

ERRATA

Corrections to published RIFE reports

RIFE 26, 2020

Page 33

The paragraph should read:

“During the first pandemic lockdown period (March 2020 to July 2020), there were no operations carried out at Magnox sites and discharge monitoring was suspended with agreement from the Environment Agency in accordance with published COVID-19 regulatory positions statements, which are available on the [www.gov.uk](https://www.gov.uk/government/collections/covid-19-regulatory-position-statements) website: <https://www.gov.uk/government/collections/covid-19-regulatory-position-statements>. Assessments of discharges were made once the sites returned to operations and all discharge reporting completed by September 2020.”

Table 2.16, page 133

Ravenglass. These are small changes to the Ravenglass estuary marsh users dose as shown below. These apply to the relevant points of text and tables (1.4).

Individual radiation exposures, Sellafield, 2020			
Representative person ^a	Exposure, mSv per year		
	Total	External radiation from intertidal areas, river banks or fishing gear	Intakes of sediment and water
Ravenglass Estuary, marsh users	0.018	0.014	<0.005

Table 3.6(a), page 177

The concentration of ²⁴¹Am in Largs Scallops should read 0.0059 Bq kg⁻¹

Figure 4.1, page 197

The figure caption is incorrect, it should read “‘Total dose’ at research establishments, 2009–2020....”

Figure 4.6 – page 208

The figure and caption are incorrect. Sediment monitoring ceased at the end of 2019, the correct figure and caption is replicated below.

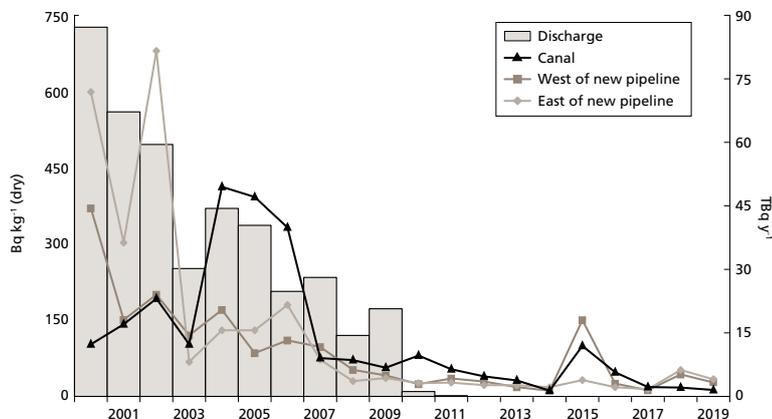


Figure 4.6. Tritium liquid discharge from Cardiff and mean concentrations in sediment near Cardiff, 2000-2019

Section 6.7, page 254

Due to the December 2020 SEPA Cyber-attack, the non-nuclear discharge data for 2020 were not published in RIFE 26, these data are presented below.

Data for Scotland are presented (in the tables below) in terms of OSPAR regions (Zone II represents the Greater North Sea and Zone III the Celtic Sea). This change in format allows easier trend analysis to be performed for OSPAR. The data are grouped according to the main industries giving rise to such wastes in the UK and exclude information for other industries considered in other sections of this report, principally the nuclear sector. The main industries are:

- Oil and gas (off and onshore)
- Education (Universities and Colleges)
- Hospitals
- Other (research, manufacturing and public sector)

Discharges of gaseous radioactive wastes from non-nuclear establishments in Scotland by OSPAR region, 2020

	Discharges during 2020, Bq					
	OSPAR Region II - Greater North Sea			OSPAR Region III - Celtic Seas		
	Education (Universities and Colleges)	Hospitals	Other (Research, manufacturing and public sector)	Education (Universities and Colleges)	Hospitals	Other (Research, manufacturing and public sector)
¹⁴ C	5.2E+06	Nil	1.1E+04	Nil	2.1E+06	Nil
¹⁸ F	Nil	Nil	Nil	Nil	6.0E+09	Nil
Group of Two or More Specified Radionuclides	3.0E+09	5.3E+10	Nil	Nil	Nil	3.2E+04
Other Beta/Gamma	2.7E+11	Nil	Nil	4.8E+04	Nil	5.9E+01
Other Radionuclides Not Listed	6.1E+08	Nil	Nil	Nil	3.7E+10	Nil

^a Excludes nuclear power and defence industries. Excludes discharges which are exempt from reporting.

Nil discharges were reported for ³H, ⁸⁵Kr, ¹²⁵I, ¹³¹I, ¹³³Xe, ¹³⁷Cs and Other Alpha in all sectors and OSPAR regions. These radionuclides have been omitted for clarity.

Section 6.7, page 254

Table 6.10 Discharges of liquid radioactive waste from non-nuclear establishments in Scotland by OSPAR region, 2020a Errata

	Discharges during 2020, Bq						
	OSPAR Region II - Greater North Sea				OSPAR Region III - Celtic Seas		
	Education (Universities and Colleges)	Hospitals	Other (Research, manufacturing and public sector)	Oil and gas (on-shore)	Education (Universities and Colleges)	Hospitals	Other (Research, manufacturing and public sector)
³ H	2.0E+08	Nil	2.5E+08	Nil	1.4E+08	Nil	2.8E+08
¹⁴ C	4.7E+07	Nil	5.0E+09	Nil	Nil	4.0E+06	Nil
¹⁸ F	Nil	1.12E+11	Nil	Nil	Nil	2.6E+11	Nil
²² Na	1.0E+06	Nil	Nil	Nil	Nil	Nil	Nil
³² P	2.7E+08	Nil	1.9E+06	Nil	3.9E+07	Nil	3.5E+08
³³ P	1.4E+09	Nil	Nil	Nil	Nil	Nil	Nil
³⁵ S	6.1E+08	Nil	Nil	Nil	1.3E+09	Nil	Nil
⁶⁷ Ga	Nil	Nil	Nil	Nil	Nil	9.6E+07	Nil
⁷⁵ Se	Nil	5.8E+07	Nil	Nil	Nil	1.3E+07	Nil
⁸⁹ Sr	Nil	Nil	Nil	Nil	Nil	Nil	Nil
⁹⁰ Y	Nil	7.7E+07	Nil	Nil	Nil	5.4E+08	Nil
^{99m} Tc	1.0E+08	2.7E+12	Nil	Nil	Nil	1.8E+12	6.6E+07
¹¹¹ In	Nil	5.3E+09	Nil	Nil	Nil	1.8E+09	Nil
¹²³ I	Nil	3.6E+10	Nil	Nil	Nil	2.7E+10	Nil
¹²⁵ I	1.0E+06	9.9E+06	Nil	Nil	Nil	1.7E+07	Nil
¹³¹ I	3.0E+09	2.2E+11	Nil	Nil	Nil	2.6E+11	Nil
¹⁵³ Sm	Nil	Nil	Nil	Nil	Nil	1.3E+07	Nil
²⁰¹ Tl	Nil	Nil	Nil	Nil	Nil	4.0E+09	Nil
²¹⁰ Pb	Nil	Nil	2.4E+05	3.5E+08	Nil	Nil	Nil
²¹⁰ Po	Nil	Nil	4.4E+05	3.5E+08	Nil	Nil	Nil
²²⁶ Ra	Nil	Nil	1.7E+05	1.3E+09	Nil	Nil	1.5E+07
²²⁸ Ra	Nil	Nil	4.0E+04	1.5E+09	Nil	Nil	2.1E+07
²³² Th	Nil	Nil	Nil	Nil	Nil	Nil	9.2E+05
Uranium Alpha	Nil	Nil	1.9E+05	Nil	Nil	Nil	Nil
Group of Two or More Specified Radionuclides	Nil	Nil	Nil	Nil	Nil	Nil	1.6E+07
Other Alpha	Nil	1.5E+08	Nil	Nil	Nil	Nil	2.1E+04
Other Beta/Gamma ^b	1.1E+11	1.0E+09	Nil	Nil	Nil	8.8E+11	1.1E+07
Other Radionuclide Not Listed	Nil	Nil	Nil	Nil	Nil	3.6E+08	Nil

^a Excludes nuclear power and defence industries. Excludes discharges which are exempt from reporting.

^b Excluding specific radionuclides

Nil discharges were reported for ⁵¹Cr, ⁵⁷Co, ⁶⁰Co, ⁸⁹Sr, ⁹⁰Sr, ¹³⁴Cs, ¹³⁷Cs, ¹⁶⁹Er, ²³⁷Np, Plutonium Alpha and ²⁴¹Am in all sectors and OSPAR regions. These radionuclides have been omitted for clarity

Table A2.1, page 316

The gaseous discharges of 'Alpha emitting radionuclides', tritium and iodine-129 from Dounreay should read 6.40E+04 Bq, 1.60E+10 Bq and 1.50E+07 Bq, respectively. The % of annual limits are unchanged.

Table A2.1

The operators on the Capenhurst site each have their own permit. The UCP permit was varied in 2018 and the UNS permit was varied in 2020. These permit variations introduced the discharge limits for the new tails facility and revised the discharge limits for UNS. The details of the revised permits (and discharges) were omitted from RIFE 26 and these are presented below. No changes to the Urenco UK Ltd permit or discharge data were made.

