

TABLE 1A - REG GUIDE 1.21

CALVERT CLIFFS NUCLEAR POWER PLANT  
EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT  
SECOND HALF - 1991

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES (11)

A. FISSION AND ACTIVATION GASES	UNITS	3RD QUARTER	4TH QUARTER	EST. TOTAL ERROR, %
1. Total Release	Ci	5.04E+02	6.74E+02	$\pm 5.40E+00$
2. Average release rate for period	uCi/sec	6.34E+01	8.48E+01	
3. Percent of Tech. Spec. limit(1)	%	1.36E-02	1.80E-02	
4. Percent of Tech. Spec. limit(2)	%	1.63E-02	2.18E-02	
5. Percent of Tech. Spec. limit(3)	%	1.94E-01	2.57E-01	
6. Percent of Tech. Spec. limit(4)	%	9.70E-02	1.29E-01	
7. Percent of Tech. Spec. limit(5)	%	2.17E-01	2.92E-01	
8. Percent of Tech. Spec. limit(6)	%	1.08E-01	1.46E-01	
<b>B. IODINES</b>				
1. Total Iodine - 131	Ci	1.42E-03	7.12E-03	$\pm 6.50E+00$
2. Average release rate for period	uCi/sec	1.79E-04	8.96E-04	
3. Percent of Tech. Spec. limit(7)	%	4.24E-04	2.13E-03	
4. Percent of Tech. Spec. limit(8)	%	2.72E-01	1.36E+00	
5. Percent of Tech. Spec. limit(9)	%	1.36E-01	6.82E-01	
<b>C. PARTICULATES</b>				
1. Particulates with half lives greater than 8 days (12)	Ci	7.89E-07	1.12E-06	$\pm 2.80E+01$
2. Average release rate for period	uCi/sec	9.93E-08	1.40E-07	
3. Percent of Tech. Spec. limit(7)	%	0.00E+00	8.03E-10	
4. Percent of Tech. Spec. limit(8)	%	0.00E+00	5.26E-07	
5. Percent of Tech. Spec. limit(9)	%	0.00E+00	2.63E-07	
6. Gross alpha radioactivity	Ci	7.89E-07	1.07E-06	$\pm 5.36E+01$

7pp

TABLE 1A - REG GUIDE 1.21 (Cont.)

CALVERT CLIFFS NUCLEAR POWER PLANT  
EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT  
SECOND HALF - 1991

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

D. TRITIUM	UNITS	3RD QUARTER	4TH QUARTER	EST. TOTAL ERROR, %
1. Total Release	Ci	4.69E+00	6.39E-01	$\pm 1.32E+01$
2. Average release rate for period	uCi/sec	2.98E-01	4.06E-02	

NOTES TO TABLE 1A

- (1) Percent of I.A.1 whole body dose rate limit (500 mrem/year)
- (2) Percent of I.A.1 skin dose rate limit (3000 mrem/year)
- (3) Percent of I.A.3 gamma quarterly dose limit (10 mrad)
- (4) Percent of I.A.3 gamma yearly dose limit (20 mrad)
- (5) Percent of I.A.3 beta quarterly dose limit (20 mrad)
- (6) Percent of I.A.3 beta yearly dose limit (40 mrad)
- (7) Percent of I.B.1 organ dose limit (1500 mrem/year)
- (8) Percent of I.B.3 quarterly dose limit (15 mrem)
- (9) Percent of I.B.3 yearly dose limit (30 mrem)
- (10) Less than minimum detectable activity which meets the LLD requirements of Technical Specification Surveillance Requirement 4.11.2.1.2.
- (11) The results appearing in Table 1A are based on the activities of the individual radionuclides listed in Table 1C. Where intermediate calculations have been performed, the results of these intermediate calculation were not rounded to three significant figures. In this way, numerical rounding was applied only to the final values which appear in Table 1A.
- (12) The curies reported on line C.1 includes the gross alpha radioactivity reported on line C.6 of this table.

