CALVERT CLIFFS NUCLEAR POWER PLANT
EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT
SUPPLEMENTAL INFORMATION

Facility - Calvert Cliffs Nuclear Power Plant

Licensee - Baltimore Gas & Electric Company

I. REGULATORY LIMITS

A. Fission and Activation Gases

1. The instantaneous release rate of noble gases in gaseous effluents shall not result in a site boundary dose rate in excess of 500 mrem/year to the whole body or 3000 mrem/year to the skin (Technical Specification 3/4.11.2.1).

2. Gaseous Radwaste Treatment System and the Ventilation Exhaust Treatment System shall be used to reduce gaseous emissions when the calculated gamma dose due to gaseous effluents exceeds 1.20 mrad or the calculated beta dose due to gaseous effluents exceeds 2.40 mrad at the site boundary in a 92 day period (Technical Specification 3/4.11.2.4).

3. The air dose at the site boundary due to noble gases released in gaseous effluents shall not exceed (Technical Specification 3/4.11.2.2):

   10 mrad/qtr, gamma air

   20 mrad/qtr, beta air

   20 mrad/year, gamma air

   40 mrad/year, beta air

4. All of the above parameters are calculated according to the methodology specified in the Offsite Dose Calculation Manual (ODCM).

B. Iodines and Particulates with Half Lives Greater than Eight Days

1. The instantaneous release rate of iodines and particulates in gaseous effluents shall not result in a site boundary dose rate in excess of 1500 mrem/year to any organ (Technical Specification 3/4.11.2.1).

2. The Gaseous Radwaste Treatment System and the Ventilation Exhaust Treatment System shall be used to reduce radioactive materials in gaseous effluents when calculated doses exceed 1.8 mrem to any organ in a 92 day period at or beyond the site boundary (Technical Specification 3/4.11.2.4).

3. The dose to a member of the public at or beyond the site boundary from iodine-131 and particulates with half lives greater than eight days in gaseous effluents shall not exceed (Technical Specification 3/4.11.2.3):

   15 mrem/qtr, any organ

   30 mrem/year, any organ

less than 0.1% of the above limits as a result of burning contaminated oil.

4. All of the above parameters are calculated according to the methodology specified in the ODCM.

C. Liquid Effluents

1. The concentrations of radionuclides in liquid effluents from the plant shall not exceed the values specified in 10 CFR Part 20, Appendix B, for unrestricted areas (Technical Specification 3/4.11.1.1).

2. The liquid radwaste treatment system shall be used to reduce the concentration of radionuclides in liquid effluents from the plant when the calculated doses to unrestricted areas exceed 0.36 mrem to the whole body, or 1.20 mrem to any organ in a 92 day period (Technical Specification 3/4.11.1.3).

3. The dose to a member of the public in unrestricted areas shall not exceed (Technical Specification 3/4.11.1.2):

3 mrem/qtr, total body

10 mrem/qtr, any organ

6 mrem/year, total body

20 mrem/year, any organ

4. All of the liquid dose parameters are calculated according to the methodology specified in the ODCM.

II. MAXIMUM PERMISSIBLE CONCENTRATIONS

A. Fission and Activation Gases

Prior to the batch release of gaseous effluents, a sample of the source is collected and analyzed by gamma spectroscopy for the principal gamma emitting radionuclides. The identified radionuclide concentrations are evaluated and an acceptable release rate is determined to ensure that the dose rate limits of Technical Specification 3/4.11.2.1 are not exceeded.

B. Iodines and Particulates with Half Lives Greater than Eight Days

Compliance with the dose rate limitations for iodines and particulates is demonstrated by analysis of the charcoal and particulate samples of the station main vents. The charcoal samples are analyzed by gamma spectroscopy for quantification of any release of radioiodines. The particulate samples are analyzed by gamma spectroscopy for quantification of particulate radioactive material. All of the above parameters are calculated according to the methodology specified in the Offsite Dose Calculation Manual (ODCM).