Table A2.1 Principal discharges of gaseous radioactive wastes from nuclear establishments in the United Kingdom, 2020

Establishment	Radioactivity	Discharge limit (annual equivalent) ^a , Bq	Discharges during 2020	
			Bq	% of annual limit ^b
Nuclear fuel production and reprocessing				
Capenhurst (Urenco	Uranium	1.00E+07	Nil	Nil
Nuclear Stewardship Ltd)	Alpha	1.00E+07	Nil	Nil
	Beta	5.00E+07	3.41E+02	<1
Capenhurst (UCP)	Uranium	7.50E+06	4.95E+03	<1
	Other Alpha	2.40E+06	Nil	Nil
	Technetium-99	1.00E+08	Nil	Nil
	Other radionuclides	7.50E+08	Nil	Nil

Table A2.4, page 325

The solid waste transfer data for Torness are incorrect. The corrected data are shown below.

Table A2.4 Solid waste transfers from nuclear establishments in Scotland, 2020

Establishment	Volume m ³	Total Activity Bq	Alpha Bq	Beta/Gamma Bq
Torness	2.47E+01		6.30E+05	1.19E+09

Page 264

The paragraph should read:

“The Government of the Isle of Man undertakes their own independent radioactivity monitoring programme and provides an indication of the far-field effects of current and historical discharges from Sellafield and other UK nuclear sites. These are reported annually: <https://www.gov.im/about-the-government/departments/environment-food-and-agriculture/regulation-directorate/government-laboratory/environmental-radioactivity/>.”

RIFE 25, 2019

Page 211, Figure 7.5

The figure caption should read “Concentrations (Bq l⁻¹) of caesium-137 in surface water from the English Channel, March-April, 2019

RIFE 24, 2018

Page 47, Figure 2.5

The 2018 ⁹⁹Tc value for Ribble Estuary Shrimp should be 0.12 Bqkg⁻¹ (incorrectly reported as 0.77 Bqkg⁻¹). This is plotted correctly in Figure 2.5, RIFE 25.

Page 57, Figure 2.11

The 2018 ⁹⁹Tc value at Bradwell should be <6.5 Bq kg⁻¹. This is plotted correctly in Figure 2.11, RIFE 25.

The 2017 and 2018 ⁹⁹Tc values for the Isle of Scilly should be 2.8 and 4.7 Bq kg⁻¹, respectively. These are plotted correctly in Figure 2.11, RIFE 25.

Further data for Isle of Scilly are presented below.

Concentrations of radionuclides in aquatic plants from the Isle of Scilly									
Year	Location	Material	No. of sampling observations	Mean radioactivity concentration (fresh), Bq kg ⁻¹					
				⁶⁰ Co	⁹⁵ Zr	⁹⁵ Nb	⁹⁹ Tc	¹⁰⁶ Ru	^{110m} Ag
2017	Isle of Scilly	Seaweed	1	<0.76	<0.86	<0.44	2.8	<4.0	<0.72
2018	Isle of Scilly	Seaweed	1	<0.55	<0.70	<0.36	4.7	<3.4	<0.53

Year	Location	Material	No. of sampling observations	Mean radioactivity concentration (fresh), Bq kg ⁻¹					
				¹²⁵ Sb	¹³⁴ Cs	¹³⁷ Cs	¹⁴⁴ Ce	¹⁵⁵ Eu	²⁴¹ Am
2017	Isle of Scilly	Seaweed	1	<2.4	<0.64	<0.50	<1.5	<0.75	<0.54
2018	Isle of Scilly	Seaweed	1	<2.1	<0.48	<0.40	<1.8	<0.84	<0.57

All measurements are made on behalf of the Environment Agency

Page 74/75, Table 2.2a

The footnotes in the table have been applied incorrectly.

Footnotes d and f should apply to Ribble Estuary Shrimps

Footnotes e should apply to Ribble Estuary Mussels

Footnote g should apply to Freshwater from Ulnes Walton

Table 2.3b and Table 2.10

The Beta radiation dose rates reported in Tables 2.3b and 2.10 are incorrectly presented. Corrected data presented below.

The paragraph “The equivalent dose to skin...” (page 45)

Should read

“The equivalent dose to skin as a result of fishermen handling their fishing gear (which is potentially contaminated with radioactivity) was 0.030 mSv in 2018.”

The sentence “In 2018, the skin doses to a fisherman from handling fishing gear...”

(Page 54)

Should read

“In 2018, the skin doses to a fisherman from handling fishing gear (including a component due to naturally occurring radiation), and a bait digger and shellfish collector from handling sediment, were 0.13 mSv and 0.064 mSv, respectively (Table 2.17)...”

These revised doses apply to relevant parts of Tables 1.4, 2.1 and 2.17.

Table 2.3(b) Monitoring of radiation dose rates near Springfields, 2018			
Location	Material or ground type	No. of sampling observations	μGy h ⁻¹
Mean beta dose rates			μSv h⁻¹
Springfields	Fishing net	1	<0.089
Springfields	Tarpaulin	1	<0.090

Table 2.10 Beta radiation dose rates on contact with fishing gear on vessels operating off Sellafield, 2018

Vessel or location	Type of gear	No. of sampling observations	Mean beta dose rate in tissue, $\mu\text{Sv h}^{-1}$
101	Nets	1	<0.084
111	Nets	1	<0.083
South 1	Lobster pots	1	0.12
South 2	Lobster pots	1	<0.092
South 3	Lobster pots	1	<0.092
South 4	Lobster pots	1	<0.092

Page 80, Table 2.5

The value of ^{99}Tc in Whitehaven Cod should read $<0.15 \text{ Bq kg}^{-1}$

Page 109, Table 3.2(a)

The Gross beta values in freshwater were omitted. These are presented below.

Location	Gross beta, Bq l^{-1}
Loch Calder	0.090
Loch Shurrery	0.048
Loch Baligill	0.13
Heldale Water	0.060

Page 112, Table 3.4(a)

The 2018 activity concentration data for Seaweed from Bognor Rock were omitted. These are presented below.

Table 3.4(a) Concentrations of radionuclides in aquatic plants near Winfrith, 2018

Material	Location	No. of sampling observations	Mean radioactivity concentration (fresh), Bq kg^{-1}			
			^{60}Co	^{99}Tc	^{137}Cs	^{241}Am
Marine samples						
Seaweed	Bognor Rock	2E	<0.57	<1.7	<0.41	<0.44

E Measurements labelled "E" are made on behalf of the Environment Agency,

Page 115

The key point for Dungeness should read

"Gaseous discharges of tritium and carbon-14 decreased, and liquid discharges of tritium increased and sulphur-35 decreased, from Dungeness B in 2018"

Page 121

The sentence starting "Discharges of tritium..." should read

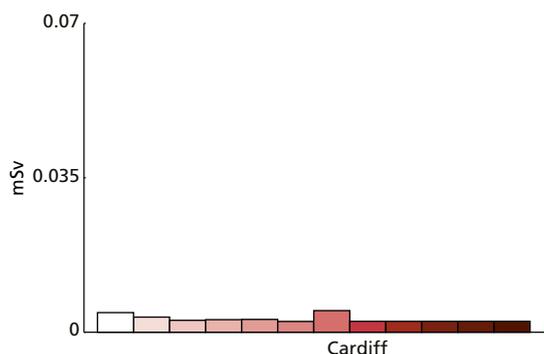
"Discharges of tritium increased and sulphur-35 decreased (both by small amounts) from Dungeness B..."

Page 151, Figure 5.1

The caption descriptor should read "including discharges to Silchester sewer and Aldermaston Stream".

Page 176, Figure 6.1

The plot for Cardiff is incorrect, it is presented correctly below.



Page 209, Table 8.12

Table 8.12 was omitted from RIFE 24, these data are presented below.

The paragraph “SEPA took a series of marine sediment and seawater...” Should be replaced by

“In 2018, SEPA took a series of marine sediment and seawater samples from across Scotland and the results are given in Table 8.12. All radionuclides were reported as less than values in seawater. Tritium was positively detected in two seawater samples from Cloch Point. Caesium-137, europium-155 and americium-241 were positively detected in some sediment samples. The results are generally consistent with those to be expected from measurements at nuclear licensed sites in this report (see, for example, Section 3). Overall, the results support the concept of a reducing trend in concentration with distance from the Sellafield site, albeit confounded by natural variability due to sediment type.”

