	0.05	< 0.06	< 0.04
Mud	Parkstone Bay	Cobalt-60	5.4	2.1	3.2	2.0	1.4
		Zinc-65				< 0.79	< 0.55
		Caesium-137	2.6	0.75	1.6	1.3	1.2
		Europium-155	2.1			1.2	< 1.1
		Plutonium-238	0.13	0.063	0.075	0.067	0.066
		Plutonium-239+240	0.66	0.32	0.37	0.35	0.34
		Americium-241	0.49	0.25	0.31	0.29	0.30
		Curium-243+244	0.0084	0.0025	0.0036	0.0039	0.0046
Mud And Sand	Kimmeridge[2]	Gamma dose	0.059	0.070	0.064	0.072	0.058

* Wet concentrations except for sediments where dry concentrations apply

1 Cod in 1997

2 Parkstone Bay in 1998

WINFRITH: Gaseous discharges and related environmental data 1994-1998

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	**1995**	**1996**	**1997**	**1998**
Gaseous waste		Alpha	$1.2\ 10^{-10}$	$6.0\ 10^{-9}$	$4.08\ 10^{-10}$	$6.76\ 10^{-9}$	$2.1\ 10^{-9}$
		Beta	$2.2\ 10^{-8}$	$1.8\ 10^{-8}$	$9.24\ 10^{-9}$		$3.0\ 10^{-9}$
		Tritium	11	12	0.960	0.366	0.350
		Carbon-14	$1.9\ 10^{-3}$	$4.8\ 10^{-4}$	$5.8\ 10^{-4}$	$6.90\ 10^{-4}$	$6.6\ 10^{-4}$
		Krypton-85	$2.1\ 10^{-3}$	0.061		$4.20\ 10^{-4}$	
Milk	Near farms	Tritium	< 10	< 10	< 2.9	< 3.1	< 2.7
		Carbon-14	19	17	16		
	Max	Tritium	< 10	< 10	< 3.0	< 3.3	< 2.8
		Carbon-14	21	19	18		
	Far farms	Tritium	< 10	< 10	< 3.0		
		Carbon-14	19	16	18		
Apples		Tritium	< 10	< 10	< 3.0	< 3.0	< 3.0
		Carbon-14	22	15	11		
Cabbage		Tritium	< 10	< 10	< 3.0	< 3.0	< 3.0
		Carbon-14	< 15	< 15	< 6.0		
Potatoes		Tritium	14	< 10	< 3.0	< 3.0	
		Carbon-14	25	22	26		

WINFRITH: Gaseous discharges and related environmental data 1994-1998 (cont.)

Material	Location	Radionuclide	Discharge, TBq, concentration of activity, Bq kg^{-1}*				
			1994	**1995**	**1996**	**1997**	**1998**
Raspberries[1]		Tritium	12	< 10	< 3.0	< 4.0	< 3.0
		Carbon-14	18	15	9.0		

* Bq l^{-1} for milk

1 Strawberries in 1994

WYLFA: Liquid discharges and related environmental data 1994-1998

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1}* or gamma dose rate, μGy h^{-1}				
			1994	**1995**	**1996**	**1997**	**1998**
Liquid waste		Tritium	6.98	7.56	9.88	7.02	9.64
		Other Radionuclides	0.0539	0.0528	0.0611	0.0461	0.0701
Plaice	Pipeline	Carbon-14	41	31	48	39	52
		Caesium-137	2.8	1.8	2.0	0.95	1.3
Crabs[1]	Pipeline	Cobalt-60		0.02		< 0.12	< 0.11
		Technetium-99	1.3	1.3	6.1	4.8	59
		Silver-110m	0.47	0.69		< 0.22	< 0.20
		Caesium-137	1.0	0.55	0.50	0.51	0.34

WYLFA: Liquid discharges and related environmental data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1}* or gamma dose rate, μGy h^{-1}				
			1994	**1995**	**1996**	**1997**	**1998**
		Plutonium-238	0.0061	0.0050	0.0027	0.0033	0.0015
		Plutonium-239+240	0.032	0.023	0.014	0.018	0.0082
		Americium-241	0.15	0.18	0.043	0.045	0.0079
		Curium-243+244	0.00025			0.000062	0.00011
Winkles	Cemaes Bay	Cobalt-60	0.12		0.19	0.20	< 0.08
		Zinc-65		0.32		< 0.14	< 0.13
		Caesium-137	1.4	1.6	0.86	1.0	0.64
		Plutonium-238	0.050	0.060	0.035	0.040	0.025
		Plutonium-239+240	0.27	0.32	0.19	0.22	0.14
		Plutonium-241	3.1	4.4	2.0	2.5	1.4
		Americium-241	0.40	0.41	0.26	0.25	0.19
		Curium-242				0.00088	0.00053
		Curium-243+244	0.00055	0.0011	0.00049	0.00056	0.00035
Mud	Cemlyn Bay	Cobalt-60	1.5		0.37	< 0.80	< 0.51
		Caesium-134	1.4			< 0.75	< 0.63
		Caesium-137	220	180	150	170	160
		Europium-155	1.6		1.2	< 1.3	< 2.0
		Plutonium-238	5.9	4.2	4.0	4.1	3.9
		Plutonium-239+240	30	23	22	23	22
		Americium-241	46	33	31	32	31
		Curium-242	0.10				
		Curium-243+244	0.11	0.061	0.067	0.035	0.052

