BWXT
BWX Technologies, Inc.

February 29, 2016
16-016

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

Reference: License No. SNM-42, Docket 70-27

Subject: Semi-Annual Effluent Monitoring Report

Dear Sir or Madam:

The Semi-Annual Effluent Report for the BWXT Nuclear Operations Group, Inc., Lynchburg (NOG-L) facility covering the second semi-annual effluent monitoring period for 2015 is enclosed. This report is being submitted in accordance with the requirements of 10 CFR 70.59.

If you have questions or require additional information, please contact Chris Terry, Manager of Licensing and Safety Analysis, at ctterry@bwxt.com or 434-522-5202.

Sincerely,

B. Joel Burch
Vice President and General Manager
BWXT Nuclear Operations Group, Inc. – Lynchburg

Enclosure

cc: NRC, Region II
NRC, Resident Inspector

NMS620

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ENCLOSURE

7 pages

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I. GASEOUS EFFLUENTS (Continuously Sampled Stacks)
Reporting Period: 06/29/15 to 01/03/16 (Weeks Ending 07/05/15 to 01/03/16)

Stack: WASTE MGMT CENTER (# 39)
Average Flow Rate: 1.47 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Error Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Off-Site Dose (mrem)
U-234 (S)	<1.00E-14	<1.00E-14	<1.00E-14	2.00E-02	1.1E-05

Stack: MFP LOAD (# 19)
Average Flow Rate: 1.82 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Error Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Off-Site Dose (mrem)
U-234 (S)	<1.00E-14	<1.00E-14	<1.00E-14	3.00E-02	1.6E-05

Stack: 2A STACK (# 23)
Average Flow Rate: 0.76 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Error Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Off-Site Dose (mrem)
U-234 (S)	4.00E-14	3.00E-14	4.00E-14	5.00E-01	2.7E-04

Stack: 2A PRODUCTION SUPPORT (# 44)
Average Flow Rate: 1.09 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Error Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Off-Site Dose (mrem)
U-234 (S)	<1.00E-14	<1.00E-14	<1.00E-14	5.00E-02	2.7E-05

Stack: 1A MAINTENANCE (# 43)
Average Flow Rate: 5.41 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Error Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Off-Site Dose (mrem)
U-234 (S)	<1.00E-14	<1.00E-14	<1.00E-14	2.10E-01	1.2E-04

I. GASEOUS EFFLUENTS (Continuously Sampled Stacks)
Reporting Period: 06/29/15 to 01/03/16 (Weeks Ending 07/05/15 to 01/03/16)

Stack: RECLAMATION (# 20)
Average Flow Rate: 0.26 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Error Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Off-Site Dose (mrem)
U-234 (S)	<1.00E-14	<1.00E-14	<1.00E-14	1.00E-02	5.6E-06

Stack: PHARMACY (# 24)
Average Flow Rate: 1.42 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Error Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Off-Site Dose (mrem)
U-234 (S)	<1.00E-14	<1.00E-14	<1.00E-14	8.00E-02	4.3E-05

Stack: NMC STORAGE (# 42)
Average Flow Rate: 0.80 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Error Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Off-Site Dose (mrem)
U-234 (S)	<1.00E-14	<1.00E-14	<1.00E-14	4.00E-02	1.9E-05

Stack: MET LAB (# 26)
Average Flow Rate: 4.88 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Error Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Off-Site Dose (mrem)
U-234 (S)	1.00E-14	<1.00E-14	<1.00E-14	8.10E-01	4.3E-04

Stack: U-MOL (# 45)
Average Flow Rate: 5.85 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Error Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Off-Site Dose (mrem)
U-234 (S)	1.00E-14	1.00E-14	1.00E-14	1.80E-01	8.7E-05

I. GASEOUS EFFLUENTS (Continuously Sampled Stacks)
Reporting Period: 06/29/15 to 01/03/16 (Weeks Ending 07/05/15 to 01/03/16)

Stack: RTRT (# 16)
Average Flow Rate: 6.29 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Error Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Off-Site Dose (mrem)
U-234 (S)	<1.00E-14	<1.00E-14	<1.00E-14	4.40E-01	2.1E-04

Stack: SFF (# 11)
Average Flow Rate: 9.60 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Error Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Off-Site Dose (mrem)
U-234 (S)	3.00E-14	1.00E-14	1.00E-14	4.02E+00	2.4E-03

Stack: 13A/14A/15A DRY (# 38)
Average Flow Rate: 13.40 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Error Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Off-Site Dose (mrem)
U-234 (S)	2.00E-14	2.00E-14	2.00E-14	5.08E+00	3.0E-03

Stack: CHEM LAB SCRUBBER (# 37)
Average Flow Rate: 11.86 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Error Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Off-Site Dose (mrem)
U-234 (S)	1.00E-14	<1.00E-14	1.00E-14	1.02E+00	6.1E-04

Stack: 14A MAINTENANCE (# 35)
Average Flow Rate: 3.43 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Error Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Off-Site Dose (mrem)
U-234 (S)	1.00E-14	1.00E-14	2.00E-14	7.70E-01	4.6E-04

I. GASEOUS EFFLUENTS (Continuously Sampled Stacks)
Reporting Period: 06/29/15 to 01/03/16 (Weeks Ending 07/05/15 to 01/03/16)