Table 8.12 Concentrations of radionuclides in marine sediments and seawater - background survey in Scotland, 2018^a

Sample location and type	Sample source	No. of sampling observations	Mean radioactivity concentration, Bq kg ⁻¹ (dry) ^b									
			³ H	⁶⁰ Co	⁹⁵ Nb	¹¹⁰ Ag	¹²⁵ Sb	¹³⁷ Cs	¹⁵⁵ Eu	²⁴¹ Am	Gross alpha	Gross beta
Marine Sediments												
Firth of Forth	Lower Taylorton	1	<5.0	<0.14	<8.7	<0.33	<0.40	4.4	<0.41	0.81	220	1700
Firth of Forth	Bannockburn	1	<5.0	<0.13	<7.8	<0.32	<0.37	5.3	<0.29	0.82	220	1800
Firth of Forth	Fallin	1	<5.0	<0.15	<8.4	<0.34	<0.43	6.9	<0.32	1.1	250	2100
Firth of Forth	Devon Confluence	1	<5.0	<0.14	<5.3	<0.33	<0.38	13	2.2	1.6	25	2000
Forth Estuary	Swing Bridge	1	<5.0	<0.10	<4.8	<0.19	<0.23	3.2	<0.26	<0.29	220	1500
Firth of Clyde	NW Cloch Point	1	<5.0	<0.11	<7.0	<0.26	<0.31	14	<0.21	4.3	190	1400
Firth of Clyde	West Cloch Point	1	<5.0	<0.12	<7.6	<0.28	<0.40	29	<0.30	6.80	280	1600
Inner Clyde	Leven Confluence	1	<5.0	<0.10	<3.1	<0.13	<0.15	2.0	<0.19	<0.18	83	550
Inner Clyde	Dalmuir	1	<5.0	<0.10	<6.2	<0.23	<0.31	15	<0.23	0.8	82	1200
Inner Clyde	Kelvin	1	<5.0	<0.13	<8.9	<0.33	<0.44	38	<0.28	1.6	110	1200
Seawater												
Firth of Forth	Lower Taylorton	1	<1.0	<0.10	<0.24	<0.10	<0.16	<0.10	<0.11	<0.10		
Firth of Forth	Bannockburn	1	<1.0	<0.10	<0.23	<0.10	<0.12	<0.10	<0.10	<0.10		
Firth of Forth	Fallin	1	<1.0	<0.10	<0.19	<0.10	<0.14	<0.10	<0.11	<0.10		
Firth of Forth	Devon Confluence	1	<1.0	<0.1	<0.25	<0.10	<0.15	<0.10	<0.14	<0.10		
Forth Estuary	Swing Bridge	1	<1.0	<0.10	<0.26	<0.10	<0.15	<0.10	<0.13	<0.10		
Firth of Clyde	NW Cloch Point	1	1.1	<0.10	<0.16	<0.10	<0.14	<0.10	<0.10	<0.10		
Firth of Clyde	West Cloch Point	1	1.4	<0.10	<0.17	<0.10	<0.14	<0.15	<0.10	<0.12		
Inner Clyde	Leven Confluence	1	<1.0	<0.10	<0.13	<0.10	<0.13	<0.10	<0.11	<0.10		
Inner Clyde	Dalmuir	1	<1.0	<0.10	<0.17	<0.10	<0.18	<0.10	<0.16	<0.10		
Inner Clyde	Kelvin	1	<1.0	<0.10	<0.13	<0.10	<0.13	<0.10	<0.10	<0.10		

^a Results are available for other radionuclides detected by gamma spectrometry. All such results are less than the limit of detection

^b Except for seawater where units are Bq l⁻¹

Appendix 1, page 24, Table X2.2

The consumption and occupancy rates for the Sellafield M (Sellafield fishing community 2014-2018) group should read:

- 20 kg y⁻¹ Cod
- 35 kg y⁻¹ Other fish
- 11 kg y⁻¹ Crabs
- 14 kg y⁻¹ Lobsters
- 10 kg y⁻¹ Other crustaceans
- 7.6 kg y⁻¹ Winkles
- 4.2 kg y⁻¹ Other molluscs

- 870 hours y⁻¹ over mud and sand

The sentence “For molluscs (winkles and other molluscs)...” (page 52) should read

“For molluscs (winkles and other molluscs), the overall consumption rates were unchanged in the 2018 and decreased in the 2014–2018 datasets.”

The revised doses to this group are given below. They apply to the relevant portions of Tables 1.4, 2.17 and 7.1. Table 2.16 has been corrected for RIFE 25 onwards.

The sentence “The doses from artificial radionuclides to people...” (page 53) should read

“The doses from artificial radionuclides to people, who consume a large amount of seafood, were 0.066 mSv (0.082 mSv in 2017) and 0.072 mSv (0.085 mSv in 2017) using the annual and five-year rolling average habits data, respectively, in 2018.”

The sentence “Taking artificial and enhanced natural radionuclides together...” (page 53) should read

Taking artificial and enhanced natural radionuclides together, the source specific doses were both 0.44 mSv (values are rounded to two significant figures) for the both the annual and five-year rolling average habits data.

Table 2.17 Individual radiation exposures, Sellafield, 2018

Representative person	Exposure, mSv per year							
	Total	Seafood (nuclear industry discharges)	Seafood (other discharges)	Other local food	External radiation from intertidal areas, river banks or fishing gear	Intakes of sediment and water	Gaseous plume related pathways	Direct radiation from site
Source specific doses								
Seafood consumers								
Local seafood consumers (habits averaged 2014-18)	0.40 ^f	0.044	0.33	-	0.028	-	-	-

^f The dose due to nuclear industry discharges was 0.072 mSv

RIFE 23, 2017

Page 13, Technical summary

The two sentences starting “In Wales, ... “ should be replaced with “In Wales, the representative person who received the highest dose from permitted releases of radioactivity consumed locally produced food at Trawsfynydd. The dose was 0.028 mSv in 2017.”

Page 42, Figure 2.2

The discharge data for non-uranic alpha (liquid) for 2017 was 9.43E+06 Bq, not zero. This is shown correctly in Figure 2.2 in RIFE-24

Page 91, Table 2.12

The concentration of sulphur-35 in Half Moon Bay Seaweed was 9.4 Bq kg⁻¹

Page 108, Table 3.2(a)

The correct value for ²³⁸Pu in cod collected from Scrabster is 0.00035 Bq kg⁻¹ (fresh).

Page 145, Table 4.6(a)

The concentration of polonium-210 in Morecambe Mussels was 41 Bq kg⁻¹

Page 149, Table 4.8(a)

The concentration of strontium-90 in Southwold Harbour sediments was <6.6 Bq kg⁻¹

Page 164, Section 5.2

Replace “Gaseous and liquid discharges may be made under permit but were both reported as nil in 2017.”

With “Gaseous and liquid discharges may be made under permit. Gaseous discharges were reported as nil in 2017.”

Pages 220-221, Tables 8.7 (footnote a) and 8.9, Page 207, section 8.8

In Table 8.7, footnote a, the concentrations of polonium-210 and radium-226 the values are <0.010 Bq l⁻¹ and 0.012 Bq l⁻¹, respectively.

The revised doses are given (in bold) in Table 8.9 (abbreviated below).

Subsequently (on page 207)

“The mean annual dose from consuming drinking water in the UK was assessed as 0.015 mSv in 2017 (Table 8.9). The highest annual dose was estimated to be 0.028 mSv for drinking water from Matlock, Derbyshire. The estimated doses were dominated by naturally occurring radionuclides and are similar to those in recent years.”

Table 8.9 Doses from radionuclides in drinking water, 2017

Region	Mean Exposure, mSv per year			Maximum exposure, mSv per year	
	Man-made radionuclides	Naturally occurring radionuclides	All radionuclides	Location	All radionuclides
England	<0.001	0.028	0.028		0.028
UK	<0.001	0.014	0.015	Matlock, Groundwater, Derbyshire	0.028

Page 241, Table A2.1, Dounreay (Vulcan)

The “Beta” category should read “All other radionuclides”

Page 249, Table A2.4

The transfer data for Dounreay should read:

Volume – 4.88E+02 m³, Alpha – 2.48E+09 Bq and Beta/Gamma – 4.54E+10 Bq

Previous RIFE reports (RIFE 1-20 inclusive)

Gaseous discharges of krypton-85 from Dounreay Fast Reactor

In May 2016, DSRL notified SEPA of the identification of the release of unmonitored krypton-85 gaseous discharges through the authorised discharge outlet at the DFR facility (see table A2.5 RIFE-22 for more detail). The krypton-85 discharge data have been revised and are presented below.

Year	Revised Discharge (Bq)	Revised % of annual limit
1995	1.46E+08	37
1996	1.47E+08	37
1997	1.25E+08	31
1998	1.25E+08	31
1999	1.25E+08	31
2000	1.26E+08	31
2001	1.25E+08	31
2002	5.31E+08	130
2003	3.57E+08	89
2004	8.35E+07	21
2005	2.37E+07	5.9
2006	2.37E+07	5.9
2007	2.55E+07	6.4
2008	3.04E+07	7.6
2009	3.61E+07	9.0
2010	5.89E+07	15
2011	9.29E+07	23
2012	9.68E+07	24
2013	1.07E+09	270
Discharge authorisation revised 2014		
2014	2.58E+08	<1
2015	7.92E+08	<1

RIFE-22, 2017

Page 135, Table 4.2(b)

The mean gamma dose rate for Lydney Rocks should read 0.099.

Page 246, Table A2.3

Niobium-84 should read Niobium-94.