C. Liquid Effluents

The MPCs used for radioactive materials released in liquid effluents are in accordance with Technical Specification 3/4.11.1.1 and the values from 10 CFR 20, Appendix B, including applicable table notes. In all cases, the more restrictive (lower) MPC found for each radionuclide is used regardless of solubility.

III. TECHNICAL SPECIFICATION REPORTING REQUIREMENTS (Section 6.9.1.8)

A. Previous Calendar Year (1992) Dose Assessment Summary

During 1992, liquid releases from Calvert Cliffs resulted in a calculated maximum annual organ dose of 0.40 mrem and a maximum whole body dose of 0.08 mrem. These doses are less than 2.1% of the Technical Specification yearly organ dose limit and less than 1.3% of the Technical Specification yearly dose limit for the whole body. These doses were calculated using the methodology and parameters outlined in the ODCM. The controlling pathway was the fish and shellfish pathway with adult as the controlling age group, and the gastrointestinal tract representing the organ with the highest calculated dose.

Gaseous releases of noble gases resulted in a maximum, quarterly, gamma-air dose of 0.04 mrad and a maximum, quarterly, beta-air dose of 0.11 mrad. Iodines and particulates in gaseous effluents from Calvert Cliffs resulted in a maximum organ dose of 0.48 mrem for the year via the child-infant-thyroid pathway. These doses were calculated using ODCM methodology. For 1992, calculated off-site doses via the gaseous release pathways were below 1.6% of their allowable Technical Specification limits.

B. 40 CFR 190 Total Dose Compliance

Based upon all releases for 1992 and the ODCM calculations, the maximum exposed individual would receive less than 2% of the allowable dose. During 1992, there were no on-site sources of direct radiation that would have contributed to a significant or measurable off-site dose. The direct radiation contribution is measured by both on-site and off-site thermoluminescent dosimeters (TLDs). The results of these measurements did not indicate any statistical increase in off-site radiation doses attributable to on-site sources. Therefore, no increase in the off-site calculated dose is attributable to the direct exposure from on-site sources. A more detailed evaluation will be reported in the Annual Radiological Environmental Operating Report.

C. Solid Waste Report Requirements

During the second half of 1992, the types of radioactive solid waste shipped from Calvert Cliffs were radioactive resin, which was dewatered and shipped in high integrity containers, low level radioactive resin which was dewatered and shipped in strong, tight containers, dry compressible waste, which was shipped as LSA waste in strong, tight containers, and irradiated waste which was shipped in a high-integrity steel container. Appendix A provides a detailed breakdown of the waste shipments for the second half of 1992 per the categories specified in Technical Specification 6.9.1.8.

D. ODCM and Process Control Program (PCP) Changes

One change was made to the ODCM during the second half of 1992. The change was reviewed by POSRC and approved by the Plant General Manager, Calvert Cliffs Nuclear Power Plant, prior to implementation. The scope and basis for this change is discussed in Appendix B. In keeping with the requirement of the Technical Specification 6.17, a copy of the approved change to the CCNPP ODCM is enclosed in Attachment 1.

No changes were made in the PCP in the second half of 1992.

E. Radioactive Gaseous Effluent Monitoring Instrumentation

None of the Technical Specification effluent monitors were out of service for greater than 30 days.

IV. AVERAGE ENERGY

Not Applicable.

V. MEASUREMENTS AND APPROXIMATIONS AND TOTAL RADIOACTIVITY

A. Fission and Activation Gases

1. Batch Releases

Prior to each batch release of gas from a pressurized gas decay tank, a sample is collected and analyzed by gamma spectroscopy using a Germanium (Ge) detector for the principal gamma emitting noble gas radionuclides. The total activity released is based on the pressure/volume relationship (gas laws) of the tank.

Prior to and after each containment purge, a gas sample is collected and analyzed by gamma spectroscopy using a Ge detector for the principal gamma emitting noble gas radionuclides. The total activity released is based on containment volume and purge rate. Activity buildup while purging is also considered.

2. Continuous Releases

A gas sample is collected at least weekly from the main vents and analyzed by gamma spectroscopy using a Ge detector for the principal gamma emitting noble gas radionuclides. The total activity released for the week is based on the total sample activity decay corrected to the sample time, multiplied by the main vent flow for the week.

