

Table 1.

		³² P	³³ P	³⁵ S	⁴⁵ Ca	⁶¹ Cr	⁶⁹ Fe	⁸⁶ Rb	^{99m} Tc	¹²⁵ I
Annual total	1996	108	101	374	11	1	0	577	0	56
quantity of	1967	32	188	1	173	2	10	0	0	23
storage in	1998	7	138	0	256	0	0	0	0	38
RIC ^a	1999	206	9	353	10	256	0	0	0	1
(MBq)	2000	563	0	209	2	752	0	0	263	2
Annual total	1996	2.64x10 ⁻²⁶⁷	9.46x10 ⁻⁹	64	1.08x10 ²	1.26x10 ⁻⁹	0	1.17x10 ⁻¹²	0	1.82x10 ⁻¹
quantity of deca	1997	7.82x10 ⁻²⁶⁸	1.76x10 ⁻⁸	0	1.69x10 ³	2.77x10 ⁻⁹	3.78x10 ⁻⁴	1.77x10 ⁻¹⁶	0	7.47x10 ⁻²
in storage	1998	1.74x10 ⁻²⁶⁸	1.29x10 ⁻⁸	0	2.50x10 ³	0	1.22x10 ⁻⁶	1.51x10 ⁻¹⁶	0	1.23x10 ⁻¹
for 3 years ^b	1999	5.06x10 ⁻²⁶⁷	8.43x10 ⁻¹⁰	60	9.68x10 ²	3.22x10 ⁻⁷	0	1.91x10 ⁻¹⁶	0	1.17x10 ⁻³
(kBq)	2000	1.38x10 ⁻²⁶⁶	0	36	2.05x10	9.47x10 ⁻⁷	4.76x10 ⁻⁶	0	0	6.88x10 ⁻³
BSS exemption level										
(kBq)		1x10 ²	1x10 ⁵	1x10 ⁶	1x10 ⁴	1x10 ⁴	1	1x10 ³	1x10 ⁴	1x10 ³
Decay in		³² P	³³ P	³⁵ S	⁴⁵ Ca	⁶¹ Cr	⁶⁹ Fe	⁸⁶ Rb	^{99m} Tc	¹²⁵ I
storage	1996	1.50x10 ⁻¹⁷²	7.4x10 ⁻⁷	4	2	4.15x10 ⁻⁸	0	3.29x10 ⁻⁹	0	4.37x10 ⁻²
for 2 years	1997	4.48x10 ⁻¹⁷³	1.38x10 ⁻⁶	0	2.81x10	9.13x10 ⁻⁸	0	4.96x10 ⁻¹³	0	0
Radioactivity	1998	9.92x10 ⁻¹⁷⁴	1.01x10 ⁻⁶	0	4.16x10	0	3.4x10 ⁻⁴	4.21x10 ⁻¹³	0	0
(Bqg ⁻¹) ^a	1999	2.88x10 ⁻¹⁷²	6.60x10 ⁻⁸	4	2	1.06x10 ⁻⁶	0	5.36x10 ⁻¹³	0	4.13x10 ⁻⁴
	2000	7.86x10 ⁻¹⁷²	0	2	3.42x10 ⁻²	3.12x10 ⁻⁶	1.32x10 ⁻³	0	0	1.64x10 ⁻³
Decay in		³² P	³³ P	³⁵ S	⁴⁵ Ca	⁶¹ Cr	⁶⁹ Fe	⁸⁶ Rb	^{99m} Tc	¹²⁵ I
storage	1996	9.43x10 ⁻²⁶⁰	3.35x10 ⁻¹¹	0	0	4.37x10 ⁻¹²	0	0	0	6.26x10 ⁻⁴
for 3 years	1997	2.82x10 ⁻²⁶⁰	6.24x10 ⁻¹¹	3.01x10 ⁻⁴	6	9.62x10 ⁻¹²	1.34x10 ⁻⁹	0	0	2.57x10 ⁻⁴
Radioactivity	1998	6.22x10 ⁻²⁶¹	4.58x10 ⁻¹¹	2.92x10 ⁻⁴	9	0	4.32x10 ⁻⁹	0	0	4.23x10 ⁻⁴
(Bqg ⁻¹) ^a	1999	1.81x10 ⁻²⁶⁹	2.99x10 ⁻¹²	0	0	1.12x10 ⁻⁹	0	0	0	5.93x10 ⁻⁶
	2000	4.93x10 ⁻²⁶⁹	0	0	0	3.29x10 ⁻⁹	1.69x10 ⁻⁸	0	0	2.36x10 ⁻⁶
RS-G-1.7	(Bqg ⁻¹)	1x10 ³	1x10 ³	1x10 ²	1x10 ²	1x10 ²	1x10 ³	1x10 ²	1x10 ²	1x10 ²

