framatome

February 26, 2020
YRS:20:003

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk (03-H8)
Director, Office of Nuclear Material Safety and Safeguards
One White Flint North
11555 Rockville Pike
Rockville, Maryland 20852-2738

License SNM-1227
Docket 70-1257

Subject: Required Reporting of Effluents per 10 CFR 70.59

As required by 10 CFR 70.59, Framatome is reporting discharges of radioactive materials in the effluents from its nuclear fuels fabrication plant on Horn Rapids Road in Richland, Washington for the period from July 1 through December 31, 2019.

The total exposure from all stacks is 2.06E-05 mrem. Doses were determined using CAP88 Version 4.

If there are any questions, please contact me at (509) 375-8355

Very truly yours,

Y.R. Sakach
Radiation Protection
Attachments

cc: L. A. Dudes, U.S. Nuclear Regulatory Commission, Region II
P. J. Martell, State of Washington Department of Health
R. Gibson, U. S. Nuclear Regulatory Commission, Region II
M. Elsen, Director, Office of Radiation Protection (WDOH)

IE48
NMSS20
NMSS

Framatome Inc.
2101 Horn Rapids Road
Richland, WA 99354
Tel: (509) 375-8100

www.framatome.com

I. Gaseous Effluents (Continuously Sampled Stacks)
Reporting Period: July 1 – December 31, 2019

Stack: **UO_2 Building – Room 100 (K03)**
Average Flow Rate: 13.08 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Uncertainty Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Estimated Exposure (mrem)
Gross alpha	1.00E-15	4.00E-15	3.00E-17	2.08E-01	NA
Gross beta	9.00E-15	1.00E-14	1.00E-16	1.89E+00	NA
U-232	2.00E-24	9.00E-24	7.00E-26	4.17E-10	2.48E-15
U-234	2.00E-18	9.00E-18	7.00E-20	4.17E-04	2.48E-09
U-235	5.00E-17	2.00E-16	2.00E-18	1.04E-02	6.20E-08
U-236	3.00E-17	1.00E-16	9.00E-19	5.21E-03	3.10E-08
U-238	1.00E-15	4.00E-15	3.00E-17	1.92E-01	1.14E-06

Stack: **SF Building – NAF(K06)**
Average Flow Rate: 5.91 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Uncertainty Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Estimated Exposure (mrem)
Gross alpha	7.00E-16	6.00E-15	8.00E-17	6.67E-02	NA
Gross beta	7.00E-15	2.00E-14	2.00E-16	5.95E-01	NA
U-232	1.00E-24	1.00E-23	2.00E-25	1.33E-10	1.12E-15
U-234	1.00E-18	1.00E-17	2.00E-19	1.33E-04	1.12E-09
U-235	4.00E-17	3.00E-16	4.00E-18	3.34E-03	2.80E-08
U-236	2.00E-17	1.00E-16	2.00E-18	1.67E-03	1.40E-08
U-238	7.00E-16	5.00E-15	7.00E-17	6.16E-02	5.16E-07

Stack: **UO_2 Building – Room 182 (K21)**
Average Flow Rate: 4.09 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Uncertainty Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Estimated Exposure (mrem)
Gross alpha	4.00E-15	2.00E-14	1.00E-16	2.71E-01	NA
Gross beta	4.00E-14	5.00E-14	3.00E-16	2.75E+00	NA
U-232	8.00E-24	3.00E-23	2.00E-25	5.42E-10	4.96E-15
U-234	8.00E-18	3.00E-17	2.00E-19	5.42E-04	4.96E-09
U-235	2.00E-16	8.00E-16	6.00E-18	1.36E-02	1.24E-07
U-236	1.00E-16	4.00E-16	3.00E-18	6.78E-03	6.20E-08
U-238	4.00E-15	2.00E-14	1.00E-16	2.50E-01	2.29E-06