Previous RIFE reports (RIFE 9, 11, 13-22)

Table A2.1

Gaseous discharges from Dounreay

In April 2017, DSRL notified SEPA that incorrect duct flowrate information had been used in the calculation of gaseous tritium and non-alpha discharges from the PFR facility. Further to this, DSRL have also undertaken a site wide review of their discharge monitoring arrangements. This review identified improvements in particulate flow measurement and the calculation of tritium discharges going back to 2003 for some radionuclide groupings. The revised discharge data for tritium, alpha, beta and non-alpha from Dounreay are given in the table below. **This table also supersedes the previously published “Gaseous Discharges from Dounreay” (RIFE 15-22) errata item.**

	Year	Revised Discharges	Revised % of annual limit
Prototype Fast Reactor: Tritium	2009	2.55E+11	2.4
	2010	7.19E+10	<1
	2011	4.74E+10	<1
	2012	9.56E+10	<1
	2013	6.18E+09	<1
Discharge authorisation revised 2014: Non-alpha	2014	8.05E+07	4.7
	2015	1.21E+08	7.9
	2016	1.11E+08	6.6
Discharge authorisation revised 2014: Tritium ^a	2014	3.25E+11	1.9
	2015	4.33E+10	<1
	2016	4.46E+10	<1
East Minor Sources: Alpha	2003	1.31E+05	<1
	2005	7.75E+04	<1
	2007	7.86E+04	<1
	2008	6.27E+04	<1
	2009	9.24E+04	<1
	2010	6.38E+04	<1
	2011	7.43E+04	<1
	2012	6.06E+04	<1
	2013	8.80E+04	<1
East Minor Sources: Beta	2003	1.31E+05	<1
	2005	7.75E+04	<1
	2007	7.86E+04	<1
	2008	6.27E+04	<1
	2009	9.24E+04	<1
	2010	6.38E+04	<1
	2011	7.43E+04	<1
	2012	6.06E+04	<1
	2013	8.80E+04	<1

^a Discharge data for tritium (2014-2016) are still under review. Should these values be revised, data will be updated in RIFE 25

Previous RIFE reports (RIFE 15-22 inclusive)

Table A2.1

Gaseous Discharges from Dounreay

In April 2017, DSRL notified SEPA that incorrect duct flowrate information had been used in the calculation of gaseous tritium and non-alpha discharges from the PFR facility. The revised data for tritium and non-alpha discharges are shown below. Values for 2014 are for the period May to December (see RIFE 21 for more details).

	Year	Revised Discharges	Revised % of annual limit
Prototype Fast Reactor: Tritium	2009	2.55E+11	2.4
	2010	7.19E+10	<1
	2011	4.74E+10	<1
	2012	9.56E+10	<1
	2013	6.18E+09	<1
Discharge authorisation revised 2014: Non-alpha	2014	8.05E+07	4.7
	2015	1.21E+08	7.9
	2016	1.11E+08	6.6
Discharge authorisation revised 2014: Tritium	2014	3.25E+11	1.9
	2015	4.33E+10	<1
	2016	4.46E+10	<1

RIFE-21, 2016

Page 44, Section 2

The two sentences starting “During the financial year...”, should be replaced with “During the financial year, 2015/16, 460 tonnes of spent oxide fuel was reprocessed in THORP, compared with an original target of 435 tonnes, and the highest reprocessing throughput since NDA too ownership of the site. The reprocessing of spent Magnox fuel for 2015/16 was a total of 390 tonnes of fuel, compared with an original performance target of 477 tonnes.” The footnote is not correct and no longer applies.

Page 50, Figure 2.8

The carbon-14, strontium-90 and caesium-137 discharge data for 2015 (figure 2.8) were plotted incorrectly, it is shown corrected in Figure 2.9 in RIFE-22.

Page 98, Section 3.2

Replace Iodine-125 with iodine-131 (twice).

Page 143, Table 4.9(a)

The concentration of plutonium-239+240 in sediment (pipeline) was 109 Bq kg⁻¹.

Page 161, Table 5.1

Devonport, the total dose of breakdown of “External radiation from intertidal areas or river banks” in the table should read <0.005, the table should read.

Site	Representative person ^{a,b}	Exposure, mSv per year					
		Total	Fish and shellfish	Other local food	External radiation from intertidal areas, river banks or fishing gear	Intakes of sediment and water	Gaseous plume related pathways
Devonport							
Total dose – all sources	Adult fish consumers	<0.005	<0.005	–	<0.005	–	–

Previous RIFE reports (RIFE 19–21 inclusive)

Table A2.1

Gaseous discharges from Chapelcross

Replace the Tritium and all other radionuclides discharge limits with 7.50E+14 and 2.50E+09, respectively. The authorisation was revised 1 May 2013.

RIFE-20, 2014

Page 201, Table 8.1

Iodine-129 data were entered incorrectly and should be removed with the exception of Alderney *Fucus vesiculosus* which was undertaken by radiochemistry. All other results reported as ¹²⁹I were actually ¹³¹I.

RIFE-17-20 2014

Page 86, Table 2.11

The units of Mean beta dose rate in tissue should read uSv^h⁻¹

Page 183, Table 6.1

Cardiff, these are small changes to the *total dose* and source-specific assessments shown below. They apply to relevant parts of text, tables (1.2B, 1.4 and 6.1) and figure (1.3)

Site	Exposed population ^a	Exposure, mSv per year					
		Total	Fish and shellfish	Other local food	External radiation from intertidal areas or the shoreline	Gaseous plume related pathways	Direct radiation from site
Total dose – liquid discharges	Adult occupants over sediment	0.006	<0.005	–	0.005	–	–
Source specific doses	Prenatal children of seafood consumers	0.009	<0.005	–	0.009	–	–

Page 41, Figure 2.13

The cobalt-60 liquid discharge datum for 2013 (Figure 2.13, RIFE-19) was plotted incorrectly, it is shown corrected in Figure 2.13 in RIFE-20

Page 247, Appendix A2.1

Chapelcross, replace All other nuclides limit of 7.50E+09 Bq with 5.15E+09 Bq

Page 109, Figure 3.5

The discharge data for ⁶⁰Co and ¹³⁷Cs for 2013 (figure 3.5) were plotted incorrectly, they are shown corrected in Figure 3.5 in RIFE-20

Page 232, Table 8.15

Eu-155 results have been revised

Location	Sample source	reported ¹⁵⁵ Eu	revised ¹⁵⁵ Eu
Firth of Clyde	East of Gull Point	<0.21	0.72
Firth of Clyde	SW of Lady Isle	<0.36	2.1
Firth of Clyde	East of Johnston's Point	<0.22	0.81
Firth of Clyde	East of Brodick	<0.39	1.8
Clyde Estuary	The Hole	<0.50	2.1
Clyde Estuary	Kempoch Point	<0.43	2.7

Page 33, Table 1.2

Some data was missing from Table 1.2 C (electronic version only), revised table shown below.

Table 1.2. continued			
Site	Representative person ^a	Exposure, mSv	
		Total	Dominant contributions ^b
C All sources			
Aldermaston and Burghfield	Infant milk consumer	<0.005	Milk, ³ H ^c , ¹³⁷ Cs ^c , ²³⁸ U
Amersham	Local adult inhabitant (0–0.25km)	0.22	Direct radiation
Barrow	Adult occupant on a houseboat	0.076	Gamma dose rate over sediment
Berkeley and Oldbury	Adult occupant over sediment	0.010	Gamma dose rate over sediment
Bradwell	Prenatal child of green vegetable consumers	<0.005	Green vegetables, potatoes, root vegetables, ¹⁴ C
Capenhurst	Local inhabitant aged 10y (0–0.25km)	0.080	Direct radiation
Cardiff	Infant milk consumer	0.010	Milk, ¹⁴ C, ³² P ^c
Chapelcross	Infant milk consumer	0.024	Milk, ⁹⁰ Sr, ²⁴¹ Am ^c
Derby	Adult consumer of locally sourced water	<0.005	Water, ⁶⁰ Co ^c
Devonport	Adult fish consumer	<0.005	Fish, ¹⁴ C, ²⁴¹ Am ^c
Downreay	Adult green vegetable consumer	0.012	Domestic fruit, potatoes, root vegetables, ¹²⁹ I ^c , ²³⁸ Pu ^c , ^{239/240} Pu ^c , ²⁴¹ Am ^c
Dungeness	Local adult inhabitant (0.5–1km)	0.021	Direct radiation
Faslane	Adult occupant over sediment	<0.005	Gamma dose rate over sediment
Hartlepool	Local adult inhabitant (0–0.25km)	0.024	Direct radiation, gamma dose rate over sediment
Harwell	Prenatal child of local inhabitants (0–0.25km)	0.010	Direct radiation
Heysham	Adult mollusc consumer	0.028	Fish, gamma dose rate over sediment, molluscs, ¹³⁷ Cs, ^{239/240} Pu, ²⁴¹ Am
Hinkley Point	Adult occupant over sediment	0.022	Gamma dose rate over sediment
Hunterston	Prenatal child of local inhabitants (0.25–0.5km)	0.021	Direct radiation
LLWR near Drigg ^e	Adult fish consumer	0.061 ^f	Crustaceans, fish, gamma dose rate over sediment, ¹²⁹ I ^c , ²¹⁰ Po
Rosyth	Adult occupant over sediment	<0.005	Gamma dose rate over sediment
Sellafield ^{e,g}	Adult occupant on a houseboat	0.076	Gamma dose rate over sediment
Sizewell	Local adult inhabitant (0–0.25km)	0.021	Direct radiation
Springfields	Adult occupant on a houseboat	0.060	Gamma dose rate over sediment
Torness	Local adult inhabitant (0.5–1km)	0.020	Direct radiation
Trawsfynydd	Infant local inhabitant (0.25–0.5km)	0.017	Milk, ¹⁴ C, ²⁴¹ Am
Whitehaven ^e	Adult fish consumer	0.061 ^f	Crustaceans, fish, gamma dose rate over sediment, ¹²⁹ I ^c , ²¹⁰ Po
Winfrith	Infant milk consumer	<0.005	Milk, ¹⁴ C
Wylfa	Adult occupant over sediment	<0.005	Gamma dose rate over sediment