A monthly composite sample is collected from the main vents and analyzed by liquid scintillation for tritium. The total tritium release for the month is based on this sample analysis and the vent flow.[1]

B. Iodine and Particulates

1. Batch Releases

The total activities of radioiodines and particulates released from pressurized waste gas decay tanks, containment purges, and containment vents are accounted for by the continuous samplers on the main vent.

2. Continuous Releases

During the release of gas from the main vents, samples of iodines and particulates are collected using a charcoal and particulate filter, respectively. The filters are removed weekly and are analyzed by gamma spectroscopy using a Ge detector for significant gamma emitting radionuclides. The total activity released for the week is based on the total sample activity decay corrected to the midpoint of the sample period multiplied by the main vent flow for the week. These weekly particulate filters are then composited to form monthly and quarterly composites for the gross alpha and strontium 89 and 90 analyses.

C. Liquid Effluents

1. Batch Releases

Prior to the release of liquid from a waste tank, a sample is collected and analyzed by gamma spectroscopy for the principal gamma emitting radionuclides. To demonstrate compliance with the requirements addressed in Section I.C.1 above, the measured radionuclide concentrations are compared with the allowable MPCs; dilution in the discharge conduit is considered, and an allowable release rate is verified.

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[1] Analysis results from the tritium sample for October 1992 erroneously indicated main vent tritium concentrations several orders of magnitude larger (i.e., 1E-7 uCi/cc) than the concentrations normally experienced (i.e., 1E-10 uCi/cc). This erroneous analysis result was thought to be linked to a plant evolution where a pressure relief valve on the steam generator blowdown tank discharged secondary side steam to the plant vent stack. This steam saturated the tritium sampler's silica gel. It is postulated that at some point in time -- either before sample collection or after sample collection -- the sample was contaminated. It is hypothesized that this contamination was the source of the erroneous analysis result. The plant data which supports this hypothesis is as follows. (1) The primary to secondary leak rate did not change significantly during the September/October timeframe, (2) the tritium concentration in the liquid radwaste processing system did not change significantly during the September/October timeframe, and (3) there were no indications of commensurate increases in the concentrations of any other radionuclides in the plant vent during the September/October timeframe. In lieu of reporting the erroneous analysis results, it was determined that the tritium concentrations from the previous or following months (i.e., September or November) -- whichever was greater -- would be used to account for the tritium activity released from the Unit 1 plant vent stack during October 1992. Since the September, Unit 1, plant vent stack tritium concentration (i.e., 6.41E-10 uCi/cc) was greater than the November, Unit 1 plant vent stack tritium concentration (3.32E-11 uCi/cc), the September value was chosen as the best estimate for the October, Unit 1 plant vent stack tritium concentration.

The total activity released in each batch is determined by multiplying the volume released by the concentration of each radionuclide. The actual volume released is based on the difference in tank levels prior to and after the release. A proportional composite sample is also withdrawn for each release and this is used in turn to prepare monthly and quarterly composites for the gross alpha, strontium 89 and 90, and tritium analyses.

2. Continuous Releases

Prior to discharge of any continuous releases, a sample is collected and analyzed by gamma spectroscopy for the principal gamma emitting radionuclides. The measured radionuclide concentrations are compared with the allowable MPC concentrations in the discharge conduit, and an allowable release rate is verified.

When steam generator blowdown is discharged to the circulating water conduits, it is sampled daily and these samples are used in turn to prepare a weekly blowdown composite sample based on each day's blowdown. The weekly composite sample is analyzed by gamma spectroscopy for the principal gamma emitting radionuclides. These results are multiplied by the actual quantity of blowdown to determine the total activity released. The weekly composite is also used to prepare monthly and quarterly composites for tritium, gross alpha, and strontium 89 and 90 analyses.

During primary to secondary leakage, the secondary system becomes contaminated and subsequently, contaminates the turbine plant sumps. This low-level activity water (predominately tritium) is released directly to the Chesapeake Bay. This water is sampled at least weekly and composited. These samples are added to a composite based on the amount released during that week. The composite sample is analyzed monthly for tritium and principal gamma emitting radionuclides. The results are multiplied by the actual quantity of liquid released to determine the total activity released. This composite is used to prepare quarterly samples for strontium 89 and 90 analyses.