WYLFA: Liquid discharges and related environmental data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq, concentration of activity, Bq kg^{-1}* or gamma dose rate, μGy h^{-1}				
			1994	**1995**	**1996**	**1997**	**1998**
Sand	Cemaes Bay	Gamma dose	0.057	0.053	0.053	0.053	0.051
Mud	Cemlyn Bay	Gamma dose	0.083	0.078	0.082	0.078	0.073

* Wet concentrations except for sediments where dry concentrations apply

1 Lobsters in 1998

WYLFA: Gaseous discharges and related environmental data 1994-1998

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq; concentration of activity, Bq kg^{-1}*				
			1994	**1995**	**1996**	**1997**	**1998**
Gaseous waste		Beta	1.1 10^{-4}	9.99 10^{-5}	8.71 10^{-5}	7.35 10^{-5}	6.35 10^{-5}
		Tritium	15	10.3	6.70	5.29	8.25
		Carbon-14	1.1	1.15	1.24	1.33	1.47
		Sulphur-35	0.25	0.259	0.20	0.21	0.30
		Argon-41	35	19.2	43.9	51.4	60.6
Milk	Near farms	Tritium	< 10	< 10	< 3.1	< 3.1	< 3.0
		Carbon-14	20	< 17	14	16	16
		Sulphur-35	< 1.0	< 1.1	< 0.71	0.69	< 0.60

WYLFA: Gaseous discharges and related environmental data 1994-1998 (cont.)

Material or ground type	Location	Radionuclide or dose measurement	Discharge, TBq; concentration of activity, Bq kg^{-1}*				
			1994	1995	1996	1997	1998
	Max	Tritium	< 10	< 10	< 3.5	< 3.5	< 3.80
		Carbon-14	20	19	15	17	22
		Sulphur-35	< 1.5	< 1.3	< 0.98	0.78	< 0.78
	Far farms	Tritium	< 10	< 10	< 3.0		
		Carbon-14	18	17	16		
		Sulphur-35	< 1.0	< 1.0	0.40		
Apples		Tritium	< 10	< 10	< 3.0	< 3.0	3.0
		Carbon-14	14	18	14	11	14
		Sulphur-35	< 1.0	< 1.0	0.30	0.60	0.40
Blackberries		Tritium	26	< 10	3.0	< 3.0	< 3.0
		Carbon-14	19	13	23	22	24
		Sulphur-35	< 1.0	< 1.0	4.5	4.0	8.0
Potatoes		Tritium	< 10	< 10	< 3.0	< 3.0	< 3.0
		Carbon-14	18	23	18	23	22
		Sulphur-35	< 1.0	< 1.0	0.80	0.40	< 0.30

* Bq l^{-1} for milk

APPENDIX 3

Radiation doses from terrestrial food pathways and aquatic pathways for 1994-1998 by site.

ALDERMASTON: Radiation doses from aquatic pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
H-3					5.04E-06
Co-57				1.54E-07	1.70E-07
Co-60	3.27E-06	6.18E-06			
Zn-65					2.26E-06
Cs-137	1.41E-05	8.08E-06	7.02E-06	2.10E-06	2.76E-06
Eu-155	5.58E-07	6.17E-08		5.15E-07	
Pu-238		1.96E-08	8.97E-09		1.22E-07
Pu-239+240	1.38E-08	9.75E-08	4.25E-08	1.03E-08	6.50E-07
Am-241	1.94E-08	7.20E-08	5.40E-08	1.38E-07	9.80E-07
Cm-243					1.50E-09
Total	**1.80E-05**	**1.45E-05**	**7.13E-06**	**2.92E-06**	**1.20E-05**

ALDERMASTON: Radiation doses from terrestrial pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
U-235				5.17E-07	
Am-241	3.63E-05	2.85E-05	2.26E-05	8.46E-05	4.85E-05
H-3	5.60E-05	2.64E-05	1.65E-05	1.78E-05	
U-234	4.08E-03	1.12E-03	1.27E-03	2.37E-03	5.08E-03
U-238				6.29E-06	
Pu-238		2.88E-05	9.13E-06	1.61E-05	1.55E-05
Pu-239+240	7.04E-05	2.76E-04	3.16E-05	4.53E-05	5.94E-05
OT-3		3.84E-04			4.00E-05
Totals	**4.25E-03**	**1.87E-03**	**1.35E-03**	**2.54E-03**	**5.24E-03**

AMERSHAM: Radiation doses from aquatic pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
H-3					5.46E-06
C-14	2.38E-05	1.10E-05	2.78E-06		3.48E-07
S-35	2.38E-05	2.39E-05	2.39E-05		
Co-57	1.30E-05	2.50E-05	1.47E-08	7.82E-06	5.40E-06
Co-58	2.90E-05	5.26E-05		2.15E-05	
Co-60		2.45E-05			
Zn-65	2.44E-05	7.01E-05		6.26E-05	3.86E-05
Cs-134	1.52E-06		1.52E-06	2.07E-05	
Cs-137	9.40E-05	9.58E-05	3.12E-06	2.59E-04	1.62E-04
Eu-155	1.98E-06			2.77E-06	1.99E-06
Am-241				1.04E-05	2.23E-05
Total	**2.12E-04**	**3.03E-04**	**3.13E-05**	**3.85E-04**	**2.36E-04**

