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Our ref: HEM-17-11
Date: February 22, 2017

U.S. Nuclear Regulatory Commission, Region III
2443 Warrenville Road, Suite 210
Lisle, IL 60532-4352

Subject: Westinghouse Hematite Decommissioning Project: Effluent Monitoring Report for the Period July 1, 2016, through December 31, 2016 (License No. SNM-33, Docket No. 70-36)

Reference: 10 CFR 70.59, "Effluent monitoring reporting requirements"

Dear Sirs:

In accordance with 10 CFR 70.59, this letter transmits the semi-annual effluent monitoring report for Hematite Decommissioning Project (Hematite), License Number SNM-33. The report, provided as an attachment to this letter, covers the period July 1, 2016, through December 31, 2016.

If you have any questions concerning this letter or the attached report, please contact W. Clark Evers, Project Radiation Safety Officer, at (314) 810-3336, or Ken Pallagi, Licensing Manager, at (314) 810-3353.

Sincerely,

W. Clark Evers, CHP
Radiation Safety Officer
Hematite Decommissioning Project

Attachment: Hematite Decommissioning Project Effluent Monitoring Report for the Period July 1, 2016, through December 31, 2016

IE48
NMSS20
NMSS

cc: J. Smetanka, Westinghouse
J. Smith, NRC/DUWP/MDP
M. Kunowski, NRC Region III/DNMS/MCID
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ATTACHMENT

Hematite Decommissioning Project
Effluent Monitoring Report for the Period
July 1, 2016, through December 31, 2016

Hematite Decommissioning Project Effluent Monitoring Report

I. Introduction

Pursuant to 10 CFR 70.59, this report summarizes the results of radiological effluent monitoring at the Hematite Decommissioning Project (HDP) for the period from July 1, 2016, through December 31, 2016. This report includes the information specified in 10 CFR 70.59, which states in part:

> *The report must specify the quantity of each of the principal radionuclides released to unrestricted areas in liquid and gaseous effluents during the previous six months of operation, and such other information as the Commission may require to estimate maximum potential annual radiation doses to the public resulting from effluent releases. If quantities of radioactive materials released during the reporting periods are significantly above the licensee's design objectives previously reviewed as part of the licensing action, the report must cover this specifically.*

II. Effluent Monitoring Report

A. Liquid Effluents

The quantity of radioactivity released to unrestricted areas in liquid effluents during this time period is summarized in Table 1 below.

As indicated in Table 1, quantities of radioactive materials released during the reporting period are significantly below the control limits specified by the Hematite Decommissioning Project License Number SNM-33. Based on the isotopic activity measurements, the maximum percentage of the annual effluent limit for an individual outfall location was 11% (based on Outfall #006/WS-52). This data confirms that the maximum potential radiation dose to the public resulting from liquid effluent releases during the reporting period is below the limits of 10 CFR 20.1301.

Table 1
Liquid Effluent Monitoring Summary Data
Reporting Period July – December 2016