a) RIC: Radioisotope Center, Okayama University

b) Annual RI storage amount that was decay in storage for 3 years.

c) Radioactivity concentration (Bqg⁻¹), which was annual RI storage amount divided by annual solid waste weight.

Table 2.

	No of dorum can	Weight of LLW (kg)	^{51}Cr (kBq)	$^{99\text{m}}\text{Tc}$ (kBq)	^{125}I (kBq)	^{32}P (kBq)	^{33}P (kBq)	^{35}S (kBq)	^{45}Ca (kBq)	^{59}Fe (kBq)
Com	31LB5210	6.3	50.3	0	10.41	0	0	6.96	0	0
	31LB5211	5.1	51.25	0	0	0	0	4.03	0	0
	31LB5212	5.3	42.29	0	11.55	0.01	0	0	0	0
	31LB5213	5.2	64.61	0	10.11	0.13	0	0	0	0
	31LB5214	6.8	11.29	0	24.24	0.27	0	0	0	0
	31LB5215	5.9	74.66	0	15.8	0.97	0	0	0	0
	31LB5216	6.3	33.65	0	0	0.10	0	0	0	0
	31LB5209	5.6	20.02	0	22.18	0	0.02	0	0	0
	31LB1636	6.1	100.02	0	0	0.01	0	0	0	0
	31LB1637	5.6	60.05	0	0	0.02	0	0	0	0
	32I8400	5.8	40.25	0	0	0.01	0	0	0	0.1
	31LB5208	6.7	90.01	0	0	0.01	0	0	0	0
Semi- Com	32I8387	11.5	0	0	0	0	0	0	1.01	0
	32I8388	10.6	0	0	0	0	0	0	1.003	0
	32I8389	12.6	0	0	0	0	0	5.45	0	0
	32I8390	8.6	0	0	0	0	0	50.82	0	1.0
	32I8402	10.3	50.05	0	9.4	0.02	0	40.19	0	0
	32I8403	8.3	2.30	0	20.67	0	0	19.2	0	0
	32I8404	10.1	5.32	0	3.04	0.01	0	36.5	0	0
	32I8405	9.4	11.80	0	1.87	2.90	0	20.33	0	0
	32I8406	10.3	10.26	0	0	0	0	0	0	0
	32I8391	8.2	90.19	0	0	0.01	0	0	0	0
	32I7034	9.9	93.33	0	14.9	0.97	0	0	0	0
	32I76992	10.3	67.83	0	0	2.21	0	0	0	0
	32I76995	12	45.05	0	0	2.06	0	0	0	0
	32I76994	8.9	69.51	0	13.11	0.07	0	0	0	0
	32I8418	10.2	2.53	0	0	0	0	0	0	0
	32I8384	8.3	70.47	0	6.02	0.04	0	0	0	0
	32I8385	9.8	0.23	0	5.02	0	0	0	0	0
	32I8401	9.3	40.41	0	0	0	0.003	0	0	0
	32I8386	10.2	60.04	0	0	0.01	0	0	0	0
	32I7033	8.9	0	262.5	0	0.86	0	0	0	0.7
	31LB1638	11.3	0.01	0	0	0	0	0	0	0
	32I7035	9.7	192.66	0	5.17	4.17	0	0	0	0
	32I8381	11.2	20.00	0	12.01	0.02	0	0	0	0
	32I8382	9.6	0.00	0	19.65	0.01	0	0	0	0
	32I8383	11.2	0.00	0	20.87	0.03	0	0	0	0
Total (kBq)		(321.4kg)	1470.39	10.51	226.02	14.92	0.023	183.48	2.013	1.8
Bqg ⁻¹ = Di			5.60	0.61	1.38	0.070	0.0015	2.86	0.091	0.079
Used RI activities ^a (kBq)			49013.0	262.5	2260.20	29.84	0.04	407.70	4.47	6.1x10 ⁻³
RS-G-1.7 (Bqg ⁻¹)=Ci			100.0	100.0	100.0	1000.0	1000.0	100.0	100	1.0
DiCi ⁻¹			0.056	0.006	0.014	0.000	0.000	0.029	0.001	0.079
Bqg ⁻¹ of furnace ash ^a			255.900	0.000	99.600	0.823	0.019	111.700	2.200	1.34x10 ⁻²
Calculated Bqg ⁻¹ (Ei) ^d			0.030	0.000	1.480	0.000	0.000	6.200	0.120	4.56x10 ⁻⁶
Exempt activities (Bq)			1x10 ⁷	1x10 ⁶	1x10 ⁶	1x10 ⁵	1x10 ³	1x10 ³	1x10 ⁷	1x10 ⁶