AMERSHAM: Radiation doses from terrestrial pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
S-35		1.96E-03	1.07E-03	1.12E-03	1.05E-03
I-131		5.76E-03	2.13E-03	2.25E-03	2.42E-03
H-3	1.54E-04	2.04E-05	5.46E-05	6.55E-05	
Se-75	1.88E-03	1.88E-03	2.02E-03	2.45E-03	2.77E-03
I-125	1.57E-03	1.34E-03	9.56E-04	7.40E-04	9.78E-04
OT-3	6.54E-05	3.84E-04			1.32E-04
Totals	**3.67E-03**	**1.14E-02**	**6.23E-03**	**6.62E-03**	**7.35E-03**

BARROW: Radiation doses from aquatic pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
Gamma Dose	3.0E-02	2.3E-02	2.2E-02	2.3E-02	2.5E-02
Total	**3.0E-02**	**2.3E-02**	**2.2E-02**	**2.3E-02**	**2.5E-02**

BERKELEY & OLDBURY: Radiation doses from aquatic pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
H-3				6.85E-03	4.42E-03
C-14	2.34E-03	2.09E-03	2.74E-03	2.45E-03	1.78E-03
Co-60	6.78E-05				
Cs-134	7.49E-05			4.11E-05	3.65E-05
Cs-137	2.36E-03	1.11E-04	1.16E-04	7.59E-05	8.54E-05
Eu-155	1.20E-05			1.07E-06	1.54E-06
Pu-238	4.06E-07	2.03E-07	6.09E-07	4.51E-07	1.69E-07
Pu-239+240	2.57E-06	1.23E-06	3.31E-06	2.94E-06	9.43E-07
Am-241	3.83E-06	9.80E-07	4.31E-06	5.12E-04	7.15E-04
Cm-243	2.13E-08	6.62E-09	2.21E-08	3.53E-08	1.32E-08
Gamma Dose	1.98E-03	7.50E-03	4.75E-03	3.83E-03	1.87E-03
Total	**6.84E-03**	**9.70E-03**	**7.61E-03**	**1.38E-02**	**8.91E-03**

BERKELEY & OLDBURY: Radiation doses from terrestrial pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
S-35	2.03E-03	2.05E-03	1.40E-03	1.13E-03	1.73E-03
C-14	6.18E-03	1.52E-03	7.68E-05	7.07E-04	2.36E-03
H-3		2.86E-05	5.17E-05	7.12E-05	
OT-3	4.51E-04	3.84E-04			1.86E-04
Totals	**8.66E-03**	**3.98E-03**	**1.53E-03**	**1.91E-03**	**4.27E-03**

BRADWELL: Radiation doses from aquatic pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
C-14	5.57E-04				
Co-60	1.12E-03	1.54E-03	6.51E-04	8.40E-04	4.90E-04
Zn-65			2.87E-05	1.08E-04	1.03E-04
Cs-134	1.48E-03	1.32E-03	1.25E-03	1.65E-03	1.24E-03
Cs-137	8.77E-03	7.45E-03	7.44E-03	7.76E-03	6.91E-03
Eu-155	2.45E-05	1.75E-05	1.28E-05	2.26E-05	
Pu-238	8.63E-08				
Pu-239+240	4.50E-07				
Am-241	1.23E-06	4.04E-06		2.00E-03	2.72E-03
Cm-243	6.75E-08				
Total	**1.20E-02**	**1.03E-02**	**9.39E-03**	**1.24E-02**	**1.15E-02**

BRADWELL: Radiation doses from terrestrial pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
S-35	2.08E-03	2.24E-03	9.55E-04	1.81E-03	9.00E-04
C-14	3.72E-04	1.23E-03	1.76E-04	4.39E-03	1.62E-04
H-3	2.27E-05	2.65E-05	5.26E-05	5.40E-05	
OT-3		3.84E-04			1.29E-04
Totals	**2.47E-03**	**3.88E-03**	**2.14E-03**	**6.26E-03**	**1.19E-03**

CAPENHURST: Radiation doses from aquatic pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
H-3		3.68E-05	3.68E-05	1.68E-05	1.16E-06
Co-60					1.02E-06
Tc-99	1.76E-06	1.21E-05	3.47E-06	1.50E-06	3.25E-06
Cs-137	5.20E-07	3.06E-07	4.03E-07	3.25E-06	4.49E-06
Eu-155			9.60E-10		
Th-234	2.72E-06	2.76E-06	2.17E-06	3.23E-06	8.42E-06
U-234	3.06E-05	4.97E-05	4.90E-05	2.54E-05	2.83E-05
U-235+236	2.00E-06	3.28E-06	2.93E-06	1.26E-06	1.55E-06
U-238	1.94E-05	4.36E-05	3.55E-05	1.66E-05	2.20E-05
Pa-233	1.04E-07	1.54E-07	1.58E-07	1.72E-07	1.72E-06
Np-237	1.46E-05	7.48E-06	1.66E-05	6.30E-06	1.28E-05
Am-241				1.06E-04	1.41E-04
Total	**7.17E-05**	**1.56E-04**	**1.47E-04**	**1.80E-04**	**2.26E-04**

CAPENHURST: Radiation doses from terrestrial pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
Tc-99		2.10E-05	2.26E-05	4.69E-05	9.84E-06
U-235				7.80E-06	1.27E-05
U-234	3.41E-04	1.30E-03	3.89E-04	1.31E-02	3.87E-03
U-238				2.47E-04	3.70E-04
OT-3					3.19E-05
Totals	**3.41E-04**	**1.32E-03**	**4.12E-04**	**1.34E-02**	**4.29E-03**