TABLE 1C - REG GUIDE 1.21

CALVERT CLIFFS NUCLEAR POWER PLANT  
EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT  
SECOND HALF - 1991

GASEOUS EFFLUENTS - GROUND LEVEL RELEASES

		UNITS	CONTINUOUS MODE		BATCH MODE	
1. FISSION AND ACTIVATION GASES			3RD QUARTER	4TH QUARTER	3RD QUARTER	4TH QUARTER
Argon	-41	Ci	(2)	(2)	3.44E-05	1.58E-03
Krypton	-85	Ci	(2)	(2)	1.58E+00	5.70E+00
Krypton	-85m	Ci	4.49E+00	5.73E+00	2.37E-05	1.19E-07
Krypton	-87	Ci	(2)	1.07E+00	(2)	(2)
Krypton	-88	Ci	(2)	(2)	(2)	(2)
Xenon	-131m	Ci	(2)	(2)	8.51E-02	6.16E-01
Xenon	-133	Ci	4.35E+02	5.51E+02	8.12E-01	3.19E+01
Xenon	-133m	Ci	(2)	(2)	4.64E-04	5.66E-02
Xenon	-135	Ci	6.18E+01	7.76E+01	4.07E-04	3.04E-02
Xenon	-138	Ci	(2)	(2)	(2)	(2)
Total for Period		Ci	5.01E+02	6.35E+02	2.48E+00	3.83E+01
2. HALOGENS						
Iodine	-131	Ci	1.42E-03	7.12E-03	(1)	9.85E-07
Iodine	-133	Ci	1.08E-02	1.03E-02	(1)	2.65E-08
Total For Period		Ci	1.22E-02	1.74E-02	(1)	1.01E-06

TABLE 1C - REG GUIDE 1.21 (Cont.)

CALVERT CLIFFS NUCLEAR POWER PLANT  
EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT  
SECOND HALF - 1991

GASEOUS EFFLUENTS - GROUND LEVEL RELEASES

		CONTINUOUS MODE		BATCH MODE	
3. PARTICULATES	UNITS	3RD QUARTER	4TH QUARTER	3RD QUARTER	4TH QUARTER
Manganese -54	Ci	(2)	(2)	(1)	(1)
Iron -59	Ci	(2)	(2)	(1)	(1)
Cobalt -58	Ci	(2)	(2)	(1)	(1)
Cobalt -60	Ci	(2)	(2)	(1)	(1)
Zinc -65	Ci	(2)	(2)	(1)	(1)
Rubidium -88	Ci	(2)	(2)	7.91E-05	(1)
Strontium -89	Ci	(2)	(2)	(1)	(1)
Strontium -90	Ci	(2)	(2)	(1)	(1)
Molybdenum -99	Ci	(2)	(2)	(1)	(1)
Cesium -134	Ci	(2)	(2)	(1)	1.40E-08
Cesium -137	Ci	(2)	(2)	(1)	3.21E-08
Cerium -141	Ci	(2)	(2)	(1)	(1)
Cerium -144	Ci	(2)	(2)	(1)	(1)
Gross Alpha Radioactivity	Ci	7.89E-07	1.07E-06	(1)	(1)
Total For Period	Ci	7.89E-07	1.07E-06	7.91E-05	4.61E-08

NOTES TO TABLE 1C

- (1) Iodines and particulates in batch releases are accounted for with the main vent continuous samplers when the release is made through the plant main vent.
- (2) Less than minimum detectable activity which meets the LLD requirements of Technical Specification Surveillance Requirement 4.11.2.1.2.

TABLE 2A - REG GUIDE 1.21

CALVERT CLIFFS NUCLEAR POWER PLANT  
EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT  
SECOND HALF - 1991

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES (7)