Framatome Inc.
2101 Horn Rapids Road
Richland, WA 99354
Tel: (509) 375-8100

www.framatome.com

I. Gaseous Effluents (Continuously Sampled Stacks)
Reporting Period: July 1 – December 31, 2019

Stack: **ELO Building – Shop (K25)**
Average Flow Rate: 1.35 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Uncertainty Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Estimated Exposure (mrem)
Gross alpha	7.00E-16	1.00E-14	3.00E-16	1.95E-02	NA
Gross beta	1.00E-14	5.00E-14	1.00E-15	2.34E-01	NA
U-232	1.00E-24	2.00E-23	7.00E-25	2.95E-11	2.66E-15
U-234	1.00E-18	2.00E-17	7.00E-19	2.95E-05	2.66E-09
U-235	3.00E-17	6.00E-16	2.00E-17	7.38E-04	6.65E-08
U-236	2.00E-17	3.00E-16	9.00E-18	3.69E-04	3.33E-08
U-238	6.00E-16	1.00E-14	3.00E-16	1.36E-02	1.23E-06

Stack: **UO_2 Building – ADU (K31)**
Average Flow Rate: 3.74 cubic meters/second
* There are several sampled effluent streams discharged via this stack.

Radionuclide	Concentration (µCi/ml)	Uncertainty Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Estimated Exposure (mrem)
Gross alpha	8.00E-15	9.00E-15	1.00E-16	2.45E-01	NA
Gross beta	4.00E-14	3.00E-14	4.00E-16	2.52E+00	NA
U-232	2.00E-23	2.00E-23	2.00E-25	4.90E-10	2.58E-15
U-234	2.00E-17	2.00E-17	2.00E-19	4.90E-04	2.58E-09
U-235	4.00E-16	4.00E-16	6.00E-18	1.23E-02	6.45E-08
U-236	2.00E-16	2.00E-16	3.00E-18	6.13E-03	3.23E-08
U-238	7.00E-15	8.00E-15	1.00E-16	2.26E-01	1.19E-06

Stack: **UO_2 Building – U_3O_8 (K37)**
Average Flow Rate: 6.29 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Uncertainty Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Estimated Exposure (mrem)
Gross alpha	1.00E-15	7.00E-15	7.00E-17	1.07E-01	NA
Gross beta	8.00E-15	2.00E-14	2.00E-16	7.86E-01	NA
U-232	2.00E-24	1.00E-23	1.00E-25	2.14E-10	2.04E-15
U-234	2.00E-18	1.00E-17	1.00E-19	2.14E-04	2.04E-09
U-235	5.00E-17	3.00E-16	4.00E-18	5.36E-03	5.10E-08
U-236	3.00E-17	2.00E-16	2.00E-18	2.68E-03	2.55E-08
U-238	1.00E-15	6.00E-15	7.00E-17	9.89E-02	9.41E-07

I. Gaseous Effluents (Continuously Sampled Stacks)
Reporting Period: July 1 – December 31, 2019

Stack: **Laundry Facility (K42)**
Average Flow Rate: 1.73 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Uncertainty Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Estimated Exposure (mrem)
Gross alpha	8.00E-16	1.00E-14	3.00E-16	2.05E-02	NA
Gross beta	8.00E-15	4.00E-14	8.00E-16	2.33E-01	NA
U-232	2.00E-24	2.00E-23	5.00E-25	4.10E-11	2.12E-15
U-234	2.00E-18	2.00E-17	5.00E-19	4.10E-05	2.12E-09
U-235	4.00E-17	5.00E-16	1.00E-17	1.03E-03	5.30E-08
U-236	2.00E-17	3.00E-16	7.00E-18	5.13E-04	2.65E-08
U-238	7.00E-16	1.00E-14	2.00E-16	1.89E-02	9.78E-07

Stack: **ELO Building – Labs (K46)**
Average Flow Rate: 6.09 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Uncertainty Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Estimated Exposure (mrem)
Gross alpha	1.00E-15	8.00E-15	8.00E-17	1.45E-01	NA
Gross beta	2.00E-14	3.00E-14	2.00E-16	1.58E+00	NA
U-232	3.00E-24	2.00E-23	2.00E-25	2.90E-10	5.06E-15
U-234	3.00E-18	2.00E-17	2.00E-19	2.90E-04	5.06E-09
U-235	7.00E-17	4.00E-16	4.00E-18	7.25E-03	1.27E-07
U-236	4.00E-17	2.00E-16	2.00E-18	3.63E-03	6.33E-08
U-238	1.00E-15	8.00E-15	7.00E-17	1.34E-01	2.34E-06