CARDIFF: Radiation doses from aquatic pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
H-3	3.18E-02	2.23E-02	3.18E-02	2.23E-02	4.16E-02
C-14	1.14E-02	1.10E-02	1.08E-02	8.44E-03	1.37E-02
Cs-134	5.78E-05				4.04E-05
Cs-137	1.20E-03	1.69E-04	1.52E-04	1.08E-03	1.43E-04
Eu-154	8.64E-05				
Eu-155					1.64E-06
Gamma Dose		5.53E-04	5.53E-04		1.12E-03
Total	**4.45E-02**	**3.41E-02**	**4.32E-02**	**3.19E-02**	**5.66E-02**

CARDIFF: Radiation doses from terrestrial pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
S-35	1.80E-03	2.25E-03	1.55E-03	1.75E-03	1.29E-03
C-14	1.62E-02	9.96E-03	4.27E-03	1.23E-02	5.70E-03
H-3	7.18E-05				
P-32	1.22E-02	4.56E-03	2.92E-03	2.61E-03	2.74E-03
Ca-45	4.34E-03	3.68E-03	1.04E-03	6.07E-04	1.19E-03
Co-57	1.65E-04	1.20E-04	1.02E-04		
I-125	5.53E-04	1.36E-03	8.09E-04	7.83E-04	9.02E-04
OT-3	5.38E-03	4.63E-03	3.12E-03	5.07E-03	3.47E-03
Totals	**4.07E-02**	**2.66E-02**	**1.38E-02**	**2.32E-02**	**1.53E-02**

DEVONPORT: Radiation doses from aquatic pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
C-14				7.54E-06	2.90E-05
Co-60				2.43E-04	1.68E-05
Zn-65	2.54E-06				
Cs-137	1.37E-04	1.30E-04	1.40E-04	8.11E-04	6.01E-05
Eu-155				1.91E-05	4.04E-06
Pu-238				1.45E-08	
Pu-239+240				2.51E-07	
Am-241				6.08E-04	3.63E-03
Cm-243				5.58E-08	
Gamma Dose	9.35E-03	1.02E-02	3.40E-03		1.53E-02
Total	**9.49E-03**	**1.03E-02**	**3.54E-03**	**1.69E-03**	**1.90E-02**

DUNGENESS: Radiation doses from aquatic pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
H-3					4.94E-04
C-14					1.27E-03
Co-60	2.78E-03	2.38E-05	7.79E-06	3.49E-05	3.87E-05
Sr-90	2.11E-06	6.02E-06	5.16E-06	7.31E-06	7.31E-06
Cs-134	5.36E-06	1.07E-05			
Cs-137	8.43E-04	5.31E-04	7.55E-04	5.77E-04	6.25E-04
Eu-155	1.75E-05				5.10E-06
Pu-238	2.04E-06	3.22E-06	2.35E-06	2.80E-06	3.54E-06
Pu-239+240	9.64E-06	1.26E-05	1.09E-05	1.09E-05	1.37E-05
Am-241	1.05E-05	1.37E-05	7.00E-06	2.55E-03	2.71E-03
Cm-242		3.36E-09		3.86E-09	3.53E-08

DUNGENESS: Radiation doses from aquatic pathways 1994-1998 (mSv/y) (Cont.)

	1994	1995	1996	1997	1998
Cm-243	1.54E-06	1.24E-06	5.04E-07	4.83E-07	9.45E-07
Gamma Dose		6.80E-03	5.10E-03	4.25E-03	8.50E-03
Total	**3.68E-03**	**7.40E-03**	**5.89E-03**	**7.43E-03**	**1.37E-02**

DUNGENESS: Radiation doses from terrestrial pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
S-35	2.07E-03	1.96E-03	1.15E-03	2.88E-04	1.69E-04
Sr-90	6.60E-05	3.88E-04	1.28E-04	2.09E-05	
I-131	1.15E-02	5.76E-03	1.27E-03		
Cs-137	1.68E-03	1.29E-03	1.10E-03	2.32E-03	1.97E-03
Am-241	2.74E-07	7.59E-07	4.63E-07	3.92E-06	
C-14	5.82E-03	3.13E-03	1.24E-03	2.11E-03	1.71E-03
H-3		1.66E-04	5.12E-05	2.62E-05	
Pu-238	1.44E-07	5.04E-07	4.04E-07	1.46E-06	
Pu-239+240	1.51E-07	5.29E-07	2.77E-07	2.10E-06	
OT-3	4.17E-04				4.22E-05
Totals	**2.16E-02**	**1.27E-02**	**4.94E-03**	**4.77E-03**	**3.89E-03**

HARTLEPOOL: Radiation doses from aquatic pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
C-14	1.30E-03	3.32E-04	4.22E-04	5.23E-04	1.43E-03
Co-60				1.79E-05	2.06E-05
Cs-137	4.37E-04	6.03E-04	5.34E-04	5.14E-04	5.59E-04
Eu-155				3.51E-06	
Pu-238	1.90E-05	4.01E-05	3.56E-05	4.43E-05	3.31E-05
Pu-239+240	1.14E-04	2.40E-04	2.26E-04	2.70E-04	1.98E-04
Am-241	6.23E-05	1.29E-04	1.08E-04	9.71E-04	1.57E-03
Cm-242		1.17E-08		6.26E-08	
Cm-243	1.58E-07	1.51E-07	1.27E-07	4.00E-07	1.26E-05
Gamma Dose					1.56E-03
Total	**1.93E-03**	**1.34E-03**	**1.33E-03**	**2.34E-03**	**5.38E-03**