Nuclide[1]	Total Volume (L)	Average Activity Concentration (µCi/ml)	Analytical Uncertainty Estimate (µCi/ml)	LLD[2] (µCi/ml)	Quantity Released (Ci)	Total Uncertainty Estimate[3] (Ci)	Fraction of Limit[5]
Site Dam (Outfall #002)							
Gross Alpha	7.27E+08	2.28E-09	1.76E-09	3.03E-09	1.66E-03	3.68E-04	N/A
Gross Beta	7.27E+08	3.11E-09	1.02E-09	1.41E-09	2.26E-03	2.14E-04	N/A
U-234	7.27E+08	6.70E-10	2.68E-10	2.76E-10	4.87E-04	3.77E-03	0.00
U-235	7.27E+08	0.00E+00	1.06E-10	2.62E-10	0.00E+00	1.48E-04	0.00
U-238	7.27E+08	2.49E-10	1.57E-10	1.06E-10	1.81E-04	1.39E-04	0.00
Th-232	7.27E+08	4.25E-12	8.76E-11	2.48E-10	3.09E-06	1.90E-03	0.00
Ra-226	7.27E+08	2.00E-10	1.52E-10	2.13E-10	1.46E-04	1.61E-05	0.00
Ra-228	7.27E+08	1.33E-10	2.84E-10	4.83E-10	9.65E-05	4.90E-04	0.00
Pb-210	7.27E+08	6.59E-10	1.76E-09	2.93E-09	4.79E-04	2.03E-05	0.07
Tc-99	7.27E+08	0.00E+00	1.23E-09	2.12E-09	0.00E+00	1.82E-04	0.00
Th-228	7.27E+08	4.25E-12	8.76E-11	2.48E-10	3.09E-06	1.90E-03	0.00
Th-231	7.27E+08	0.00E+00	1.06E-10	2.62E-10	0.00E+00	1.48E-04	0.00
Th-234	7.27E+08	2.49E-10	1.57E-10	1.06E-10	1.81E-04	1.39E-04	0.00
					Total Fraction of the Limit		0.07

WTS Discharge (Outfall #003a)
No Discharge

South Culvert (Outfall #005)
No Flow

Table 1
Liquid Effluent Monitoring Summary Data
Reporting Period July - December 2016 (Cont.)

Nuclide[1]	Total Volume (L)	Average Activity Concentration (µCi/ml)	Analytical Uncertainty Estimate (µCi/ml)	LLD[2] (µCi/ml)	Quantity Released (Ci)	Total Uncertainty Estimate[3] (Ci)	Fraction of Limit[4]
Soil Laydown Area (Outfall #006)							
Gross Alpha	9.92E+07	5.74E-09	2.67E-09	4.48E-09	5.69E-04	1.03E-04	N/A
Gross Beta	9.92E+07	7.54E-09	1.76E-09	2.15E-09	7.48E-04	7.02E-05	N/A
U-234	9.92E+07	7.94E-10	3.22E-10	2.83E-10	7.87E-05	1.04E-03	0.00
U-235	9.92E+07	1.05E-10	1.14E-10	9.62E-11	1.04E-05	8.67E-05	0.00
U-238	9.92E+07	3.04E-10	2.24E-10	2.46E-10	3.01E-05	3.63E-04	0.00
Th-232	9.92E+07	3.36E-10	2.60E-10	2.07E-10	3.33E-05	2.90E-04	0.01
Ra-226	9.92E+07	7.69E-10	5.42E-10	7.66E-10	7.63E-05	3.38E-05	0.01
Ra-228	9.92E+07	1.32E-09	1.44E-09	2.36E-09	1.31E-04	7.93E-05	0.02
Pb-210	9.92E+07	5.65E-10	2.50E-09	4.19E-09	5.61E-05	1.05E-05	0.06
Tc-99	9.92E+07	3.87E-10	1.31E-09	2.21E-09	3.84E-05	3.06E-05	0.00
Th-228	9.92E+07	3.36E-10	2.60E-10	2.07E-10	3.33E-05	2.90E-04	0.00
Th-231	9.92E+07	1.05E-10	1.14E-10	9.62E-11	1.04E-05	8.67E-05	0.00
Th-234	9.92E+07	3.04E-10	2.24E-10	2.46E-10	3.01E-05	3.63E-04	0.00
						Total Fraction of the Limit	0.11

Table 1 Notes

Note 1: Th-228, Th-231, and Th-234 are assumed to be in equilibrium with Th-232, U-235, and U-238, respectively.

Note 2: The lower level of detection (LLD) was calculated by averaging the LLD for all samples.

Note 3: The total uncertainty includes the cumulative uncertainties from the analytical and the volumetric measurements.

Note 4: Average nuclide activity as a fraction of the 10 CFR 20 Appendix B Table 2 Effluent Concentration.

Note 5: Negative values are reported as zero.