Com: combustible LLRW, Semi-com: semi-combustible LLRW

Date of incineration experiment: March 1-30, 2003

a: Radioactivity was corrected by incinerated day.

b: The total value of [radioactivity concentration of each radionuclide (Di) in LLRW2][clearance level (Ci) of each radionuclide according to RS-G-1.7]-1 is 0.185. $0.185 \times 2.87 = 0.531 < 1$

c: Total radioactivity concentration of incineration ash (March, 2003).

d: Calculated total radioactivity concentrations of incinerated ash after decay in storage for one year (March, 2004).

The total value of EiCi⁻¹ is 0.0783. $0.0783 \times 2.87 = 0.225 < 1$ $\Sigma \text{DiCi}^{-1} = 0.185^b$ $\Sigma \text{EiCi}^{-1} = 0.0783^d$

Table 3												
LLRW group	Used RI (kBq) ^a	Disposal quantity (kBq) ^a	Bqg ⁻¹ of ashe after storage for one year	Radioactivity concentration of incineration ash after decay in storage for 7 years. (Bqg-1)								
				³ H	¹⁴ C	⁴⁰ K	²¹² Pb	²²⁴ Ra	²¹⁴ Pb	²¹⁴ Bi	²¹² Bi	²²⁸ Ac
A P	3590	97	4.7x10 ⁻⁶	BG	BG	0.085	0.058	0	0.0375	0.018	0	0.036
³² p	1430	14.92	3.0x10 ⁻⁷	BG	BG	0.933	0.035	0	0.0371	0.025	0	0.060
³² p	2360	715	3.0x10 ⁻⁶	BG	BG	0.380	0.019	0	0	0	0	0
³³ p	12.3	0.02	2.4x10 ⁻⁶	BG	BG	0.401	0.022	0	0.0188	0	0	0
A Cr	3500	105	0.04	BG	BG	0.921	0.014	0	0.0287	0.000	0	0.061
⁵¹ Cr	8690	251.9	0.08	BG	BG	0.804	0.054	0.0160	0	0.027	0	0.050
A I	362	36.2	1.69	BG	BG	0.456	0.016	0.0194	0	0	0	0.017
¹²⁵ I	295	29.5	1.04	BG	BG	2.537	0.065	0	0.0127	0.030	0	0.047
¹²³ I	1130.1	322.6	3.9x10 ⁻⁷	BG	BG	0.431	0.026	0.0959	0.0400	0.035	0.115	0.087
A Ca	26.1	1.01	0.56	BG	BG	0.698	0.029	0.0232	0	0	0	0
⁴⁶ Ca	19.5	1.003	0.65	BG	BG	0.089	0.017	0	0.0181	0	0	0
AS	643.1	40.19	5.87	BG	BG	0.460	0.029	0	0.0307	0.023	0	0.026
³⁵ S	482.2	36.5	4.46	BG	BG	0.782	0.018	0.020	0.0095	0.000	0	0
ATc	682.5	136.5	0	BG	BG	0.571	0.022	0	0	0	0	0