HARTLEPOOL: Radiation doses from terrestrial pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
S-35	2.00E-03	1.90E-03	1.51E-03	8.97E-04	1.49E-03
I-131	5.76E-03	5.76E-03	1.27E-03		
Cs-137			1.93E-03		
C-14	7.83E-03	1.25E-03	9.52E-04	5.19E-03	2.01E-03
H-3		9.60E-07	5.47E-05	5.42E-05	
OT-3		4.19E-04			9.68E-05
Totals	**1.56E-02**	**9.33E-03**	**5.72E-03**	**6.14E-03**	**3.60E-03**

HARWELL: Radiation doses from aquatic pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
H-3					1.13E-05
Co-57				1.26E-08	8.40E-09
Co-60		2.41E-04		2.38E-07	1.36E-07
Zn-65					3.90E-07
Sr-90		2.55E-07	2.86E-07		
Cs-134	9.50E-07	1.58E-06	9.50E-07		5.32E-06
Cs-137	3.64E-05	2.91E-03	6.50E-05	4.68E-05	3.38E-04
Eu-155				5.12E-08	
Pu-238	2.53E-09	6.21E-09	8.97E-09		
Pu-239+240	1.28E-08	4.00E-08	5.00E-08		
Am-241	1.40E-08	7.13E-07	6.60E-08	4.80E-05	2.60E-05
Gamma Dose	8.56E-03	1.62E-02	9.12E-03	1.38E-02	1.62E-02
Total	**8.60E-03**	**1.93E-02**	**9.18E-03**	**1.39E-02**	**1.65E-02**

HARWELL: Radiation doses from terrestrial pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
H-3	1.78E-04	6.35E-05	4.80E-07	3.84E-07	
OT-3		3.84E-04	3.46E-04	1.56E-04	1.68E-04
Totals	**1.78E-04**	**4.48E-04**	**3.47E-04**	**1.57E-04**	**1.68E-04**

HEYSHAM: Radiation doses from aquatic pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
H-3					2.72E-04
C-14	2.31E-03	4.02E-03	5.36E-03	3.56E-03	3.69E-03
Co-60	2.99E-05	4.79E-05	9.19E-05	1.28E-04	1.28E-04
Sr-90	1.42E-03	5.57E-04	5.12E-04	3.52E-04	3.62E-04
Tc-99	8.88E-04	2.23E-03	3.31E-03	3.49E-03	2.17E-03
Ru-106	2.23E-04	2.46E-04	3.80E-04	9.62E-04	8.29E-04
Ag-110m	5.38E-06			6.02E-05	4.94E-05
Sb-125	8.47E-06	6.78E-06	3.87E-06		
Cs-134	6.16E-05	2.57E-05			
Cs-137	2.16E-02	1.87E-02	1.65E-02	1.35E-02	1.15E-02
Eu-154	2.64E-06	2.82E-06	4.40E-07		
Eu-155		2.82E-07	7.04E-08	8.26E-06	
Pu-238	2.13E-03	1.95E-03	2.06E-03	1.76E-03	1.90E-03
Pu-239+240	1.17E-02	1.12E-02	1.21E-02	1.07E-02	1.12E-02
Pu-241	2.90E-03	6.25E-05	2.96E-03	2.04E-03	2.68E-03
Am-241	2.14E-02	1.83E-02	2.13E-02	2.14E-02	2.25E-02
Cm-242	8.32E-07			2.52E-08	2.66E-08
Cm-243	2.34E-05	3.17E-05	3.28E-05	2.78E-05	2.27E-05
Gamma Dose	1.50E-02	1.26E-02	1.68E-02	1.53E-02	1.66E-02
Total	**7.97E-02**	**6.99E-02**	**8.14E-02**	**7.32E-02**	**7.39E-02**

HEYSHAM: Radiation doses from terrestrial pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
S-35	2.03E-03	2.00E-03	3.26E-03	1.31E-03	1.25E-03
I-131	5.76E-03	5.76E-03	1.50E-03		
Cs-137	1.33E-03	1.43E-03	1.14E-03		1.97E-03
C-14	8.03E-03	1.92E-03	6.19E-04	2.17E-04	1.76E-03
H-3		2.38E-05	7.01E-05	6.88E-05	
OT-3	4.51E-04	4.22E-04			1.94E-04
Totals	**1.76E-02**	**1.15E-02**	**6.59E-03**	**1.60E-03**	**5.17E-03**

HINKLEY: Radiation doses from aquatic pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
H-3				6.24E-03	6.97E-03
C-14	3.35E-03	2.64E-03	2.22E-03	2.22E-03	2.75E-03
S-35	7.33E-04				
Mn-54				2.00E-05	1.69E-05
Co-60		1.00E-04	9.25E-05	2.61E-04	1.08E-04
Zr-95		1.38E-05			
Ru-106			1.58E-05		
Cs-134	1.06E-04	3.36E-04	5.68E-04	4.00E-04	4.85E-04
Cs-137	6.46E-04	2.24E-03	2.17E-03	2.35E-03	2.04E-03
Eu-155		8.64E-06	3.59E-06		
Pu-238	5.23E-07	6.58E-07	7.48E-07	3.14E-07	3.74E-07
Pu-239+240	2.44E-06	2.76E-06	2.93E-06	1.63E-06	1.27E-06
Am-241	2.99E-06	2.73E-06	2.73E-06	1.25E-03	9.66E-04
Cm-242	2.26E-08	2.96E-08	1.79E-08		6.08E-09
Cm-243	2.73E-08	6.14E-08	8.29E-08	2.44E-08	4.10E-08
Gamma Dose	1.71E-02				
Total	**2.19E-02**	**5.34E-03**	**5.08E-03**	**1.27E-02**	**1.33E-02**