B. Gaseous (Airborne) Effluents

Eight stationary environmental air samplers are located along the site boundary. The data obtained from the samplers are used to measure the air effluents, to determine the annual average concentration from air effluents, and to demonstrate that an individual member of the public likely to receive the highest dose would not be expected to receive a total effective dose equivalent in excess of 10 mrem per year from air effluents. One stationary environmental air sampler is also located at an offsite location to measure background. All air sample results obtained during the monitoring period represented a small fraction of the air effluent limits. The results are presented in Table 2.

Table 2
Air Effluent and Environmental Monitoring Program Summary Data

Analyte[1]	Activity Concentration[2] (µCi/mL)	Analytical Uncertainty Estimate (µCi/mL)	LLD[3] (µCi/mL)	Fraction of the Limit[4]
Air Sample-1				
Alpha	2.1E-15	1.9E-15	3.6E-15	N/A
Beta	2.9E-14	5.2E-15	8.4E-15	N/A
Pb-210	7.1E-17	2.3E-16	4.3E-16	1.2E-04
Ra-226	7.1E-17	2.3E-16	4.3E-16	7.8E-05
Ra-228	5.8E-18	9.2E-18	1.6E-17	2.9E-06
Tc-99	0.0E+00	1.2E-15	2.2E-15	0.0E+00
Th-228	5.8E-18	9.2E-18	1.6E-17	2.9E-04
Th-231	0.0E+00	6.3E-18	2.9E-17	0.0E+00
Th-232	5.8E-18	9.2E-18	1.6E-17	9.6E-04
Th-234	9.8E-18	1.5E-17	2.6E-17	4.9E-08
U-234	1.5E-17	1.6E-17	2.4E-17	3.1E-04
U-235	0.0E+00	6.3E-18	2.9E-17	0.0E+00
U-238	9.8E-18	1.5E-17	2.6E-17	1.6E-04
		Total Fraction of the Limit		1.9E-03
Air Sample-2				
Alpha	1.4E-15	1.8E-15	2.5E-15	N/A
Beta	2.1E-14	4.8E-15	5.3E-15	N/A
Pb-210	3.0E-17	1.9E-16	3.6E-16	4.9E-05
Ra-226	3.0E-17	1.9E-16	3.6E-16	3.3E-05
Ra-228	6.8E-18	9.9E-18	1.4E-17	3.4E-06
Tc-99	0.0E+00	1.2E-15	2.1E-15	0.0E+00
Th-228	6.8E-18	9.9E-18	1.4E-17	3.4E-04
Th-231	0.0E+00	3.6E-18	2.2E-17	0.0E+00
Th-232	6.8E-18	9.9E-18	1.4E-17	1.1E-03
Th-234	1.1E-17	1.5E-17	1.8E-17	5.7E-08
U-234	1.6E-17	1.7E-17	2.3E-17	3.3E-04
U-235	0.0E+00	3.6E-18	2.2E-17	0.0E+00
U-238	1.1E-17	1.5E-17	1.8E-17	1.9E-04
		Total Fraction of the Limit		2.1E-03

Table 2
Air Effluent and Environmental Monitoring Program Summary Data (Cont.)