Stack: **ARF (K47)**
Average Flow Rate: 0.95 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Uncertainty Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Estimated Exposure (mrem)
Gross alpha	3.00E-15	3.00E-14	5.00E-16	5.12E-02	NA
Gross beta	7.00E-14	1.00E-13	1.00E-15	1.07E+00	NA
U-232	6.00E-24	6.00E-23	1.00E-24	1.02E-10	1.76E-15
U-234	6.00E-18	6.00E-17	1.00E-18	1.02E-04	1.76E-09
U-235	2.00E-16	2.00E-15	2.00E-17	2.56E-03	4.39E-08
U-236	8.00E-17	8.00E-16	1.00E-17	1.28E-03	2.20E-08
U-238	3.00E-15	3.00E-14	4.00E-16	4.73E-02	8.10E-07

I. Gaseous Effluents (Continuously Sampled Stacks)
Reporting Period: July 1 – December 31, 2019

Stack: **SF Building – SWUR Room (K49)**
Average Flow Rate: 3.93 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Uncertainty Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Estimated Exposure (mrem)
Gross alpha	2.00E-15	1.00E-14	1.00E-16	1.33E-01	NA
Gross beta	8.00E-15	2.00E-14	4.00E-16	4.85E-01	NA
U-232	4.00E-24	2.00E-23	2.00E-25	2.66E-10	3.06E-15
U-234	4.00E-18	2.00E-17	2.00E-19	2.66E-04	3.06E-09
U-235	1.00E-16	6.00E-16	6.00E-18	6.65E-03	7.65E-08
U-236	5.00E-17	3.00E-16	3.00E-18	3.33E-03	3.83E-08
U-238	2.00E-15	1.00E-14	1.00E-16	1.23E-01	1.41E-06

Stack: **SF Building – SWUR POG (K50)**
Average Flow Rate: 0.00 cubic meters/second
***Stack did not operate during the second half of 2019

Radionuclide	Concentration (µCi/ml)	Uncertainty Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Estimated Exposure (mrem)
Gross alpha	1.00E-14	***	***	***	NA
Gross beta	5.00E-14	***	***	***	NA
U-232	2.00E-23	***	***	***	***
U-234	2.00E-17	***	***	***	***
U-235	5.00E-16	***	***	***	***
U-236	3.00E-16	***	***	***	***
U-238	1.00E-14	***	***	***	***

Stack: **Building 9 (K52)**
Average Flow Rate: 2.11 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Uncertainty Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Estimated Exposure (mrem)
Gross alpha	7.00E-16	9.00E-15	2.00E-16	1.98E-02	NA
Gross beta	1.00E-14	3.00E-14	7.00E-16	2.53E-01	NA
U-232	1.00E-24	2.00E-23	4.00E-25	3.96E-11	8.56E-16
U-234	1.00E-18	2.00E-17	4.00E-19	3.96E-05	8.56E-10
U-235	3.00E-17	4.00E-16	1.00E-17	9.89E-04	2.14E-08
U-236	2.00E-17	2.00E-16	6.00E-18	4.95E-04	1.07E-08
U-238	6.00E-16	8.00E-15	2.00E-16	1.83E-02	3.95E-07

I. Gaseous Effluents (Continuously Sampled Stacks)
Reporting Period: July 1 – December 31, 2019

Stack: **SF Building – SWUR Shroud (K55)**
Average Flow Rate: 0.00 cubic meters/second
***Stack did not operate during the second half of 2019

Radionuclide	Concentration (µCi/ml)	Uncertainty Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Estimated Exposure (mrem)
Gross alpha	4.00E-15	***	***	***	NA
Gross beta	4.00E-14	***	***	***	NA
U-232	7.00E-24	***	***	***	***
U-234	7.00E-18	***	***	***	***
U-235	2.00E-16	***	***	***	***
U-236	9.00E-17	***	***	***	***
U-238	3.00E-15	***	***	***	***

