



Nuclear Operations Division

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February 27, 2008
08-036

ATTN: Document Control Desk
Director, Office of Nuclear Material Safety & Safeguards
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Reference: License SNM-42, Docket 70-27

Subject: Semi-Annual Effluent Monitoring Report

Dear Sir:

The Semi-Annual Effluent Monitoring Report for BWX Technologies, Inc., Nuclear Operations Division (NOD), covering the period July 2, 2007 through December 30, 2007 is enclosed. This report is being submitted in accordance with the requirements of 10 CFR 70.59 for License No. SNM-42.

If you have any questions regarding this report, please contact me at (434) 522-5665

Sincerely,

A handwritten signature in black ink, appearing to read "Barry L. Cole".

Barry L. Cole
Manager, Licensing & Safety Analysis
(Licensing Officer)

Enclosure

cc: U.S. NRC, Region II
NRC, Resident Inspector
NRC, Amy Snyder
BWXT, D.L. Spangler
BWXT, C.A. England

ENCLOSURE

I. GASEOUS EFFLUENTS (Continuously Sampled Stacks)

Reporting Period: 7/2/07 to 12/30/07 (Weeks Ending 07/08/07 to 12/30/07)

Stack: SFF (# 11)

Average Flow Rate: 10.40 cubic meters/second

Radionuclide	Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\pm\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (μCi)	Off-Site Dose (mrem)
U-234 (Y)	3E-14	1E-14	1E-14	4.59E+00	2.7E-03

Stack: 14A MAINTENANCE (# 35)

Average Flow Rate: 3.02 cubic meters/second

Radionuclide	Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\pm\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (μCi)	Off-Site Dose (mrem)
U-234 (Y)	2E-14	1E-14	1E-14	7.60E-01	4.5E-04

Stack: 13A/14A/15A DRY (# 38)

Average Flow Rate: 19.39 cubic meters/second

Radionuclide	Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\pm\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (μCi)	Off-Site Dose (mrem)
U-234 (Y)	2E-14	1E-14	1E-14	5.53E+00	3.3E-03

Stack: MFP LOAD (# 19)

Average Flow Rate: 0.76 cubic meters/second

Radionuclide	Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\pm\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (μCi)	Off-Site Dose (mrem)
U-234 (Y)	0E-14	0E-14	0E-14	3.00E-02	1.6E-05

Stack: RECLAMATION (# 20)

Average Flow Rate: 0.32 cubic meters/second

Radionuclide	Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\pm\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (μCi)	Off-Site Dose (mrem)
U-234 (Y)	1E-14	0E-14	0E-14	4.00E-02	2.2E-05

I. GASEOUS EFFLUENTS (Continuously Sampled Stacks)

Reporting Period: 7/2/07 to 12/30/07 (Weeks Ending 07/08/07 to 12/30/07)

Stack: 2A STACK (# 23)

Average Flow Rate: 1.04 cubic meters/second

Radionuclide	Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\pm\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (μCi)	Off-Site Dose (mrem)
U-234 (Y)	4E-14	2E-14	2E-14	7.10E-01	3.8E-04

Stack: 3A PHARMACY (# 24)

Average Flow Rate: 2.19 cubic meters/second

Radionuclide	Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\pm\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (μCi)	Off-Site Dose (mrem)
U-234 (Y)	1E-14	0E-14	0E-14	1.80E-01	9.7E-05

Stack: MET LAB (# 26)

Average Flow Rate: 4.50 cubic meters/second

Radionuclide	Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\pm\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (μCi)	Off-Site Dose (mrem)
U-234 (Y)	1E-14	0E-14	0E-14	6.00E-01	3.2E-04

Stack: WASTE MGMT CENTER (# 39)

Average Flow Rate: 1.27 cubic meters/second

Radionuclide	Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\pm\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (μCi)	Off-Site Dose (mrem)
U-234 (Y)	0E-14	0E-14	0E-14	1.00E-02	5.4E-06

Stack: 1A MAINTENANCE (# 43)

Average Flow Rate: 4.47 cubic meters/second

Radionuclide	Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\pm\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (μCi)	Off-Site Dose (mrem)
U-234 (Y)	0E-14	0E-14	0E-14	1.00E-01	5.4E-05

I. GASEOUS EFFLUENTS (Continuously Sampled Stacks)

Reporting Period: 7/2/07 to 12/30/07 (Weeks Ending 07/08/07 to 12/30/07)

Stack: 2A PRODUCTION SUPORT (# 44)

Average Flow Rate: 2.06 cubic meters/second

Radionuclide	Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\pm\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (μCi)	Off-Site Dose (mrem)
U-234 (Y)	0E-14	0E-14	0E-14	3.00E-02	1.6E-05

Stack: NMC STORAGE (# 42)

Average Flow Rate: 0.81 cubic meters/second

Radionuclide	Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\pm\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (μCi)	Off-Site Dose (mrem)
U-234 (Y)	1E-14	0E-14	0E-14	7.00E-02	3.4E-05

Stack: CHEM LAB SCRUBBER (# 37)

Average Flow Rate: 11.12 cubic meters/second

Radionuclide	Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\pm\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (μCi)	Off-Site Dose (mrem)
U-234 (Y)	3E-14	0E-14	0E-14	5.43E+00	3.2E-03

Stack: DOWNBLEND SCRUBBER (# 40)

Average Flow Rate: 0.96 cubic meters/second

Radionuclide	Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\pm\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (μCi)	Off-Site Dose (mrem)
U-234 (D)	1.6E-13	3E-14	8E-14	2.49E+00	3.7E-05

Stack: LAUNDRY STACK (# 30)

Average Flow Rate: 2.91 cubic meters/second

Radionuclide	Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\pm\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (μCi)	Off-Site Dose (mrem)
U-234 (Y)	7E-14	2E-14	1E-14	3.06E+00	2.0E-03