HINKLEY: Radiation doses from terrestrial pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
S-35	2.00E-03	5.56E-04	2.90E-03	1.56E-03	2.51E-03
I-131	5.76E-03	5.76E-03			
Cs-137			1.32E-03	1.96E-03	1.83E-03
C-14	7.01E-03	6.28E-03	2.28E-03	1.32E-03	6.31E-03
H-3			5.85E-05	5.82E-05	
OT-3	4.43E-04	4.51E-04			1.71E-04
Totals	**1.52E-02**	**1.30E-02**	**6.56E-03**	**4.90E-03**	**1.08E-02**

SELLAFIELD: Radiation doses from aquatic pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
H-3					2.65E-05
C-14	2.47E-03	2.84E-03	3.87E-03	3.47E-03	5.82E-03
Co-60	9.59E-05	2.53E-04	3.48E-04	2.50E-04	1.02E-03
Zn-65	3.34E-08		1.34E-07		
Sr-90	2.27E-03	3.21E-03	2.09E-03	1.14E-03	3.27E-03
Zr-95	2.12E-05	1.50E-06	4.99E-06	6.67E-05	4.59E-05
Nb-95	8.40E-06	1.02E-06	3.38E-06	2.59E-05	2.13E-05
Tc-99	7.26E-03	1.78E-02	4.16E-02	5.29E-02	2.34E-02
Ru-103	5.05E-07	5.84E-07	1.97E-06		
Ru-106	2.82E-03	3.16E-03	4.73E-03	1.35E-03	5.73E-03
Ag-110m	1.51E-03	7.19E-04	5.94E-04	2.65E-04	5.73E-04
Sb-125	2.72E-05	3.24E-05	2.32E-05	1.16E-05	2.66E-05
I-129					1.37E-03
Cs-134	2.90E-05	1.73E-05	1.07E-05	1.86E-04	1.93E-04
Cs-137	6.58E-03	6.82E-03	5.41E-03	5.53E-03	8.03E-03
Ce-144	4.59E-05	7.41E-05	5.57E-05	2.43E-04	2.97E-04
Pm-147	1.08E-05	6.05E-06	6.67E-06	3.55E-06	6.90E-06
Eu-154	4.82E-06	1.16E-05	1.07E-05	1.80E-05	2.95E-05
Eu-155	3.12E-07	6.01E-07	3.79E-07		3.60E-06
Np-237	3.31E-04	7.99E-05	7.99E-05	6.61E-05	5.27E-05
Pu-238	3.23E-03	5.26E-03	4.88E-03	1.79E-03	6.56E-03
Pu-239+240	1.60E-02	2.72E-02	2.56E-02	9.33E-03	3.43E-02
Pu-241	4.44E-03	6.93E-03	6.42E-03	2.43E-03	7.59E-03
Am-241	3.06E-02	4.48E-02	4.41E-02	2.12E-02	6.02E-02
Cm-242	2.64E-06	7.78E-06	1.35E-07	9.65E-07	5.04E-06
Cm-243	9.33E-05	1.05E-04	8.61E-05	4.35E-05	1.28E-04
Gamma Dose					3.70E-02
Total	**7.78E-02**	**1.19E-01**	**1.40E-01**	**1.00E-01**	**1.96E-01**

SELLAFIELD: Radiation doses from terrestrial pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
S-35	1.07E-02	1.65E-02	7.21E-03	5.11E-03	4.32E-03
Co-60	5.60E-03	3.56E-03	3.42E-03	3.55E-03	4.68E-03
Sr-90	2.01E-02	2.22E-02	1.32E-02	1.43E-02	1.10E-02
Tc-99		7.85E-05	1.72E-05	1.47E-05	
Ru-106	4.77E-03	8.42E-03	7.89E-03	1.09E-02	1.06E-02
I-129	2.66E-03	2.20E-03	4.94E-03	2.25E-03	2.09E-03
I-131	5.76E-03	5.76E-03	2.13E-03	2.02E-03	1.84E-03
Cs-134		1.95E-03	1.18E-03		
Cs-137	2.67E-03	3.50E-03	3.11E-03	1.93E-03	1.56E-03
Ce-144		2.68E-04	3.87E-03	5.41E-05	
U-235				3.90E-07	
Pu-241	2.54E-05	2.32E-04	2.67E-04	4.44E-05	5.67E-05
Am-241	1.02E-04	1.14E-04	2.23E-04	1.58E-04	1.38E-04
C-14	1.31E-02	1.13E-02	4.68E-03	1.82E-03	3.11E-03
H-3	3.33E-04	4.83E-05	8.64E-07	3.84E-07	
S125	1.42E-04	1.35E-03	1.49E-03	1.58E-03	2.15E-03
U-234		4.65E-05	2.51E-05	2.83E-05	2.15E-05
U-238				7.98E-07	
Pu-238	3.92E-05	4.57E-05	6.81E-05	6.57E-05	9.70E-05
Pu-239+240	3.31E-04	2.87E-04	7.54E-04	1.86E-04	1.87E-04
OT-3		4.99E-04	7.44E-04	3.13E-04	4.95E-04
Totals	**6.63E-02**	**7.84E-02**	**5.52E-02**	**4.43E-02**	**4.24E-02**