^a Selected on the basis of providing the highest dose from the pathways associated with the sources as defined in A, B or C

^b Pathways and radionuclides that contribute more than 10% of the total dose. Some radionuclides are reported as being at the limits of detection and based on these measurements, an upper estimate of dose is calculated

^c The assessed contribution is based on data being wholly at limits of detection

^d The effects of gaseous discharges and direct radiation are not assessed for this site

^e The effects of liquid discharges from Sellafield, Whitehaven and LLWR near Drigg are considered together when assessing exposures at these sites because their effects are manifested in a common area of the Cumbrian coast

^f The doses from man-made and naturally occurring radionuclides were 0.040 and 0.021 mSv respectively. The source of naturally occurring radionuclides was a phosphate processing works near Sellafield at Whitehaven. Minor discharges of radionuclides were also made from the LLWR near Drigg into the same area

^g The highest exposure due to operations at Sellafield was to a person living on a houseboat near Barrow

RIFE-18, 2012

Page 134, Table 4.1

Hinkley Point. These are small changes to the total dose and source specific dose shown below. The apply to relevant points of text, tables (S, 1.2, 1.3, 1.4 and 4.1) and figures (1.1, 4.1 and 6.2).

Site	Exposed population ^a	Exposure, mSv per year					
		Total	Fish and shellfish	Other local food	External radiation from intertidal areas or the shoreline	Gaseous plume related pathways	Direct radiation from site
Total dose – all sources	Adult occupants over sediment	0.013	<0.005	<0.005	0.012	<0.005	<0.005
Source specific doses	Seafood consumers	0.018	<0.005	–	0.017	–	–

Page 240, Appendix 2

Third entry on the table – Sellafield – the discharges during 2012 (Bq and % of annual limit^b) columns and should have read:

Beta	1.03E+09	2.5
Antimony-125	3.20E+09	11
Caesium-137	1.59E+08	2.7

Page 41, Figure 2.3

The River Ribble houseboat dose rate datum for 2012 (figure 2.3, RIFE-18) was plotted incorrectly, it is shown corrected in Figure 2.4 in RIFE-19

Page 134, Table 2.18

Sellafield. These are small changes to the total dose shown below. They apply to relevant points of text, tables (1.2 and 2.18) and figure 2.6.

Exposed population ^a	Exposure, mSv per year							
	Total	Seafood (nuclear industry discharges)	Seafood (other discharges)	Other local food	External radiation from intertidal areas, river banks or fishing gear	Intakes of sediment and water	Gaseous plume related pathways	Direct radiation from site
Total dose – maximum effect of gaseous release and direct radiation sources								
Infant root vegetable consumers	0.011	–	–	0.011	–	–	–	–

Page 196, Table 7.7

Discharge data reported previous to RIFE-18 classified as Oil & Gas (Offshore) should have been classified as Oil & Gas (Onshore). This has been corrected for RIFE-18 onwards.

RIFE-17, 2011

Page 52, Section 2

On Figure 2.14 the year labels from 2004 to 2011 were underneath the bar chart incorrectly and should have been one place to the right, as shown in RIFE 18.

Page 61, Section 2

Springfields 'Source specific doses' last entry on the table should read: 'Consumers of locally grown food' not 'Infant consumers of locally grown food'

Page 209, Section 9

Line 7, paragraph 7, should read: Tritium concentrations in the western English Channel were also very low (Figure 9.7).

Page 240, Appendix 2

Third entry on the table – Capenhurst (Urenco UK) the discharge limits (annual equivalent)^a Bq column should have read:

Uranium	7.50E+06
Other Alpha	2.40E+06
Technetium-99	1.00E+08
Others	2.25E+09

RIFE-14-17, 2011

CD, Appendix 1

Table X2.2 Sellafield Q – Ravenglass nature warden assessment, the ingestion and inhalation rates of sediment have been incorrect, they should have read:

RIFE-14

3.1 10^{-3} kg y^{-1} mud by inadvertant ingestion

5.6 10^{-5} kg y^{-1} mud by resuspension and inhalation

RIFE-15

3.4 10^{-3} kg y^{-1} mud by inadvertant ingestion

6.3 10^{-5} kg y^{-1} mud by resuspension and inhalation

RIFE-16

3.4 10^{-3} kg y^{-1} mud by inadvertant ingestion

6.3 10^{-5} kg y^{-1} mud by resuspension and inhalation

RIFE-17

3.4 10^{-3} kg y^{-1} mud by inadvertant ingestion

6.3 10^{-5} kg y^{-1} mud by resuspension and inhalation

RIFE-16, 2010

Page 30, Table 1.2B

Trawsfynydd, should read...

Adult fish consumers

0.012

Fish, gamma dose rate over sediment, ^{90}Sr , ^{137}Cs , ^{241}Am

Page 37, Section 2

Line 13, paragraph 3, second column should read...

The dose to wildfowlers and farmers from exposure over salt marsh was 0.032 mSv, which was less than 4 per cent of the dose limit for members of the public of 1 mSv. The small decrease in dose from 0.036 mSv (in 2009) was due to lower gamma dose rates over marsh in 2010.

Page 100, Section 3

The graph in Figure 3.2 is missing 2010 data. The data for 2010 is shown in Figure 3.2 RIFE 17

Page 122, Section 4

Line 7, paragraph 1, first column should read...

An increase in the fish and crustacean consumption rates has been observed, together with a decrease in the mollusc and occupancy rates, in comparison with those of the previous survey reported in 2006.

Appendix 1, Annex 2

Table X2.2 Sellafield Group N winkle consumption should have said 15kg y^{-1} (not 18 kg y^{-1})

RIFE-15, 2009

Page 233, Table A2.1

MoD Coulport under reported discharges for the end of 2009.
The ³H discharge for 2009 should have been 3.40 E-03 TBq.

Page 249, Table A4.2B

Trawsfynydd, should read...

Adult fish consumers 0.012 Fish, gamma dose rate over sediment, ⁹⁰Sr, ¹³⁷Cs, ²⁴¹Am

RIFE-14, 2008

Page 12, Figure S1

Both bars for Bradwell should be the same height.
The bar for exposures due to liquid wastes is wrong.

Page 33, Section 2

Springfields, doses to the public

Lines 1 & 2 second column should read...

...pathways from gaseous discharges were less than 0.005mSv which was less than 0.5 per cent...

Page 51, Figure 2.22

The bar for Whitehaven in 2008 should have been the same height as the bar for 2007

Page 109, Section 4

Gaseous discharges and terrestrial monitoring

Line 28, first column should read...

The results of monitoring for 2008...

Page 167, Table 6.3a

Results for Cardiff East WWTW should have been:

Material	Location or selection ^b	No. of sampling observations ^c	Mean radioactivity concentration (fresh) ^a , Bq kg ⁻¹			
			Organic			
			³ He	³ H	³ Hf	14 ^c
Terrestrial samples						
Crude effluent	Cardiff East WWTW	3E	<150	<220	82	<11
Final effluent	Cardiff East WWTW	3E	<60	<70	80	<11
Sludge pellets	Cardiff East WWTW	3E		76000		740
Solids from crude effluent	Cardiff East WWTW	3E		<7500		<1800

Page 225, Table A2.2

Sellafield (sea pipelines) Tritium discharge limit should have read 2 10⁴

Page 236, Table A4.2B

Trawsfynydd, should read...

Adult fish consumers 0.010 Fish, gamma dose rate over sediment, ⁹⁰Sr, ¹³⁷Cs, ²⁴¹Am

RIFE-13, 2007

Page 127, Table 4.5a

The ^{210}Po and ^{210}Pb results are the wrong way round for South Gare winkles. ^{210}Po should be 11 and ^{210}Pb should be 0.46 Bq kg^{-1}

Page 153, Table 5.1

Derby, the total exposure and exposure from intakes of sediment and water should have been $<0.005 \text{ mSv}$.

Page 161, Section 6 Key points

Line 17 second column should read...

- The total dose of $0.008...$

Page 236, Table A4.2B

Trawsfynydd, should read...

Adult fish consumers	0.014	Fish, gamma dose rate over sediment, ^{90}Sr , ^{137}Cs , ^{241}Am
----------------------	-------	---

Page 239, Appendix 5

Line 3 first column should read...

... indicated that it was likely there would be no adverse impact

RIFE-12, 2006

Page 70, Table 2.7

The concentration of ^{241}Am in winkles at Drigg should have been 29.

Page 103, Section 4 Key points

Line 22 second column replace with

- At Dungeness, dose from gaseous discharges increased.