I. GASEOUS EFFLUENTS (Continuously Sampled Stacks)

Reporting Period: 7/2/07 to 12/30/07 (Weeks Ending 07/08/07 to 12/30/07)

Stack: RECOVERY (# 15)

Average Flow Rate: 11.39 cubic meters/second

Radionuclide	Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\pm\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (μCi)	Off-Site Dose (mrem)
U-234 (D)	3.85E-12	9E-14	4E-14	6.90E+02	4.1E-03

Stack: RTRT (# 16)

Average Flow Rate: 6.20 cubic meters/second

Radionuclide	Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\pm\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (μCi)	Off-Site Dose (mrem)
U-234 (Y)	1E-14	0E-14	0E-14	5.20E-01	2.5E-04

Stack: COMPACTOR (# 32)

Average Flow Rate: 1.63 cubic meters/second

Radionuclide	Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\pm\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (μCi)	Off-Site Dose (mrem)
U-234 (Y)	0E-14	0E-14	0E-14	6.00E-02	3.9E-05

Stack: WT SCRUBBER (# 31)

Average Flow Rate: 2.47 cubic meters/second

Radionuclide	Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\pm\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (μCi)	Off-Site Dose (mrem)
U-234 (Y)	6.9E-13	2E-14	1E-14	2.68E+01	1.7E-02

Stack: DECON (# 33)

Average Flow Rate: 2.02 cubic meters/second

Radionuclide	Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\pm\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (μCi)	Off-Site Dose (mrem)
U-234 (Y)	5E-14	2E-14	1E-14	1.60E+00	1.0E-03

I. GASEOUS EFFLUENTS (Continuously Sampled Stacks)

Reporting Period: 7/2/07 to 12/30/07 (Weeks Ending 07/08/07 to 12/30/07)

Stack: RETENTION TANKS (# 36)

Average Flow Rate: 0.54 cubic meters/second

Radionuclide	Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\pm\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (μCi)	Off-Site Dose (mrem)
U-234 (Y)	0E-14	0E-14	0E-14	1.00E-02	6.5E-06

Stack: LTC 50 METER STACK

Average Flow Rate: 15.49 cubic meters/second

Radionuclide	Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\pm\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (μCi)	Off-Site Dose (mrem)
U-234 (Y)	3E-14	2E-14	3E-14	6.90E+00	3.5E-04
Sr-90(Y)	8E-14	4E-14	8E-14	1.83E+01	

Stack: LTC AC STACK

Average Flow Rate: 1.70 cubic meters/second

Radionuclide	Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\pm\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (μCi)	Off-Site Dose (mrem)
U-234 (Y)	2E-14	1E-14	1E-14	5.16E-01	3.8E-04
Sr-90(Y)	5E-14	1E-14	2E-14	1.18E+00	

Stack: LTC RCL STACK

Average Flow Rate: 1.44 cubic meters/second

Radionuclide	Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\pm\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (μCi)	Off-Site Dose (mrem)
U-234 (Y)	2E-14	1E-14	1E-14	3.39E-01	2.5E-04
Sr-90(Y)	4E-14	1E-14	1E-14	8.58E-01	

I. GASEOUS EFFLUENTS (Continuously Sampled Stacks)

Reporting Period: 7/2/07 to 12/30/07 (Weeks Ending 07/08/07 to 12/30/07)

NOTES:

- (1) The total exposure from all stacks is 0.036 mrem. Doses were determined using the EPA COMPLY code. Actual stack and building heights were used. A distance from source to receptor of 540 meters was used, with wind blowing towards the receptor at a speed of 2 meters/sec, 25% of the time. All alpha activity is conservatively reported as U-234 as this is the predominant uranium nuclide and has the most conservative dose conversion factors of the various uranium isotopes.
- (2) Average uranium concentrations, errors and LLDs are quoted as $0\text{E-}14$ $\mu\text{Ci/ml}$ for stacks when these values are less than $5\text{E-}15$. Beta/Gamma nuclides are not reported unless they exceed the respective MDC based on isotopic analysis.
- (3) The reported average stack flow rate, concentration, error and LLD are the average for all samples collected within this reporting period. The error is 95% counting error for the sample.
- (4) Quantity released (μCi) is the sum of the emissions calculated from each sample collected during the reporting period.
- (5) Twenty four (24) stacks were monitored during this monitoring period.

II. LIQUID EFFLUENT

- A. Reporting Period: 7/1/07 through 12/31/07
- B. Location of Sample: Collection Prior to Discharge into the James River.
- C. Total Liquid Flow: 3.40E+08 liters
- D. Sample Collection: Batch composite sampler.

Radionuclide	Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\pm\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (μCi)	Total Dose (mrem)
U-234	8.68E-09	2.90E-09	1.70E-10	2,953.58	2.81E-02
U-235	1.97E-10	3.66E-10	1.98E-10	67.14	6.00E-04
U-238	4.15E-11	2.27E-10	1.57E-10	14.14	1.21E-04
				Total	2.89E-02

NOTES:

- (1) The total dose calculated for liquid release uses a dilution factor of 18:1. Regulatory Guide 1.109 was used as guidance, with conservative assumptions to estimate the exposure.
- (2) The semi-annual concentration reported above is a volume-weighted average for the six months and may be less than the averaged MDC for the same period.
- (3) Isotopic analysis is performed on monthly composite samples for the most commonly utilized beta/gamma nuclides such as Sr-90, Tc-99, Cs-137, Cs-134, and Mn-54. The analysis of these nuclides typically indicates results less than minimum detectable concentration (MDC). Only nuclides with concentration above the respective MDC are reported. There were no results greater than MDC during this reporting period.