A. FISSION AND ACTIVATION PRODUCTS	UNITS	3RD QUARTER	4TH QUARTER	EST. TOTAL ERROR, %
1. Total Release (not including tritium, gases, alpha)	Ci	5.89E-01	1.62E-01	$\pm 1.03E+01$
2. Average diluted concentration during period	uCi/ml	1.18E-08	7.71E-10	
3. Percent of Tech. Spec. limit(1)	%	8.45E-02	1.75E-04	
4. Percent of Tech. Spec. limit(2)	%	4.25E-02	8.75E-02	
5. Percent of Tech. Spec. limit(3)	%	5.59E-01	2.50E-02	
6. Percent of Tech. Spec. limit(4)	%	2.79E-01	1.25E-02	
<b>B. TRITIUM</b>				
1. Total Release	Ci	4.33E+02	4.52E+02	$\pm 9.80E+00$
2. Average diluted concentration during period	uCi/ml	8.66E-06	2.15E-06	
3. Percent of applicable limit(5)	%	2.89E-01	7.17E-02	
<b>C. DISSOLVED AND ENTRAINED GASES</b>				
1. Total Release	Ci	2.94E-02	1.76E-01	$\pm 4.60E+00$
2. Average diluted concentration during period	uCi/ml	5.89E-10	8.37E-10	

TABLE 2A - REG GUIDE 1.21 (Cont.)

**CALVERT CLIFFS NUCLEAR POWER PLANT  
EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT  
SECOND HALF - 1991**

**LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES**

<b>D. GROSS ALPHA RADIOACTIVITY</b>	<b>UNITS</b>	<b>3RD QUARTER</b>	<b>4TH QUARTER</b>	<b>EST. TOTAL ERROR, %</b>
1. Total Release	Ci	2.23E-05	8.35E-05	$\pm 5.36E+01$
<b>E. VOLUME OF WASTE RELEASED (prior to dilution)</b>	liters	9.73E+06	3.15E+07	$\pm 1.30E+00$
<b>F. VOLUME OF DILUTION WATER USED DURING PERIOD</b>	liters	5.00E+10	2.10E+11	$\pm 1.64E+01$

**NOTES TO TABLE 2A**

- (1) Percent of I.C.3 Quarterly Organ Dose Limit (10 mrem) to maximum exposed organ
- (2) Percent of I.C.3 Yearly Organ Dose Limit (20 mrem) to maximum exposed organ
- (3) Percent of I.C.3 Quarterly Whole Body Dose Limit (3 mrem)
- (4) Percent of I.C.3 Yearly Whole Body Dose Limit (6 mrem)
- (5) Limit used is  $3 \times 10^{-3}$  uCi/ml
- (6) Less than minimum detectable activity which meets the LLD requirements of Technical Specification Surveillance Requirement 4.11.1.1.1.
- (7) The results appearing in Table 2A are based on the activities of the individual radionuclides listed in Table 2B. Where intermediate calculations have been performed, the results of these intermediate calculation were not rounded to three significant figures. In this way, numerical rounding was applied only to the final values which appear in Table 2A.



TABLE 2B - REG GUIDE 1.21

CALVERT CLIFFS NUCLEAR POWER PLANT  
EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT  
SECOND HALF - 1991

LIQUID EFFLUENTS

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED (2)	UNITS	3RD QUARTER	4TH QUARTER	3RD QUARTER	4TH QUARTER
Sodium -24	Ci	(1)	(1)	8.74E-05	(1)
Chromium -51	Ci	(1)	(1)	(1)	1.24E-03
Manganese -54	Ci	(1)	(1)	1.02E-03	1.92E-04
Cobalt -57	Ci	(1)	(1)	(1)	(1)
Cobalt -58	Ci	(1)	(1)	1.50E-02	7.28E-02
Iron -59	Ci	(1)	(1)	(1)	4.52E-06
Cobalt -60	Ci	(1)	(1)	8.47E-03	4.82E-03
Zinc -65	Ci	(1)	(1)	(1)	(1)
Strontium -89	Ci	(1)	(1)	3.28E-03	1.17E-03
Strontium -90	Ci	(1)	(1)	2.93E-04	2.14E-04
Strontium -92	Ci	(1)	(1)	(1)	(1)
Niobium -95	Ci	(1)	(1)	2.85E-04	1.78E-03
Niobium -97	Ci	(1)	(1)	1.41E-04	1.10E-03
Zirconium -95	Ci	(1)	(1)	(1)	8.95E-04
Molybdenum -99	Ci	(1)	(1)	(1)	(1)
Technetium -99m	Ci	(1)	(1)	5.72E-04	3.05E-04
Ruthenium -106	Ci	(1)	(1)	(1)	(1)
Silver -110m	Ci	(1)	(1)	5.82E-03	1.92E-03
Tin-113	Ci	(1)	(1)	(1)	
Antimony -122	Ci	(1)	(1)	3.71E-05	6.04E-06
Antimony -125	Ci	(1)	(1)	1.39E-02	1.63E-05
Tellurium -132	Ci	(1)	(1)	(1)	(1)

TABLE 2B - REG GUIDE 1.21 (Cont.)