Analyte[1]	Activity Concentration[2] (µCi/mL)	Analytical Uncertainty Estimate (µCi/mL)	LLD[3] (µCi/mL)	Fraction of the Limit[4]
Air Sample-3				
Alpha	1.3E-15	1.8E-15	2.2E-15	N/A
Beta	2.5E-14	4.9E-15	4.7E-15	N/A
Pb-210	1.7E-16	2.3E-16	3.8E-16	2.8E-04
Ra-226	1.7E-16	2.3E-16	3.8E-16	1.8E-04
Ra-228	0.0E+00	3.5E-18	1.8E-17	0.0E+00
Tc-99	0.0E+00	1.0E-15	1.9E-15	0.0E+00
Th-228	0.0E+00	3.5E-18	1.8E-17	0.0E+00
Th-231	6.8E-18	1.4E-17	2.6E-17	7.6E-10
Th-232	0.0E+00	3.5E-18	1.8E-17	0.0E+00
Th-234	0.0E+00	1.8E-18	1.1E-17	0.0E+00
U-234	1.4E-17	1.6E-17	2.2E-17	2.9E-04
U-235	6.8E-18	1.4E-17	2.6E-17	1.1E-04
U-238	0.0E+00	1.8E-18	1.1E-17	0.0E+00
			Total Fraction of the Limit	8.6E-04
Air Sample-4				
Alpha	2.2E-15	1.9E-15	2.2E-15	N/A
Beta	2.3E-14	4.9E-15	4.8E-15	N/A
Pb-210	1.4E-17	1.9E-16	3.7E-16	2.4E-05
Ra-226	1.4E-17	1.9E-16	3.7E-16	1.6E-05
Ra-228	1.0E-18	7.7E-18	2.1E-17	5.2E-07
Tc-99	0.0E+00	1.3E-15	2.3E-15	0.0E+00
Th-228	1.0E-18	7.7E-18	2.1E-17	5.2E-05
Th-231	0.0E+00	3.2E-18	2.3E-17	0.0E+00
Th-232	1.0E-18	7.7E-18	2.1E-17	1.7E-04
Th-234	1.1E-17	1.3E-17	1.8E-17	5.6E-08
U-234	1.8E-17	1.8E-17	2.1E-17	3.6E-04
U-235	0.0E+00	3.2E-18	2.3E-17	0.0E+00
U-238	1.1E-17	1.3E-17	1.8E-17	1.9E-04
			Total Fraction of the Limit	8.1E-04
Air Sample-5 (background)[5]				
Alpha	1.1E-15	1.8E-15	2.2E-15	N/A
Beta	2.1E-14	4.8E-15	4.7E-15	N/A
Pb-210	1.1E-16	2.3E-16	4.1E-16	1.9E-04
Ra-226	1.1E-16	2.3E-16	4.1E-16	1.2E-04
Ra-228	7.3E-19	7.1E-18	2.0E-17	3.6E-07
Tc-99	0.0E+00	1.0E-15	1.9E-15	0.0E+00
Th-228	7.3E-19	7.1E-18	2.0E-17	3.6E-05
Th-231	7.2E-19	5.2E-18	2.4E-17	8.0E-11
Th-232	7.3E-19	7.1E-18	2.0E-17	1.2E-04
Th-234	6.6E-18	1.0E-17	1.9E-17	3.3E-08
U-234	9.4E-18	1.3E-17	1.9E-17	1.9E-04
U-235	7.2E-19	5.2E-18	2.4E-17	1.2E-05
U-238	6.6E-18	1.0E-17	1.9E-17	1.1E-04
			Total Fraction of the Limit	7.8E-04

Table 2
Air Effluent and Environmental Monitoring Program Summary Data (Cont.)