Stack: **ELO Building – GSUR (K56)**
Average Flow Rate: 0.29 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Uncertainty Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Estimated Exposure (mrem)
Gross alpha	1.00E-15	3.00E-14	2.00E-15	4.63E-03	NA
Gross beta	1.00E-14	1.00E-13	5.00E-15	5.03E-02	NA
U-232	2.00E-24	6.00E-23	3.00E-24	9.25E-12	1.02E-16
U-234	2.00E-18	6.00E-17	3.00E-18	9.25E-06	1.02E-10
U-235	5.00E-17	2.00E-15	8.00E-17	2.31E-04	2.56E-09
U-236	3.00E-17	8.00E-16	4.00E-17	1.16E-04	1.28E-09
U-238	1.00E-15	3.00E-14	1.00E-15	4.27E-03	4.73E-08

Stack: **UO_2 Building – Labs (K58)**
Average Flow Rate: 7.64 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Uncertainty Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Estimated Exposure (mrem)
Gross alpha	5.00E-16	4.00E-15	6.00E-17	6.39E-02	NA
Gross beta	6.00E-15	2.00E-14	2.00E-16	7.86E-01	NA
U-232	1.00E-24	9.00E-24	1.00E-25	1.28E-10	1.24E-15
U-234	1.00E-18	9.00E-18	1.00E-19	1.28E-04	1.24E-09
U-235	3.00E-17	2.00E-16	3.00E-18	3.19E-03	3.10E-08
U-236	1.00E-17	1.00E-16	2.00E-18	1.60E-03	1.55E-08
U-238	5.00E-16	4.00E-15	6.00E-17	5.90E-02	5.71E-07

I. Gaseous Effluents (Continuously Sampled Stacks)
Reporting Period: July 1 – December 31, 2019

Stack: **SF Building – NAF Furnace (K60)**
Average Flow Rate: 6.64 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Uncertainty Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Estimated Exposure (mrem)
Gross alpha	9.00E-16	6.00E-15	7.00E-17	1.02E-01	NA
Gross beta	1.00E-14	2.00E-14	2.00E-16	1.01E+00	NA
U-232	2.00E-24	1.00E-23	1.00E-25	2.03E-10	1.90E-15
U-234	2.00E-18	1.00E-17	1.00E-19	2.03E-04	1.90E-09
U-235	5.00E-17	3.00E-16	3.00E-18	5.08E-03	4.74E-08
U-236	2.00E-17	2.00E-16	2.00E-18	2.54E-03	2.37E-08
U-238	9.00E-16	6.00E-15	6.00E-17	9.37E-02	8.75E-07

Stack: **Dry Conversion Facility (K62)**
Average Flow Rate: 23.07 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Uncertainty Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Estimated Exposure (mrem)
Gross alpha	6.00E-16	3.00E-15	2.00E-17	2.27E-01	NA
Gross beta	9.00E-15	1.00E-14	6.00E-17	3.26E+00	NA
U-232	1.00E-24	5.00E-24	4.00E-26	4.54E-10	1.43E-15
U-234	1.00E-18	5.00E-18	4.00E-20	4.54E-04	1.43E-09
U-235	3.00E-17	1.00E-16	1.00E-18	1.13E-02	3.57E-08
U-236	2.00E-17	7.00E-17	5.00E-19	5.67E-03	1.78E-08
U-238	6.00E-16	3.00E-15	2.00E-17	2.09E-01	6.58E-07

Stack: **BDU Facility (K65)**
Average Flow Rate: 0.94 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Uncertainty Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Estimated Exposure (mrem)
Gross alpha	6.00E-16	1.00E-14	5.00E-16	9.07E-03	NA
Gross beta	7.00E-15	5.00E-14	2.00E-15	1.05E-01	NA
U-232	1.00E-24	3.00E-23	1.00E-24	1.81E-11	2.38E-16
U-234	1.00E-18	3.00E-17	1.00E-18	1.81E-05	2.38E-10
U-235	3.00E-17	7.00E-16	2.00E-17	4.53E-04	5.95E-09
U-236	1.00E-17	3.00E-16	1.00E-17	2.27E-04	2.98E-09
U-238	6.00E-16	1.00E-14	5.00E-16	8.37E-03	1.10E-07