CALVERT CLIFFS NUCLEAR POWER PLANT  
EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT  
SECOND HALF - 1991

LIQUID EFFLUENTS

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED (2)	UNITS	3RD QUARTER	4TH QUARTER	3RD QUARTER	4TH QUARTER
Iodine -131	Ci	(1)	(1)	1.85E-02	1.64E-02
Iodine -132	Ci	(1)	(1)	(1)	8.29E-06
Iodine -133	Ci	(1)	(1)	1.82E-02	1.93E-03
Iodine -135	Ci	(1)	(1)	1.86E-04	(1)
Cesium -134	Ci	(1)	(1)	9.42E-02	1.88E-02
Cesium -136	Ci	(1)	(1)	(1)	1.12E-05
Cesium -137	Ci	(1)	(1)	4.06E-01	3.78E-02
Barium -140	Ci	(1)	(1)	1.33E-03	(1)
Lanthanum -140	Ci	(1)	(1)	1.67E-03	5.25E-04
Cerium -144	Ci	(1)	(1)	1.87E-04	(1)
Tungsten -187	Ci	(1)	(1)	2.21E-04	(1)
Total For Period	Ci	(1)	(1)	5.89E-01	1.62E-01

Krypton -85	Ci	(1)	(1)	(1)	5.56E-02
Xenon -131m	Ci	(1)	(1)	(1)	(1)
Xenon -133	Ci	(1)	(1)	2.85E-02	1.18E-01
Xenon -133m	Ci	(1)	(1)	(1)	1.50E-03
Xenon -135	Ci	(1)	(1)	9.46E-04	7.37E-04
Xenon -135m	Ci	(1)	(1)	(1)	(1)
Total For Period	Ci	(1)	(1)	2.94E-02	1.76E-01



TABLE 3A

CALVERT CLIFFS NUCLEAR POWER PLANT  
EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT  
SECOND HALF - 1991

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (NOT IRRADIATED FUEL)

1. Type of Waste	UNITS	6-MONTH PERIOD	EST. TOTAL ERROR %
a. Dewatered spent resin	m <sup>3</sup> Ci	6.81E+00 5.00E+01	±2.00E+01
b. Dry Compressible Waste (Burial) Contaminated Equipment, etc. (Prior to compaction)	m <sup>3</sup> Ci m <sup>3</sup>	7.01E+01 1.32E+01 5.40E+02	±5.00E+01
c. Irradiated Components, Control Rods, etc.	m <sup>3</sup> Ci	6.20E-01 4.32E+03	±5.00E+01
d. Other (CVCS Filters)	m <sup>3</sup> Ci	--- ---	---

2. Estimate of Major Nuclides (By Type of Waste - Only nuclides >1 % are reported)

a.	
Fe-55	4.55E+00%
Co-58	1.55E+00%
Co-60	2.95E+00%
Ni-63	1.06E+01%
Sb-125	1.10E+00%
Cs-134	1.96E+01%
Cs-137	5.50E+01%
b.	
C-14	2.05E+00%
Cr-51	9.62E+00%
Fe-55	3.55E+01%
Co-58	1.52E+00%
Co-60	1.01E+01%
Ni-63	1.31E+01%
Ru-106	2.52E+00%
Ag-110m	1.41E+00%
Sb-125	4.75E+00%
Cs-134	2.70E+00%
Cs-137	1.07E+01%
c.	
Mn-54	1.20E+00%
Fe-55	5.66E+01%
Co-60	3.80E+01%
Ni-63	4.00E+00%