D. Estimation of Total Error

Total error for all releases was estimated using, as a minimum, the random counting error associated with typical releases. In addition to this random error, the following systematic errors were also examined:

1. Liquid

a. Error in volume of liquid released prior to dilution during batch releases.

b. Error in volume of liquid released via steam generator blowdown.

c. Error in amount of dilution water used during the reporting period.

2. Gases

   a. Error in main vent release flow.

   b. Error in sample flow rate.

   c. Error in containment purge release flow.

   d. Error in gas decay tank pressure.

   Where errors could be estimated they are usually considered additive.

VI. BATCH RELEASES

		1992	
		3RD QUARTER	4TH QUARTER
A.	**Liquid**		
1.	Number of batch releases	1.25E+02	1.24E+02
2.	Total time period for batch releases (min)	1.33E+04	2.04E+04
3	Maximum time period for a batch release (min)	6.52E+02	1.30E+03
4.	Average time period for batch releases (min)	1.06E+02	1.65E+02
5.	Minimum time period for a batch release (min)	2.00E+00	2.00E+00
6.	Average stream flow during periods of effluent into a flowing stream (liters/min of dilution water)	4.47E+06	4.48E+06
B.	**Gaseous**		
1.	Number of batch releases	2.50E+01	1.10E+01
2.	Total time period for batch releases (min)	4.14E+04	5.00E+03
3.	Maximum time period for a batch release (min)	7.60E+03	2.54E+03
4.	Average time period for batch release (min)	1.65E+03	4.54E+02
5.	Minimum time period for a batch release (min)	3.50E+01	1.50E+01

VII. ABNORMAL RELEASES

		1992	
		3RD QUARTER	4TH QUARTER
A.	**Liquid**		
1.	Number of releases	- 0 -	- 0 -
2.	Total activity released (Curies)	- 0 -	- 0 -
B.	**Gaseous**		
1.	Number of releases	- 0 -	- 0 -
2.	Total activity releases (Curies)	- 0 -	- 0 -

TABLE 1A - REG GUIDE 1.21

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GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

A. FISSION AND ACTIVATION GASES	UNITS	3RD QUARTER	4TH QUARTER	EST. TOTAL ERROR, %
1. Total Release	Ci	2.88E+01	9.57E+01	±5.40E+00
2. Average release rate for period	uCi/sec	3.62E+00	1.20E+01	
3. Percent of Tech. Spec. limit(1)	%	6.17E-04	3.04E-03	
4. Percent of Tech. Spec. limit(2)	%	8.19E-04	3.11E-03	
5. Percent of Tech. Spec. limit(3)	%	8.84E-03	4.29E-02	
6. Percent of Tech. Spec. limit(4)	%	4.42E-03	2.14E-02	
7. Percent of Tech. Spec. limit(5)	%	2.71E-02	8.82E-02	
8. Percent of Tech. Spec. limit(6)	%	1.36E-02	4.41E-02	
B. IODINES				
1. Total Iodine - 131	Ci	6.67E-04	7.55E-04	±6.50E+00
2. Average release rate for period	uCi/sec	8.39E-05	9.50E-05	
3. Percent of Tech. Spec. limit(7)	%	1.99E-04	2.26E-04	
4. Percent of Tech. Spec. limit(8)	%	5.02E-03	5.69E-03	
5. Percent of Tech. Spec. limit(9)	%	2.51E-03	2.84E-03	
C. PARTICULATES				
1. Particulates with half lives greater than 8 days	Ci	3.21E-05	6.20E-06	±2.80E+01
2. Average release rate for period	uCi/sec	4.04E-06	7.80E-07	
3. Percent of Tech. Spec. limit(7)	%	5.26E-07	1.04E-07	
4. Percent of Tech. Spec. limit(8)	%	3.56E-04	6.81E-05	
5. Percent of Tech. Spec. limit(9)	%	1.78E-04	3.40E-05	
6. Gross alpha radioactivity	Ci	4.60E-10	(10)	±5.36E+01