Page 187, Figure 8.5

The range in the key should have been 2 to 8.

Page 234, Table A4.2B

Trawsfynydd, should read...

Prenatal children of fish consumers	0.013	Fish, gamma dose rate over sediment, ^{90}Sr
-------------------------------------	-------	---

Previous RIFE reports (RIFE 2–12 inclusive)

Gaseous Discharges of Alpha and Beta at Sellafield

The published gaseous discharges of alpha and beta at Sellafield in the years, 1996, 1998-2001 and 2005-6 were reported incorrectly. The revised data is given below, the % of annual limit for Alpha in 1997 should read 12% (not 1.2%).

Year	Alpha (Bq)	% of annual Limit	Beta (Bq)	% of annual Limit
1996	1.80E+08	11	3.40E+09	7.1
1998	8.20E+07	4.8	1.60E+09	3.3
1999	1.70E+08	10	2.20E+09	4.6
2000	9.00E+07	5.3	1.10E+09	2.3
2001	7.20E+07	3.7	9.70E+08	<1
2005	8.90E+07	10	1.70E+09	4.0
2006	1.10E+08	13	2.00E+09	4.8

RIFE-11, 2005

Page 72, Table 3.3a

Footnote 'd' showed an incorrect value. It should have read:

^d The concentration of ²³⁷Np was 0.00035 Bq kg⁻¹

Page 112, Table 4.3a

Column headings should have read: ²³⁹Pu+²⁴⁰Pu ²⁴¹Pu

Page 140, Table 5.5a

The result of <0.13 for ²⁴¹Am in the *Fucus vesiculosus* samples from Pilot Station was incorrectly put into the ²³⁹Pu+²⁴⁰Pu column.

Page 206, Figures 9.5 and 9.6

Incorrect units were shown. The correct units were mBq l⁻¹.

Page 225, Table 9.15

Incorrect headings in the top part of the table. Should have been as below:

Table 9.15. Concentrations of radionuclides in sources of drinking water in England and Wales, 2005

Location	Sample source	No. of sampling observations	Mean radioactivity concentration, Bq l ⁻¹					
			³ H	⁴⁰ K	⁹⁰ Sr	¹³⁷ Cs	²¹⁰ Po	
Wales								
Gwynedd	Cwm Ystradllyn Treatment Works	4	<4.0	<0.020	0.0036	0.0018	<0.010	
Mid-Glamorgan	Llwyn-on Reservoir	4	<4.0	<0.045	0.0030	<0.0010	<0.013	
Powys	Elan Valley Reservoir	4	<4.0	<0.050	0.0040	0.00090	<0.010	

Page 248, Table A1.2

Sellafield discharge limits for alpha and beta should have been 8.90 10⁻⁵ and 0.00174 TBq respectively.

Page 251, Table A1.2

Aldermaston Tritium discharge and % limit should have been 14.1 and 8.3 respectively.

Prenatal children of occupants over sediment

0.008

Direct radiation, gamma dose rate over sand/stone

RIFE 8-11, 2002-2005

Concentrations in sediments

For sediment samples with unusually high water contents it was discovered in 2007 that the resulting sample bulk densities were outside the instrument calibration range. Following investigations a correction factor has been calculated and this has been applied to the affected data from 2002-2005 and the new results are reported here in Table E2.

These amendments do not significantly affect any assessments, charts or statements in the relevant RIFE reports.

Table E2. Amended concentrations of radionuclides in sediment, 2002 2005

Year	Site	Location	No. of sampling observations	Mean radioactivity concentration (dry), Bq kg ⁻¹						
				⁵⁷ Co	⁶⁰ Co	⁶⁵ Zn	⁹⁵ Zr	⁹⁵ Nb	¹⁰⁶ Ru	¹²⁵ Sb
2002	Aldermaston	Reading (Kennet)	4							
		Stream draining south	4							
	Bradwell	Maldon	2		<3.4					
		Waterside	2		<4.0					
	Capenhurst	Rossmore (4.3 km downstream)	2							
	Cardiff	Canal	2							
		West of pipeline	2							
	Devonport	Lopwell	2		<3.7					
	Dungeness	Pilot Sands	2		<0.90					
	Harwell	Appleford	4		<0.60					
Day's Lock		4		<0.50						
Sellafield	Caerhun	2		<3.3		<9.6	<7.7	<23	<9.2	
2003	Aldermaston	Reading (Kennet)	4							
		Aldermaston	4							
	Amersham	Outfall (Grand Union Canal)	3	<0.30	<1.1	<1.5				
	Bradwell	Waterside	2		<2.0					
	Cardiff	Canal	1							
	Derby	River Derwent (downstream)	4		<1.0					
Devonport	Lopwell	2		<2.5						
2004	Aldermaston	Reading (Kennet)	4							
		Aldermaston	4							
		Stream draining south	4							
	Amersham	Upstream of outfall (Grand Union Canal)	2	<6.4	<1.8	<4.1				
	Cardiff	Canal	2		<1.6		<4.5	<2.2	<12	<13
Sellafield	Caerhun	2								
2005	Aldermaston	Reading (Kennet)	4							
	Amersham	Upstream of outfall (Grand Union Canal)	2	<5.3	<1.6	<3.6				
	Cardiff	Canal	2							
		Lydebank Brook	4		<1.7					
	Harwell	Appleford	4		<2.5					
		Appleford	4		<2.5					
Sellafield	Caerhun	2		<2.6		<8.8	<6.8	<20	<20	
Trawsfynydd	Bailey Bridge	2		<8.3					<44	

Year	Site	Location	No. of sampling observations	Mean radioactivity concentration (dry), Bq kg ⁻¹							
				¹²⁵ I	¹³¹ I	¹³⁴ Cs	¹³⁷ Cs	¹⁴⁴ Ce	¹⁵⁴ Eu	¹⁵⁵ Eu	²⁴¹ Am
2002	Aldermaston	Reading (Kennet)	4				7.3				<1.9
		Stream draining south	4				<5.1				<1.2
	Bradwell	Maldon	2			6.5	80				<4.0
		Waterside	2			3.9	59				<13
	Capenhurst	Rossmore (4.3 km downstream)	2				<4.4				
	Cardiff	Canal	2	<0.80			2.4				
		West of pipeline	2	<3.1			33				
	Devonport	Lopwell	2				7.7				
	Dungeness	Pilot Sands	2				<0.90				<1.6
	Harwell	Appleford	4				<13				
Day's Lock		4				6.0					
Sellafield	Caerhun	2			<3.4	430	<25	<7.3	<8.0	75	
2003	Aldermaston	Reading (Kennet)	4				8.0				<1.6
		Aldermaston	4				6.3				<2.7
	Amersham	Outfall (Grand Union Canal)	3	<1.0	<550		<2.1				
	Bradwell	Waterside	2				35				<2.7
		Canal	1	<1.4			16				
	Derby	River Derwent (downstream)	4								
	Devonport	Lopwell	2				<10				
2004	Aldermaston	Reading (Kennet)	4				5.4				<1.1
		Aldermaston	4				<3.9				<1.3
		Stream draining south	4				<2.8				1.6
	Amersham	Upstream of outfall (Grand Union Canal)	2	<0.80	<1.4		10				
	Cardiff	Canal	2	<1.5			11				
		Caerhun	2			<1.5	220	<5.7	<7.3	<3.1	51
2005	Aldermaston	Reading (Kennet)	4				<3.9				6.5
		Upstream of outfall (Grand Union Canal)	2	<1.0	<9.1		6.2				
	Cardiff	Canal	2	<1.8			9.1				
		Lydebank Brook	4				9.0				
	Sellafield	Appleford	4				<11				
		Caerhun	2			<2.5	230	<9.3	<12	<5.3	59
	Trawsfynydd	Bailey Bridge	2			<4.2	920				76

RIFE-10, 2004

Page 75, Table 3.7

The entry for Haverigg should read 0.087.

Page 45, Figure 3.8

The americium-241 discharge data for 2004 was plotted incorrectly, it is shown corrected in Figure 3.12 in RIFE-11.

Page 87, Table 3.15, Page 151 Table 6.1(a), Page 154, Table 6.3(a), Page 166 Table 7.3(a), Page 173, Table 8.1(a)

The following activity in soil data were reported as being Bq kg⁻¹ (dry) whilst they should have been reported as Bq kg⁻¹ (wet). All data are averages unless stated.

Site/location	⁶⁰ Co	¹⁰⁶ Ru	¹²⁵ Sb	¹³⁴ Cs	¹³⁷ Cs	²³⁴ U	²³⁵ U	²³⁸ U
Sellafield (Table 3.15)	<0.43	<1.4	<0.73					
max	0.80	<1.5	<0.80			16	0.64	15
Aldermaston (Table 6.1(a))								
max						7.8	0.29	7.2
Derby (Table 6.3(a))								
max						27	0.94	23
Cardiff (Table 7.3(a))				<0.47	7.1			
max				<0.50	7.7			
Drigg (Table 8.1)								
max						11	0.42	11

Page 223, Table A1.1

The % annual limit for ¹⁰⁶Ru discharge at Sellafield was 7% (not 70%).