Stack: RECOVERY (# 15)
Average Flow Rate: 10.68 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Error Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Off-Site Dose (mrem)
U-234 (F)	2.30E-12	6.00E-14	8.00E-14	4.05E+02	2.6E-03

Stack: LAUNDRY STACK (# 30)
Average Flow Rate: 3.34 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Error Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Off-Site Dose (mrem)
U-234 (S)	6.00E-14	2.00E-14	2.00E-14	3.23E+00	2.1E-03

Stack: COMPACTOR (# 32)
Average Flow Rate: 1.87 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Error Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Off-Site Dose (mrem)
U-234 (S)	<1.00E-14	<1.00E-14	<1.00E-14	8.00E-02	5.2E-05

Stack: RETENTION TANKS (# 36)
Average Flow Rate: 0.51 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Error Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Off-Site Dose (mrem)
U-234 (S)	<1.00E-14	<1.00E-14	<1.00E-14	4.00E-02	2.6E-05

Stack: WT SCRUBBER (# 31)
Average Flow Rate: 2.13 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Error Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Off-Site Dose (mrem)
U-234 (S)	1.10E-13	1.00E-14	2.00E-14	3.76E+00	2.3E-03

I. GASEOUS EFFLUENTS (Continuously Sampled Stacks)
Reporting Period: 06/29/15 to 01/03/16 (Weeks Ending 07/05/15 to 01/03/16)

Stack: DECON (# 33)
Average Flow Rate: 2.13 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Error Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Off-Site Dose (mrem)
U-234 (S)	4.00E-14	2.00E-14	2.00E-14	1.33E+00	8.3E-04

Stack: LTC 50 METER STACK
Average Flow Rate: 14.77 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Error Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Off-Site Dose (mrem)
Th-230 (S)	<1.00E-14	<1.00E-14	<1.00E-14	1.00E-02	3.3E-06
U-234 (S)	<1.00E-14	<1.00E-14	<1.00E-14	1.87E-02	
Pu-238 (S)	<1.00E-14	<1.00E-14	<1.00E-14	1.00E-02	
H-3 (F)	1.06E-10	<1.00E-14	4.28E-13	2.39E+04	

Stack: LTC ACL STACK
Average Flow Rate: 1.41 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Error Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Off-Site Dose (mrem)
N/A	N/A	N/A	N/A	0.00E+00	0.0E+00

Stack: LTC RCL STACK
Average Flow Rate: 1.62 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Error Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Off-Site Dose (mrem)
H-3 (F)	4.16E-11	8.72E-12	1.29E-11	1.02E+03	7.6E-07

I. GASEOUS EFFLUENTS (Continuously Sampled Stacks)
Reporting Period: 06/29/15 to 01/03/16 (Weeks Ending 07/05/15 to 01/03/16)

NOTES:

(1) The total exposure from all stacks is 0.016 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. Other default parameters such as temperature were used if prompted. Comply itself is conservative.

(2) All alpha activity is conservatively reported as U-234 for the NOG-L Stacks as this is the predominant uranium nuclide and has the most conservative dose conversion factor of the various uranium isotopes. No nuclides other than Uranium were found in the NOG-L Stack Semi-Annual Composite Samples. For the LTC Stacks each nuclide above MDC is reported.

(3) Beta/Gamma nuclides are not reported unless they exceed the respective MDC based on isotopic analysis.

(4) Average concentrations, errors and MDCs are quoted as 1E-14 uCi/ml for stacks when these values are between 5E-15 uCi/ml and 1E-14 uCi/ml, and they are quoted as <1E-14 uCi/ml when the values are less than 5E-15 uCi/ml.

(5) Activities are quoted as 1E-02 uCi when these values are between 5E-03 uCi and 1E-02 uCi, and they are quoted as <1E-02 uCi when the values are less than 5E-03 uCi. 5E-03 uCi is conservatively used to calculate the offsite dose when the activity is <1E-02 uCi.

(6) The error estimate is the daily error at the 95% confidence interval propagated over the six month period.

(7) Quantity released (uCi) is the sum of the activities calculated daily based on the calculated daily concentration for all concentrations > 0.

(8) Twenty four (24) stacks were monitored during this monitoring period.

(9) Average concentrations, errors and MDCs are quoted to two significant digits.

II. LIQUID EFFLUENT

A. Reporting Period: 07/01/15 to 12/31/15

B. Location of Sample: Collection Prior to Discharge into the James River.

C. Total Liquid Flow: 3.031E+08 liters

D. Sample Collection: Batch composite sampler.

Radionuclide	Concentration (pCi/l)	Error Estimate (±pCi/l)	MDC (pCi/l)	Quantity Released (μCi)	Total Dose (mrem)
U-234	2.33E+01	5.24E+00	2.30E-01	7,064.53	7.56E-02
U-235	7.90E-01	6.10E-01	1.50E-01	223.60	2.40E-03
U-236	4.96E-01	4.69E-01	1.08E-01	154.01	1.53E-03
U-238	1.24E-01	2.93E-01	1.25E-01	24.76	3.61E-04
				Total	7.99E-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 the monthly composite samples for the most commonly utilized beta/gamma nuclides such as Sr-90, Tc-99 and Cs-137. The analysis of these nuclides typically indicates results less than minimum detectable concentration (MDC). Only nuclides with concentration above the respective MDC are reported. No beta/gamma nuclides exceeded their MDC for the reporting period.