TABLE 1A - REG GUIDE 1.21 (Continued)

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GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

D. TRITIUM	UNITS	3RD QUARTER	4TH QUARTER	EST. TOTAL ERROR, %
1. Total Release	Ci	6.66E+00	2.28E-01	±1.32E+01
2. Average release rate for period	uCi/sec	8.38E-01	2.87E-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 rate limit (1500 mrem/year)

(8) Percent of I.B.3 quarterly organ dose limit (15 mrem)

(9) Percent of I.B.3 yearly organ 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.

TABLE 1C - REG GUIDE 1.21

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GASEOUS EFFLUENTS - GROUND LEVEL RELEASES

		CONTINUOUS MODE		BATCH MODE	
1. FISSION AND ACTIVATION GASES	UNITS	3RD QUARTER	4TH QUARTER	3RD QUARTER	4TH QUARTER
Argon -41	Ci	(2)	(2)	3.56E-03	(2)
Krypton -85	Ci	(2)	(2)	5.30E+00	8.24E-01
Krypton -85m	Ci	(2)	5.92E-01	1.19E-04	(2)
Krypton -87	Ci	(2)	(2)	(2)	(2)
Kryton -88	Ci	(2)	(2)	(2)	(2)
Xenon -131m	Ci	(2)	(2)	2.44E-01	2.40E-03
Xenon -133	Ci	1.06E+01	7.65E+01	9.81E+00	2.57E-01
Xenon -133m	Ci	(2)	(2)	7.71E-02	2.10E-03
Xenon -135	Ci	2.71E+00	1.75E+01	4.00E-02	3.55E-03
Xenon -138	Ci	(2)	(2)	(2)	(2)
Total for Period	Ci	1.33E+01	9.46E+01	1.55E+01	1.09E+00
2. HALOGENS					
Iodine -131	Ci	6.66E-04	7.55E-04	7.43E-07	(1)
Iodine -133	Ci	1.33E-03	2.94E-03	(1)	(1)
Total For Period	Ci	2.00E-03	3.70E-03	7.43E-07	(1)

TABLE 1C - REG GUIDE 1.21 (Continued)

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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)
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)	2.35E-06	(1)
Cesium -137	Ci	2.65E-05	6.20E-06	3.26E-06	(1)
Cerium -141	Ci	(2)	(2)	(1)	(1)
Cerium -144	Ci	(2)	(2)	(1)	(1)
Gross Alpha Radioactivity	Ci	4.60E-10	(2)	(1)	(1)
Total For Period	Ci	2.65E-05	6.20E-06	5.61E-06	(1)

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

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LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

A. FISSION AND ACTIVATION PRODUCTS	UNITS	3RD QUARTER	4TH QUARTER	EST. TOTAL ERROR, %
1. Total Release (not including tritium, gases, alpha)	Ci	6.16E-01	4.66E-01	±3.30E+00
2. Average diluted concentration during period	uCi/ml	4.43E-09	2.48E-09	
3. Percent of Tech. Spec. limit(1)	%	2.88E+00	7.20E-01	
4. Percent of Tech. Spec. limit(2)	%	1.44E+00	3.60E-01	
5. Percent of Tech. Spec. limit(3)	%	5.12E-01	7.80E-01	
6. Percent of Tech. Spec. limit(4)	%	2.56E-01	3.90E-01	
B. TRITIUM				
1. Total Release	Ci	1.14E+02	1.89E+02	±9.80E+00
2. Average diluted concentration during period	uCi/ml	8.20E-07	1.00E-06	
3. Percent of applicable limit(5)	%	2.73E-02	3.35E-02	
C. DISSOLVED AND ENTRAINED GASES				
1. Total Release	Ci	8.58E-02	1.96E-01	±4.60E+00
2. Average diluted concentration during period	uCi/ml	6.17E-10	1.04E-09	

TABLE 2A - REG GUIDE 1.21 (Continued)

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LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

D. GROSS ALPHA RADIOACTIVITY	UNITS	3RD QUARTER	4TH QUARTER	EST. TOTAL ERROR, %
1. Total Release	Ci	1.02E-04	(6)	
E. VOLUME OF WASTE REI EASED (prior to dilution)	liters	6.04E+07	7.05E+07	±1.30E+00
F. VOLUME OF DILUTION WATER USED DURING PERIOD	liters	1.39E+11	1.88E+11	±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 3×10^{-3} uCi/ml

(6) Less than minimum detectable activity which meets the LLD requirements of Technical Specification Surveillance Requirement 4.11.1.1.1.