SIZEWELL: Radiation doses from aquatic pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
H-3					3.58E-04
C-14			3.70E-04	2.12E-04	6.93E-04
Co-58		2.10E-06	3.66E-07		
Co-60	1.81E-04	2.33E-04	8.99E-05	1.34E-04	1.70E-04
Zn-65		1.93E-06	1.19E-06	4.28E-05	
Cs-134			2.53E-05		
Cs-137	6.52E-04	7.34E-04	9.60E-04	7.81E-04	6.40E-04
Eu-155	2.88E-06	1.26E-06	3.08E-06		
Pu-238	3.49E-07	3.80E-07	1.86E-07	3.49E-07	1.46E-06
Pu-239+240	1.82E-06	2.31E-06	1.08E-06	1.98E-06	8.75E-06
Am-241	2.24E-06	3.30E-06	1.33E-06	5.54E-04	1.32E-03
Cm-242				1.90E-09	
Cm-243	3.86E-08	2.97E-08	3.56E-08	4.06E-08	4.85E-08
Total	**8.41E-04**	**9.78E-04**	**1.45E-03**	**1.73E-03**	**3.19E-03**

SIZEWELL: Radiation doses from terrestrial pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
S-35	2.03E-03	2.05E-03	8.75E-04	7.78E-04	1.67E-03
Co-60		2.61E-03			
Sr-90					1.14E-04
Cs-137	1.32E-03	1.17E-03	1.31E-03		2.13E-03
Am-241					6.81E-06
C-14	7.73E-03	1.33E-03	4.10E-04	2.77E-03	4.69E-03
H-3		2.86E-05	6.69E-05	5.46E-05	
Pu-238					2.38E-06
Pu-239+240					2.35E-06
OT-3	4.67E-04	3.84E-04			1.49E-04
Total	**1.16E-02**	**7.57E-03**	**2.66E-03**	**3.60E-03**	**8.77E-03**

SPRINGFIELDS: Radiation doses from aquatic pathways 1994-1998 (mSv/y)

Boat dwellers

	1994	1995	1996	1997	1998
Gamma Dose	1.40E-01	9.10E-02	1.40E-01	1.30E-01	1.50E-01
Total	**1.40E-01**	**9.10E-02**	**1.40E-01**	**1.30E-01**	**1.50E-01**

Fish eaters

	1994	1995	1996	1997	1998
C-14			2.63E-03	1.64E-03	1.10E-03
Co-60			3.37E-06	4.71E-04	3.80E-04
Tc-99			2.47E-04	2.31E-04	5.88E-05
Sb-125				1.28E-04	
Cs-134				2.76E-04	
Cs-137			9.10E-03	1.70E-02	1.07E-02
Eu-155				2.37E-05	
Ra-226			1.44E-03	1.34E-02	6.65E-03
Th-228				6.48E-03	4.87E-03
Th-230			1.19E-03	3.56E-04	4.72E-04
Th-232			5.25E-04	1.66E-04	2.01E-04
Th-234			1.70E-03	7.06E-03	3.24E-03
Np-237			3.38E-05	1.28E-05	
Pu-238			2.48E-04	1.61E-04	2.89E-04
Pu-239+240			2.30E-03	1.20E-03	1.64E-03
Pu-241			2.69E-04	1.71E-04	
Am-241			3.34E-03	3.07E-03	5.46E-03
Cm-243				3.06E-06	5.32E-06
Total			**2.30E-02**	**5.19E-02**	**3.51E-02**

SPRINGFIELDS: Radiation doses from terrestrial pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
Sr-90		2.65E-03	7.76E-03	5.08E-04	1.02E-03
I-129		9.33E-04	1.35E-03		
Cs-137		6.62E-04	5.49E-04	1.14E-03	1.40E-03
Pu-241		6.71E-05	1.40E-04	6.08E-05	
Am-241		1.70E-05	5.60E-05	2.39E-05	9.83E-05
C-14			1.32E-05	3.65E-05	1.03E-04
H-3			9.37E-06	8.75E-06	
Th-232		2.44E-03	4.55E-03	9.60E-04	2.07E-03
U-234	2.41E-04	5.21E-05	5.29E-05	3.07E-05	2.93E-05
Pu-238		9.30E-06	1.35E-05	7.68E-06	1.95E-05
Pu-239+240		1.63E-05	4.71E-05	1.24E-05	7.93E-05
OT-3					2.13E-05
Totals	**2.41E-04**	**6.85E-03**	**1.45E-02**	**2.79E-03**	**4.84E-03**