^{99m} Tc	2520	126	0	BG	BG	0.454	0.000	0	0.0248	0	0	0
BH	25	22.5	0	BG	BG	0.399	0.028	0.0616	0.0327	0.020	0.114	0.028
³ H	36	18	0	BG	BG	0.739	0.021	0	0.0295	0.022	0	0.019
BC	660	632.2	1.82 ^b	BG	1.81 ^a	0.141	0.015	0	0	0.016	0	0
¹⁴ C	650	614.3	1.83 ^b	BG	NE	0.291	0.062	0	0.0193	0.024	0	0.007
	31LB5208-16			BG	BG	0.086	0.031	0.0676	0.0307	0.021	0.120	0.037
	31LB1632-35			BG	BG	BG	0.022	0	0	0	0	0.0
LL- RW2	31LB1636-38	(Data of LLRW2 are showed on Table 2)		BG	BG	0.086	0.022	0	0.0345	0.027	0	0.029
	32II8401-06			BG	BG	0.571	0.017	0	0	0.016	0	0
	32II8387-91			BG	BG	0.516	0.073	0	0.0243	0.029	0	0.008
	32II8381-86			BG	BG	4.602	0	0	0	0.020	0	0
	32IJ6992-95			BG	BG	0.343	0.044	0.0164	0	0.022	0	0.048
	32IJ7033-35			BG	BG	0.466	0.021	0	0.0172	0	0	0
Maximum Bq g ⁻¹ divided by the RS-G-1.7 for each nuclide				0	0	0.406	0.073	0.0959	0.0287	0.035	0.12	0.061
BH	25	22.5	0	BG	BG	0.399	0.028	0.0616	0.0327	0.020	0.114	0.028
³ H	36	18	0	BG	BG	0.739	0.021	0	0.0295	0.022	0	0.019
BC	660	632.2	1.82 ^b	BG	1.81 ^a	0.141	0.015	0	0	0.016	0	0
¹⁴ C	650	614.3	1.83 ^b	BG	NE	0.291	0.062	0	0.0193	0.024	0	0.007
Detectability (Bqg ⁻¹)				0.1	0.051	0.085	0.014	0.015	0.012	0.014	0.05	0.053
Exemption activity (Bq)				1x10 ⁴	1x10 ⁷	1x10 ⁶	1x10 ⁶	1x10 ⁶	1x10 ⁶	1x10 ⁶	1x10 ⁶	1x10 ⁶
RS-G-1.7 (Bq g ⁻¹)				100	1	10	1	1	1	1	1	1

a: total radioactivity concentration of solid LLRW was corrected by incinerated day.

b: radioactivity concentration in the cyclone ash after incineration.

Radioactivity of ¹⁴C in the furnace ash and wall ashen was not detected.

c: radioactivity concentration in the cyclone ash after decay-in-storage for 7 years.

d: summation of Bqg-1 divided by the RS-G-1.7 value for each nuclide.

NE: not examined, BG: back ground level

Data of disposal quontites and Bqg-1 of ashe after storage for one year of the LLRW2 are showed on Table 2.