TABLE 2B - REG GUIDE 1.21

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LIQUID EFFLUENTS

			CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED		UNITS	3RD QUARTER	4TH QUARTER	3RD QUARTER	4TH QUARTER
Sodium	-24	Ci	(1)	(1)	1.77E-04	6.18E-04
Chromium	-51	Ci	(1)	(1)	3.12E-02	1.14E-02
Manganese	-54	Ci	(1)	(1)	7.36E-03	3.35E-03
Cobalt	-57	Ci	(1)	(1)	7.61E-05	(1)
Cobalt	-58	Ci	(1)	(1)	1.24E-01	4.36E-02
Iron	-59	Ci	(1)	(1)	3.81E-04	(1)
Cobalt	-60	Ci	(1)	(1)	3.89E-02	1.73E-02
Zinc	-65	Ci	(1)	(1)	5.58E-05	(1)
Strontium	-89	Ci	6.17E-08	(1)	3.61E-04	(1)
Strontium	-90	Ci	6.62E-08	(1)	3.87E-04	3.85E-08
Strontium	-92	Ci	(1)	(1)	7.56E-05	3.50E-06
Niobium	-95	Ci	(1)	(1)	4.40E-02	8.50E-03
Zirconium	-95	Ci	(1)	(1)	2.32E-02	4.12E-03
Niobium	-97	Ci	(1)	(1)	7.10E-04	1.47E-03
Zirconium	-97	Ci	(1)	(1)	(1)	3.55E-04
Molybdenum	-99	Ci	(1)	(1)	(1)	(1)
Technetium	-99m	Ci	(1)	(1)	2.26E-04	6.50E-04
Ruthenium	-103	Ci	(1)	(1)	3.16E-03	3.87E-04
Ruthenium	-106	Ci	(1)	(1)	7.48E-03	1.89E-03
Silver	-110m	Ci	(1)	(1)	9.30E-03	5.99E-03
Tin	-113	Ci	(1)	(1)	5.75E-03	4.85E-04
Antimony	-122	Ci	(1)	(1)	6.50E-05	8.11E-04

TABLE 2B - REG GUIDE 1.21 (Continued)

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LIQUID EFFLUENTS

			CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED		UNITS	3RD QUARTER	4TH QUARTER	3RD QUARTER	4TH QUARTER
Antimony	-124	Ci	(1)	(1)	3.17E-04	(1)
Antimony	-125	Ci	(1)	(1)	1.06E-02	7.43E-05
Tellurium	-127	Ci	(1)	(1)	2.10E-03	(1)
Tellurium	-129	Ci	(1)	(1)	4.73E-04	(1)
Iodine	-131	Ci	(1)	(1)	1.51E-02	2.12E-02
Iodine	-133	Ci	(1)	(1)	6.44E-03	1.22E-02
Iodine	-135	Ci	(1)	(1)	6.20E-04	(1)
Cesium	-134	Ci	8.32E-07	4.31E-07	1.02E-01	1.40E-01
Cesium	-136	Ci	(1)	(1)	1.02E-03	7.00E-04
Cesium	-137	Ci	8.59E-07	4.51E-05	1.68E-01	1.83E-01
Barium	-139	Ci	(1)	(1)	1.27E-04	1.77E-04
Barium	-140	Ci	(1)	(1)	(1)	9.68E-04
Cerium	-139	Ci	(1)	(1)	8.27E-06	1.15E-05
Lanthanum	-140	Ci	(1)	(1)	4.08E-04	1.97E-03
Cerium	-141	Ci	(1)	(1)	1.59E-04	(1)
Cerium	-144	Ci	(1)	(1)	1.15E-02	4.79E-03
Tungsten	-187	Ci	(1)	(1)	(1)	(1)
Total For Period		Ci	1.82E-06	4.55E-05	6.16E-01	4.66E-01
Xenon	-131m	Ci	(1)	(1)	2.16E-05	2.01E-04
Xenon	-133	Ci	(1)	(1)	8.41E-02	1.91E-01
Xenon	-133m	Ci	(1)	(1)	(1)	1.33E-03