TRAWSFYNYDD: Radiation doses from aquatic pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
C-14	2.29E-04	6.02E-05	2.60E-04	1.31E-04	3.16E-04
S-35	5.71E-04				
Co-60				1.03E-05	1.15E-05
Zn-65					
Se-75					
Sr-90	1.70E-03	1.02E-03	1.28E-03	3.09E-04	2.23E-04
Ru-106				2.49E-04	
Sb-125				1.11E-05	1.07E-05
Cs-134		8.53E-04	1.12E-03	3.91E-04	1.99E-04
Cs-137		9.10E-03	1.68E-02	8.11E-03	5.81E-03
Ce-144				9.88E-05	
Eu-154				1.81E-05	2.07E-05
Eu-155				2.22E-06	3.01E-06
Pu-238	3.99E-07	4.86E-07	7.99E-07	6.80E-08	1.59E-07
Pu-239+240	9.66E-07	1.90E-06	3.52E-06	2.15E-07	4.51E-07
Am-241	1.70E-06	2.76E-06	5.22E-06	5.72E-04	1.81E-03
Cm-242	1.01E-09	1.00E-10			
Cm-243	1.07E-07	4.22E-08	1.24E-08	9.98E-09	5.46E-09
Gamma Dose	9.35E-03	2.30E-02	2.30E-02	1.30E-02	1.50E-02
Total	**1.19E-02**	**3.40E-02**	**4.24E-02**	**2.29E-02**	**2.34E-02**

TRAWSFYNYDD: Radiation doses from terrestrial pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
S-35	1.62E-04	2.41E-04	2.99E-04	2.78E-05	5.70E-05
Sr-90		7.79E-04	2.03E-03	6.52E-04	2.84E-03
Cs-137	8.24E-03	1.17E-02	3.25E-03	5.11E-03	3.38E-03
Pu-241		4.56E-05	9.61E-05		
Am-241		1.45E-05	1.91E-05	1.37E-05	7.33E-06
C-14	8.06E-04	4.97E-04	1.00E-04	7.19E-05	9.18E-05
H-3		2.31E-05	1.99E-05	1.99E-05	
Pu-238		9.36E-06	1.47E-05	3.20E-06	3.68E-06
Pu-239+240		2.67E-05	3.27E-05	1.05E-05	7.74E-06
OT-3	8.63E-05	3.99E-05			4.45E-05
Totals	**9.29E-03**	**1.34E-02**	**5.86E-03**	**5.91E-03**	**6.43E-03**

WINFRITH: Radiation doses from aquatic pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
C-14	8.24E-04	3.13E-04	3.13E-04		
Co-60	3.40E-04	3.54E-04	3.96E-04	1.48E-04	1.64E-04
Zn-65	4.26E-05			1.31E-04	9.64E-05
Cs-137	3.00E-04	2.90E-04	6.71E-04	3.77E-04	3.64E-04
Eu-155				7.18E-06	
Pu-238	5.20E-06	1.17E-05	1.35E-05	5.80E-06	5.35E-06
Pu-239+240	2.83E-05	5.95E-05	5.69E-05	2.92E-05	3.13E-05
Am-241	2.18E-05	6.24E-05	6.66E-05	1.80E-03	2.49E-03
Cm-243	5.85E-07	5.85E-07	1.95E-06	5.03E-07	4.93E-07
Total	**1.56E-03**	**1.09E-03**	**1.52E-03**	**2.50E-03**	**3.15E-03**

WINFRITH: Radiation doses from terrestrial pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
Cs-137		1.44E-05		2.38E-03	1.79E-03
C-14	5.41E-03	8.87E-04	2.06E-04		
H-3	1.85E-04	2.66E-05		1.44E-07	
OT-3		3.84E-04	1.34E-04	5.70E-05	1.32E-04
Total	**5.59E-03**	**1.31E-03**	**3.41E-04**	**2.44E-03**	**1.92E-03**

WYLFA: Radiation doses from aquatic pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
C-14	1.45E-03	2.20E-04	1.62E-03	9.03E-04	1.96E-03
Co-60	7.34E-07	1.33E-06	1.16E-06	3.30E-05	
Zn-65		2.25E-06			
Tc-99	1.91E-05	1.91E-05	1.34E-04	1.15E-04	7.77E-05
Ag-110m	3.03E-05	4.44E-05			
Cs-137	3.75E-03	2.40E-03	2.61E-03	1.34E-03	1.71E-03
Pu-238	4.77E-05	5.13E-05	2.88E-05	3.40E-05	1.83E-05
Pu-239+240	3.06E-04	2.76E-04	1.66E-04	2.03E-04	1.10E-04
Pu-241	2.68E-05	3.80E-05	1.73E-05	2.16E-05	1.21E-05
Am-241	8.34E-04	9.76E-04	2.91E-04	2.74E-03	5.93E-03
Cm-242				1.90E-08	1.14E-08
Cm-243	1.01E-06	2.97E-07	1.32E-07	3.65E-07	4.74E-07
Gamma Dose	2.20E-03	9.44E-04	9.44E-04	9.44E-04	3.15E-04
Total	**8.67E-03**	**4.97E-03**	**5.82E-03**	**6.33E-03**	**1.01E-02**

WYLFA: Radiation doses from terrestrial pathways 1994-1998 (mSv/y)

	1994	1995	1996	1997	1998
S-35	2.11E-03	2.56E-03	1.85E-03	1.54E-03	1.56E-03
Cs-137	2.09E-03	2.25E-03		2.00E-03	
C-14	5.29E-03	1.07E-03	2.69E-04	7.52E-05	2.39E-03
H-3		2.57E-05	6.20E-05	6.20E-05	
OT-3	4.29E-04	3.84E-04			1.68E-04
Total	**9.91E-03**	**6.29E-03**	**2.18E-03**	**3.68E-03**	**4.11E-03**

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