I. Gaseous Effluents (Continuously Sampled Stacks)
Reporting Period: July 1 – December 31, 2019

Stack: **Cylinder Recertification Facility (K67)**
Average Flow Rate: 0.46 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Uncertainty Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Estimated Exposure (mrem)
Gross alpha	7.00E-16	2.00E-14	1.00E-15	5.05E-03	NA
Gross beta	1.00E-14	8.00E-14	3.00E-15	8.01E-02	NA
U-232	1.00E-24	4.00E-23	2.00E-24	1.01E-11	4.18E-16
U-234	1.00E-18	4.00E-17	2.00E-18	1.01E-05	4.18E-10
U-235	4.00E-17	1.00E-15	5.00E-17	2.52E-04	1.05E-08
U-236	2.00E-17	5.00E-16	3.00E-17	1.26E-04	5.23E-09
U-238	7.00E-16	2.00E-14	9.00E-16	4.66E-03	1.93E-07

Stack: **MERF Building (K69)**
Average Flow Rate: 1.69 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Uncertainty Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Estimated Exposure (mrem)
Gross alpha	8.00E-16	1.00E-14	3.00E-16	2.18E-02	NA
Gross beta	7.00E-15	3.00E-14	8.00E-16	1.97E-01	NA
U-232	2.00E-24	2.00E-23	6.00E-25	4.37E-11	1.43E-15
U-234	2.00E-18	2.00E-17	6.00E-19	4.37E-05	1.43E-09
U-235	4.00E-17	6.00E-16	1.00E-17	1.09E-03	3.58E-08
U-236	2.00E-17	3.00E-16	7.00E-18	5.46E-04	1.79E-08
U-238	7.00E-16	1.00E-14	3.00E-16	2.01E-02	6.60E-07

Stack: **UO_2 Building – BLEU Facility (K72)**
Average Flow Rate: 11.54 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Uncertainty Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Estimated Exposure (mrem)
Gross alpha	1.00E-15	5.00E-15	4.00E-17	2.19E-01	NA
Gross beta	1.00E-14	2.00E-14	1.00E-16	2.01E+00	NA
U-232	2.00E-24	1.00E-23	8.00E-26	4.38E-10	2.84E-15
U-234	2.00E-18	1.00E-17	8.00E-20	4.38E-04	2.84E-09
U-235	6.00E-17	3.00E-16	2.00E-18	1.10E-02	7.10E-08
U-236	3.00E-17	1.00E-16	1.00E-18	5.48E-03	3.55E-08
U-238	1.00E-15	5.00E-15	4.00E-17	2.02E-01	1.31E-06

I. Gaseous Effluents (Continuously Sampled Stacks)
Reporting Period: July 1 – December 31, 2019

Stack: **UNB Building (K75)**
Average Flow Rate: 0.47 cubic meters/second

Radionuclide	Concentration (µCi/ml)	Uncertainty Estimate (µCi/ml)	MDC (µCi/ml)	Quantity Released (µCi)	Estimated Exposure (mrem)
Gross alpha	5.00E-16	2.00E-14	1.00E-15	3.69E-03	NA
Gross beta	7.00E-15	6.00E-14	3.00E-15	5.36E-02	NA
U-232	1.00E-24	3.00E-23	2.00E-24	7.37E-12	8.08E-17
U-234	1.00E-18	3.00E-17	2.00E-18	7.37E-06	8.08E-11
U-235	2.00E-17	8.00E-16	5.00E-17	1.84E-04	2.02E-09
U-236	1.00E-17	4.00E-16	2.00E-17	9.22E-05	1.01E-09
U-238	5.00E-16	2.00E-14	9.00E-16	3.40E-03	3.73E-08

II. Liquid Effluent
Reporting Period: July 1 – December 31, 2019

Constituent	Concentration (μCi/ml)	LLD (μCi/ml)	Quantity (Ci)	Liquid Volume (m^3)
Soluble U	1.63E-07	***	0.0059	3.60E+04
Insoluble U**	1.83E-07	***	0.0066	
Tc-99	5.00E-07	***	0.0180	
Total Ci			0.0310	

* Combined liquid effluent released to City of Richland sewer system.

** The average concentration of insoluble uranium for the 6-month period was 70 ppb.

*** These constituents are analyzed chemically via Inductively Coupled Plasma/Mass Spectroscopy (ICP/MS) as opposed to radiation counting. Laboratory detection limits for uranium and Tc-99 are generally 1 ppb and 5 ppt, respectively