TABLE 2B - REG GUIDE 1.21 (Continued)

CALVERT CLIFFS NUCLEAR POWER PLANT
EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT
SECOND HALF - 1992

LIQUID EFFLUENTS

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	3RD QUARTER	4TH QUARTER	3RD QUARTER	4TH QUARTER
Xenon -135	Ci	(1)	(1)	3.60E-04	3.37E-03
Xenon -135m	Ci	(1)	(1)	1.28E-03	(1)
Total For Period	Ci	(1)	(1)	8.58E-02	1.96E-01

NOTES TO TABLE 2B

(1) Less than minimum detectable activity which meets the LLD requirements of Technical Specification Surveillance Requirement 4.11.1.1.1.

TABLE 3A

CALVERT CLIFFS NUCLEAR POWER PLANT
EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT
SECOND HALF - 1992

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^3 Ci	1.36E+01 4.12E+02	±2.00E+01
b. Dry Compressible Waste (Shipped) Contaminated Equipment, etc.	m^3 Ci	7.14E+02 1.83E-00	±5.00E+01
c. Irradiated Components, Control Rods, etc.	m^3 Ci	1.04E+00 5.75E+03	±5.00E+01
d. Other (Cartridge Filters)	m^3 Ci	1.02E+01 2.01E+00	±2.00E+01

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

a.

Fe-55	1.25E+00%
Co-58	5.48E+00%
Co-60	1.15E+00%
Ni-63	8.82E+00%
Cs-134	3.26E+01%
Cs-137	4.91E+01%

b.

C-14	1.99E+00%
Cr-51	9.36E+00%
Fe-55	3.45E+01%
Co-58	1.48E+00%
Co-60	9.82E+00%
Ni-63	1.27E+01%
Nb-95	1.01E+00%
Ru-106	2.45E+00%
Ag-110m	1.37E+00%
Sb-125	4.62E+00%
Cs-134	2.63E+00%
Cs-137	1.04E+01%
Ce-144	1.97E+00%

TABLE 3A

CALVERT CLIFFS NUCLEAR POWER PLANT
EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT
SECOND HALF - 1992

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS (Continued)

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

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

c.

Mn-54	4.39E+00%
Fe-55	5.83E+01%
Co-58	1.48E+00%
Co-60	3.27E+01%
Ni-63	1.63E+00%

d.

C-14	8.80E+00%
Fe-55	4.63E+01%
Co-60	9.30E+00%
Ni-63	1.05E+01%
Ru-106	2.20E+00%
Sb-125	2.20E+00%
Cs-137	1.80E+00%
Ce-144	1.21E+01%
Pu-241	3.30E+00%

3. **Solid Waste Disposition**

Number of Shipments	Mode of Transportation	Destination
10	Motor Surface Transit	Chem Nuclear Systems, Inc. Barnwell, SC
3	Motor Surface Transit	Scientific Ecology Group Oak Ridge, TN

APPENDIX A

SOLID RADWASTE SHIPMENT DATA
FOR
SEMI-ANNUAL EFFLUENT RELEASE REPORTING
SECOND HALF - 1992

TYPE WASTE: DAW

10 CFR 61 WASTE CLASS: A

SOURCE OF WASTE: Radiologically Controlled Areas

SHIPPING CONTAINER: 40' Sealand Containers

TOTAL CURIE QUANTITY: 1.83 Ci

HOW DETERMINED: Dose to curie content, conversion by volume based on generic distribution and scaling factors