Page 246, Table A5.1

Some dose per unit intake values were missing for 1 yr old. These were:

Table A5.1. Dosimetric data

Radionuclide	Dose per unit intake by inhalation using ICRP-60 methodology (Sv Bq ⁻¹)
Sr-90 [†]	1.2E-07
Zr-95 [†]	2.1E-08
Ba-140 [†]	2.6E-08
Pb-210 [†]	4.0E-06
Th-228 [†]	1.4E-04
U-238	9.4E-06

[†] Energy and dose per unit intake data include the effects of radiations of short-lived daughter products

RIFE-9, 2003

Page 82, Table 3.15, Page 138 Table 6.1(a), Page 141, Table 6.3(a), 1 Page 51, Table 7.3(a), Page 157, Table 8.1(a)

The following activity in soil data were reported as being Bq kg⁻¹ (dry) whilst they should have been reported as Bq kg⁻¹ (wet). All data are averages unless stated.

Site/location	⁶⁰ Co	¹⁰⁶ Ru	¹²⁵ Sb	¹³⁴ Cs	¹³⁷ Cs	¹⁵⁴ Eu	²³⁴ U	²³⁵ U	²³⁸ U	²⁴¹ Am
Sellafield (Table 3.15)	<0.90	<3.3	<1.2	<0.40	75	<0.50				5.9
max	1.6	<4.2	<1.6		89	<0.60	11	0.54	10	7.7
Aldermaston (Table 6.1(a))							11	0.48	11	
max										
Derby (Table 6.3(a))							47	1.6	40	
max										
Cardiff (Table 7.3(a))				<0.40	8.8					
max					11					
Drigg (Table 8.1)							6.7	0.26	6.7	
max										

Page 185, Table 9.12

Some data were incorrect. The amended version of the table is attached.

Table 9.12. Concentrations of radionuclides in rainwater and air 2003

Location	Sample	No. of sampling observations	Mean radioactivity concentration ^a in rainwater and air									
			³ H ⁷	Be	⁹⁰ Sr ^b	¹³⁷ Cs	²¹⁰ Pb	²¹⁰ Po	²²⁸ Th	Gross alpha ^b	Gross beta ^b	
Ceredigion Aberporth	Rainwater	12	<2.4	<1.6		<0.053	0.10			*		
	Air	4		0.0022		<0.00000052	0.00017			*		
Co. Down Conlig	Rainwater	4		<1.5		<0.022	*			*		
	Air	4		0.0022		<0.00000063	0.00015			*		
Dumfries and Galloway Eskdalemuir	Rainwater	4	4	<2.7	1.2		<0.0098	0.094			*	
	Air	4		0.0018		<0.00000043	0.00013			*		
North Yorkshire Dishforth	Rainwater	4		<2.2		<0.039	*			*		
	Air	4		0.0016		<0.00000055	0.00014			*		
Oxfordshire Chilton	Rainwater	12		<1.5	<0.00064	<0.032	0.32			*	0.074	0.17
	Air	13		0.0018		<0.00000034	0.00027	<0.000014		*		
Shetland Lerwick	Rainwater	4		1.6		<0.017	*			*		
	Air	4		0.0015		<0.00000052	0.00010			*		
Suffolk Orfordness	Rainwater	4	<2.2	<2.4		<0.048	*			5.2		
	Air	4		0.0022		<0.00000053	0.00020			*		

* Not detected by the method used

^a Bq l⁻¹ for rainwater and Bq kg⁻¹ for air

^b Annual bulk analysis

Page 187, Table 9.14

The concentration of ²¹⁰Po in Cornwall, River Fowey was <0.0098 Bq l⁻¹.

Page 188, Table 9.16

A revised version is attached.

Table 9.16. Estimates of maximum radiation exposure from radionuclides in drinking water, 2003^a

Country	Exposure, mSv		
	Man-made radionuclides ^b	Natural radionuclides ^c	All radionuclides
England	<0.001	0.028	0.028
Northern Ireland	<0.001	0.026 ^d	0.026 ^d
Scotland	<0.001		
Wales	<0.001	0.027	0.027

^a The maximum dose is selected for each nuclide group from data for individual sampling locations.

Many estimates of dose are based on concentration results at limits of detection.

^b Including tritium

^c Including carbon-14

^d Analysis of natural radionuclides was not undertaken

Page 214, Table A1.2

The data shown for Faslane are a duplication of the data for Rosyth and were included in error.

RIFE-8, 2002

Page 59, Table 4.1

Two tritium results were omitted. The data are attached.

Table 4.1. Beta/gamma radioactivity in fish from the Irish Sea vicinity and further afield, 2002

Location	Material	No. of sampling observations	³ H
Liverpool Bay	Flounder	2	<25
Mersey estuary	Flounder	2	<25

Page 79, Table 4.14, Page 82, Table 4.17, Page 128, Table 7.1(a), Page 138, Table 8.2(a)

The following activity in soil data were reported as being Bq kg⁻¹ (dry) whilst they should have been reported as Bq kg⁻¹ (wet). All data are averages unless stated.

Site/location	⁶⁰ Co	¹⁰⁶ Ru	¹²⁵ Sb	¹³⁴ Cs	¹³⁷ Cs	²³⁴ U	²³⁵ U	²³⁸ U
Sellafield (Table 4.14)	<0.80	<2.3	<1.2	68				
max	1.0	<2.7	<1.4	82				
Drigg (Table 4.17)								
max						6.9	0.30	6.5
Aldermaston (Table 7.1(a))								
max						8.7	0.35	8.3
Cardiff (Table 8.2(a))				<0.30	6.4			
max					8.1			

Page 102, Figure 6.1

The concentration of caesium-137 in Bradwell sediments was plotted incorrectly in Figure 6.1, it is shown corrected in Figure 5.1 of RIFE-9.

RIFE-1-8, 1995-2002

Urenco Capenhurst have reassessed atmospheric discharges of uranium; the reassessed discharges are listed in Table E1.

Table E1. Reassessed atmospheric discharges of uranium from Urenco Capenhurst

Year	Original reported discharge TBq	Reassessed discharge TBq
1993	1.74 10 ⁻⁹	2.41 10 ⁻⁷
1994	6.74 10 ⁻⁹	2.63 10 ⁻⁷
1995	2.69 10 ⁻⁸	2.75 10 ⁻⁷
1996	1.11 10 ⁻⁷	8.23 10 ⁻⁷
1997	6.80 10 ⁻⁸	4.90 10 ⁻⁷
1998	6.87 10 ⁻⁸	1.87 10 ⁻⁶
1999	8.15 10 ⁻⁸	1.01 10 ⁻⁶
2000	9.64 10 ⁻⁸	8.72 10 ⁻⁷
2001	1.20 10 ⁻⁷	9.77 10 ⁻⁷
2002	1.16 10 ⁻⁷	6.01 10 ⁻⁷

RIFE-7, 2001

Page 71, Table 4.8, Page 80, Table 4.15(a), Page 93, Table 5.2(a), 1 Page 22, Table 7.3, Page 127, Table 8.2(a), Page 130, Table 9.1

The following activity in soil data were reported as being Bq kg⁻¹ (dry) whilst they should have been reported as Bq kg⁻¹ (wet). All data are averages unless stated.

Site/location	⁶⁰ Co	¹⁰⁶ Ru	¹²⁵ Sb	¹³⁴ Cs	¹³⁷ Cs	²³⁴ U	²³⁵ U	²³⁸ U	²⁴¹ Am
Sellafield (Table 4.8)	<0.80	<3.1	<1.1		80				5.8
max	1.2				97	9.3	0.34	9.1	6.0
Springfields (Table 4.15(a))									
max						95	4.6	89	
Harwell (Table 5.2(a))	<0.40			<0.40	2.9				
Featherstone position A (Table 7.3)						9.5	0.41	9.0	
Featherstone position B (Table 7.3)						7.3	0.34	7.5	
Cardiff (Table 8.2(a))				<0.33	5.6				
max				<0.40	6.5				
Derby (Table 9.1)						18	0.80	18	
max						30	1.3	29	

Page 176, Table A1.1

Discharges of Alpha for Hunterston 'A' given as 0.14 TBq should have been 1.4 10⁻⁵ TBq. The % of limit given as 350 should have been <1.

Page 181, Table A1.2

Dungeness 'A' discharge limit and % of limit for tritium should have been 3 and 23 respectively.

RIFE-6, 2000

Page 31, Section 3.5

It was stated that the dose limits do not apply to natural radionuclides. This sentence should be deleted

Page 75, Table 4.16, Page 124, Table 9.1

The following activity in soil data were reported as being Bq kg⁻¹ (dry) whilst they should have been reported as Bq kg⁻¹ (wet). All data are averages unless stated.

Site/location	²³⁴ U	²³⁵ U	²³⁸ U
Capenhurst (Table 4.16) max	8.5	0.35	8.4
Derby (Table 9.1) max	24	0.96	23

Page 155, Table 12.1

Target date for project 'Tritium and carbon-14 in seafood' should have been March 2003.

Page 166, Table A1.1

Discharges of tritium from Devonport (pipeline) given as 0.87 TBq should have been 0.087 TBq.

Page 168, Table A1.2

Sellafield

Discharge limits of alpha and beta activity should have been 0.00196 and 0.328 TBq.