TOTAL SHIPPED WASTE VOLUME: 25230 ft^3

HOW DETERMINED: Container volume and number of containers shipped

SOLIDIFICATION AGENT OR ABSORBENT: None

TYPE WASTE: Dewatered Resin

10 CFR 61 WASTE CLASS: C

SOURCE OF WASTE: Miscellaneous Liquid Radwaste Processing/CVCS Processing

SHIPPING CONTAINER: High Integrity L-8-120 liner (120.3 ft^3)

TOTAL CURIE QUANTITY: 398 Ci

HOW DETERMINED: Gamma scan using sample of resin. Conversion by weight based on radionuclide distribution and scaling factors.

TOTAL SHIPPED WASTE VOLUME: 360.9 ft^3

HOW DETERMINED: Container volume and number of containers shipped

SOLIDIFICATION AGENT OR ABSORBENT: None

APPENDIX A

SOLID RADWASTE SHIPMENT DATA
FOR
SEMI-ANNUAL EFFLUENT RELEASE REPORTING
SECOND HALF - 1992

TYPE WASTE: Dewatered Resin

10 CFR 61 WASTE CLASS: B

SOURCE OF WASTE: Miscellaneous Liquid Radwaste Processing/CVCS Processing

SHIPPING CONTAINER: High Integrity L-8-120 liner (120.3 ft^3)

TOTAL CURIE QUANTITY: 13.8 Ci

HOW DETERMINED: Gamma scan using sample from resin. Conversion by weight based on radionuclide distribution and scaling factors.

TOTAL SHIPPED WASTE VOLUME: 120.3 ft^3

HOW DETERMINED: Volume of container and number of containers shipped

SOLIDIFICATION AGENT OR ABSORBENT: None

TYPE WASTE: Irradiated Hardware

10 CFR 61 WASTE CLASS: C

SOURCE OF WASTE: In-core instrumentation

SHIPPING CONTAINER: High Integrity Steel Container

TOTAL CURIE QUANTITY: 5.75E+03 Ci

HOW DETERMINED: Calculation based on material's composition and neutron activation

TOTAL SHIPPED WASTE VOLUME: 3.66E+01 ft^3

HOW DETERMINED: Volume of container and number of containers shipped

SOLIDIFICATION AGENT OR ABSORBANT: None

APPENDIX A

SOLID RADWASTE SHIPMENT DATA
FOR
SEMI-ANNUAL EFFLUENT RELEASE REPORTING
SECOND HALF - 1992

TYPE WASTE: Cartridge Filters

10 CFR 61 WASTE CLASS: C

SOURCE OF WASTE: Liquid waste processing filters

SHIPPING CONTAINER: High Integrity L-8-120 Liner (120 ft^3)

TOTAL CURIE QUANTITY: 2.01 Ci

HOW DETERMINED: Dose to curie content, conversion by weight based on generic distribution and scaling factors

TOTAL SHIPPED WASTE VOLUME: 360.9 ft^3

HOW DETERMINED: Container volume and number of containers shipped

SOLIDIFICATION AGENT OR ABSORBANT: None

APPENDIX B

SUMMARY OF CHANGES TO THE CCNPP ODCM
SECOND HALF 1992

CHANGES TO THE CCNPP ODCM IN SECOND HALF 1992

SUMMARY AND BASIS

A major revision of the ODCM was approved on July 27, 1992. The revision was controlled by the normal procedure change process. The change was reviewed by the Plant Operations and Safety Review Committee (POSRC) and was approved by the Plant General Manager, Calvert Cliffs Nuclear Power Plant, prior to implementation. This process meets the requirements of CCNPP Technical Specification 6.17.

This revision of the ODCM represents a significant change in format; however, the methodologies outlined in the previous ODCM remain unchanged. The new formatting greatly improves the clarity and organization of the document. A copy of the revised ODCM is attached to this report.

This revision of the ODCM was reviewed in some detail during NRC Safety Inspection INSR 93-01. The interested reader is referred to INSR 93-01 for additional information.

ATTACHMENT (1)

ODCM (CP-607) TEXT WITH

CHANGES