Percentage of limit for alpha and beta activity should have been 4.0 and <1.

Discharges of tritium and ¹⁴C from Sellafield given as 213 and 2.58 TBq should have been 355 and 2.94 TBq.

Relevant percentages given as 15 and 30 should have been 25 and 34.

RIFE-5, 1999

Page 71, Table 4.15(a), Page 73, Table 4.16, Page 118, Table 9.1

The following activity in soil data were reported as being Bq kg⁻¹ (dry) whilst they should have been reported as Bq kg⁻¹ (wet). All data are averages unless stated.

Site/location	²³⁴ U	²³⁵ U	²³⁸ U
Springfields (Table 4.15(a)) max	180	15	200
Capenhurst (Table 4.16) max	12	0.46	12
Derby (Table 9.1) max	34	1.3	31

Page 112, Section 8.2

The second sentence of paragraph three states that “the duck and tide washed pasture pathways gave doses of 0.032 and 0.009 mSv y⁻¹ respectively.” The dose due to the duck pathway should read 0.042 mSv y⁻¹. The value for tide washed pasture is correct.

Page 123, Table 10.2

The concentration of ¹⁴C in grass from Billingham was 960 Bq kg⁻¹ (wet).

Page 162, Table A1.2

The Dounreay (Fast Reactor) data were duplicated.

RIFE-4, 1998

Page 70, Table 4.12

The concentrations of total Cs and ¹⁴⁴Ce in ovine muscle (max) were 0.61 and <1.8 Bq kg⁻¹ (wet) respectively. No value for ¹⁵⁵Eu is available.

Page 75, Table 4.15(a), Page 77, Table 4.16, Page 116, Table 9.1

The following activity in soil data were reported as being Bq kg⁻¹ (dry) whilst they should have been reported as Bq kg⁻¹ (wet). All data are averages unless stated.

Site/location	²³⁴ U	²³⁵ U	²³⁸ U
Springfields (Table 4.15(a))	72	3.0	68
Capenhurst (Table 4.16)	7.9	0.30	7.4
Derby (Table 9.1)	31	0.93	26

Page 96, Table 6.4(a)

The concentration of ²⁴¹Am in mud at Paddy’s Hole was <1.0 Bq kg⁻¹ (dry). No measurement of ^{239/240}Pu was made.

Page 125, Section 11.1

Last but one paragraph. The estimated dose was 0.094 mSv.

Page 131, Section 11.8

Last paragraph, first sentence. Replace 1997 with 1998.

RIFE-3, 1997

Page 19, Table 1.1

Replace beta, tritium and ^{60}Co Devonport (sewer) discharges with 1.97×10^{-6} , 2.22×10^{-6} , 5.60×10^{-7} TBq respectively.

Replace alpha and beta limit and percentage Greenwich with 4.44×10^{-3} TBq and <1 respectively.

Page 21, Table 1.2

Replace tritium Winfrith limit with 5 TBq.

Page 38, Section 3.6.5

First paragraph. Reference to factor of 0.85 millisievert per milligray should be ICRP (1996b).

Page 70, Table 4.10, Page 72, Table 4.12, Page 81, Table 4.16, Page 121, Table 9.1

The following activity in soil data were reported as being Bq kg^{-1} (dry) whilst they should have been reported as Bq kg^{-1} (wet). All data are averages unless stated.

Site/location	^{234}U	^{235}U	^{238}U
Drigg (Table 4.10)	9.9	0.37	9.5
Ravenglass (Table 4.12)	18	0.60	16
Springfields (Table 4.12)	31	1.5	30
Capenhurst (Table 4.16)	9.5	0.40	9.5
Derby (Table 9.1)	27	0.97	24

Page 90, Section 6.3

The maximum dose due to gaseous disposals was received by adults.

Page 161, Appendix 4

The 1 year old child dose coefficient for ^{99}Tc was 4.80×10^{-9} .

RIFE-2, 1996

Page 32, Section 8.1

Lines 8-11. Replace with "In 1996 no fragments of spent fuel were found on the public beach at Dounreay. Thirteen small fragments were found with caesium-137 activities in the range 10^5 - 10^8 Bq (these activities were measured by the operator). They were all found on the Dounreay foreshore which although a public area is largely inaccessible. A"

Page 58, Table 2

Replace ^{35}S Oldbury limit of 0.8 TBq with 0.75 TBq. Replace ^{41}Ar Trawsfynydd limit of 350 TBq with 3500 TBq.

Page 85, Table 16, Page 87, Table 18, Page 91, Table 20(a), Page 95, Table 21, Page 119, Table 41

The following activity in soil data were reported as being Bq kg⁻¹ (dry) whilst they should have been reported as Bq kg⁻¹ (wet). All data are averages unless stated.

Site/location	²³⁴ U	²³⁵ U	²³⁸ U
Drigg (Table 16)	8.3	0.28	7.4
Ravenglass (Table 18)	16	0.56	15
Springfields (Table 20(a))	49	2.3	45
Capenhurst (Table 21)	9.8	0.36	10
Derby (Table 41)	44	1.7	43

Table 47

This was omitted in error. The data are attached.

Sampling location	Material	No of samples	Mean radioactivity concentration (dry)*, Bq kg ⁻¹							
			³ H	¹⁴ C	⁹⁰ Sr	¹²⁵ I	¹³⁴ Cs	¹³⁷ Cs	²³⁸ Pu	²³⁹⁺²⁴⁰ Pu
Beddingham Lewes, East Sussex	Grass	4	<40 ±18	130 ±28	1.8 ±0.1	<0.19	<0.61	<0.54 ±0.30	<0.00099 ±0.00037	0.0067 ±0.0012
Cilgwyn Quarry, Gwynedd	“	4	<30	360 ±55	3.0 ±0.2	<0.63	<0.69	<5.2 ±0.9	<0.0095	0.018 ±0.005
Lyndown, Devon	“	4	<28	150 ±30	2.4 ±0.2	<1.3 ±0.2	<0.60	<0.62 ±0.17	<0.0010	<0.0024 ±0.0009
Witton, Cheshire	“	4	<38	130 ±33	0.76 ±0.12	<1.1 ±0.3	<0.59	<0.63	<0.0013	0.0021 ±0.0016

* Results are available for other artificial nuclides detectable by gamma spectrometry
All such results are less than the limit of detection

RIFE-1, 1995

Page 38, Section 16.2

Last but one sentence, replace 1994 with 1995.

Page 39, Section 16.4

First sentence, 2nd paragraph, replace 1994 with 1995.

Page 45, Table 1

Replace ²⁴¹Am Sellafield (sea pipelines) limit of 1.3 TBq with 0.3 TBq.

Replace ⁶⁰Co Harwell (pipeline) percentage of 1.5 with 6.9.

Page 74, Table 16, Page 99, Table 33(a)

The following activity in soil data were reported as being Bq kg⁻¹ (dry) whilst they should have been reported as Bq kg⁻¹ (wet). All data are averages unless stated.

Site/location	²¹⁰ Po	²³⁸ Pu	²³⁹⁺²⁴⁰ Pu
Sellafield (Table 16)	64		
Aldermaston (Table 33(a))		0.0091	0.36
max		0.016	0.56

Page 99, Table 33(a)

The concentration of ¹³⁷Cs in clay at Outfall (Pangbourne) was 12±0.15 Bq kg⁻¹ (dry)

Page 133, Appendix 3

The average consumption rates of nuts and offal by 10 year old children were 1.5 kg y⁻¹. The consumption of whelks at Sellafield by group E (Whitehaven commercial) was 11 kg y⁻¹.

Page 138, Appendix 6

The values of t_f and t_s were 0. The transfer factors for beef offal (²⁴¹Pu) and lamb (²⁴¹Pu) were 2 10⁻² and 4 10⁻⁴ respectively.

RIFE 25, 2019

Table 2.17

Sellafield. These are small changes to the total dose and specific dose shown below. The apply to the relevant points of text, tables (S, 1.2, 1.3, 1.4, 2.17 and 6.1) and figures (S, 1.2, 2.1, 2.6, 2.7 and 2.8). The corrected data are shown below

Individual radiation exposures, Sellafield, 2019								
Representative person	Exposure, mSv per year							
	Total	Seafood (nuclear industry discharges)	Seafood (other discharges)	Other local food	External radiation from intertidal areas, river banks or fishing gear	Intakes of sediment and water	Gaseous plume related pathways	Direct radiation from site
'Total dose' - maximum effect of all sources								
Adult molluscs consumers	0.25^a	0.038	0.19	-	0.018	-	-	-
'Total dose' - maximum effect of liquid release source								
Adult molluscs consumers	0.25^a	0.038	0.19	-	0.018	-	-	-
Source specific doses								
Seafood consumers								
Local seafood consumers (habits averaged 2015-19)	0.27 ^b	0.036	0.21	-	0.027	-	-	-
Local seafood consumers (habits for 2019)	0.27 ^c	0.034	0.21	-	0.028	-	-	-

^a The dose due to nuclear industry discharges was 0.055 mSv

^b The dose due to nuclear industry discharges was 0.064mSv

^c The dose due to nuclear industry discharges was 0.062 mSv