Analyte[1]	Activity Concentration[2] (µCi/mL)	Analytical Uncertainty Estimate (µCi/mL)	LLD[3] (µCi/mL)	Fraction of the Limit[4]
Air Sample-6				
Alpha	1.1E-15	1.8E-15	3.6E-15	N/A
Beta	2.0E-14	4.8E-15	8.4E-15	N/A
Pb-210	1.7E-16	2.0E-16	3.2E-16	2.8E-04
Ra-226	1.7E-16	2.0E-16	3.2E-16	1.9E-04
Ra-228	5.1E-19	6.5E-18	2.4E-17	2.6E-07
Tc-99	0.0E+00	1.1E-15	1.9E-15	0.0E+00
Th-228	5.1E-19	6.5E-18	2.4E-17	2.6E-05
Th-231	7.8E-19	5.4E-18	2.4E-17	8.7E-11
Th-232	5.1E-19	6.5E-18	2.4E-17	8.5E-05
Th-234	1.1E-17	1.4E-17	2.1E-17	5.5E-08
U-234	1.6E-17	9.7E-18	2.3E-17	3.2E-04
U-235	7.8E-19	5.4E-18	2.4E-17	1.3E-05
U-238	1.1E-17	1.4E-17	2.1E-17	1.8E-04
			Total Fraction of the Limit	1.1E-03
Air Sample-7				
Alpha	1.1E-15	1.7E-15	2.2E-15	N/A
Beta	1.9E-14	4.7E-15	4.7E-15	N/A
Pb-210	5.5E-17	1.8E-16	3.4E-16	9.2E-05
Ra-226	5.5E-17	1.8E-16	3.4E-16	6.2E-05
Ra-228	0.0E+00	2.9E-18	1.6E-17	0.0E+00
Tc-99	0.0E+00	1.1E-15	2.0E-15	0.0E+00
Th-228	0.0E+00	2.9E-18	1.6E-17	0.0E+00
Th-231	0.0E+00	2.4E-18	1.5E-17	0.0E+00
Th-232	0.0E+00	2.9E-18	1.6E-17	0.0E+00
Th-234	1.1E-17	1.4E-17	2.2E-17	5.5E-08
U-234	1.9E-17	1.8E-17	2.3E-17	3.9E-04
U-235	0.0E+00	2.4E-18	1.5E-17	0.0E+00
U-238	1.1E-17	1.4E-17	2.2E-17	1.8E-04
			Total Fraction of the Limit	7.2E-04
Air Sample-8				
Alpha	2.8E-15	2.0E-15	2.2E-15	N/A
Beta	2.4E-14	5.0E-15	4.9E-15	N/A
Pb-210	1.1E-16	2.1E-16	3.7E-16	1.8E-04
Ra-226	1.1E-16	2.1E-16	3.7E-16	1.2E-04
Ra-228	4.5E-18	9.2E-18	1.9E-17	2.2E-06
Tc-99	0.0E+00	1.2E-15	2.1E-15	0.0E+00
Th-228	4.5E-18	9.2E-18	1.9E-17	2.2E-04
Th-231	3.9E-18	8.7E-18	1.5E-17	4.3E-10
Th-232	4.5E-18	9.2E-18	1.9E-17	7.5E-04
Th-234	1.7E-17	1.7E-17	1.9E-17	8.7E-08
U-234	1.8E-17	1.8E-17	2.3E-17	3.6E-04
U-235	3.9E-18	8.7E-18	1.5E-17	6.4E-05
U-238	1.7E-17	1.7E-17	1.9E-17	2.9E-04
			Total Fraction of the Limit	2.0E-03

Table 2
Air Effluent and Environmental Monitoring Program Summary Data (Cont.)

Analyte[1]	Activity Concentration[2] (µCi/mL)	Analytical Uncertainty Estimate (µCi/mL)	LLD[3] (µCi/mL)	Fraction of the Limit[4]
Air Sample-9				
Alpha	2.6E-15	1.9E-15	2.1E-15	N/A
Beta	2.2E-14	4.8E-15	4.7E-15	N/A
Pb-210	1.3E-16	1.9E-16	3.1E-16	2.1E-04
Ra-226	1.3E-16	1.9E-16	3.1E-16	1.4E-04
Ra-228	1.3E-18	4.6E-18	1.8E-17	6.6E-07
Tc-99	0.0E+00	1.0E-15	1.8E-15	0.0E+00
Th-228	1.3E-18	4.6E-18	1.8E-17	6.6E-05
Th-231	0.0E+00	3.7E-18	2.8E-17	0.0E+00
Th-232	1.3E-18	4.6E-18	1.8E-17	2.2E-04
Th-234	5.2E-18	5.7E-18	1.6E-17	2.6E-08
U-234	8.3E-19	5.3E-18	2.2E-17	1.7E-05
U-235	0.0E+00	3.7E-18	2.8E-17	0.0E+00
U-238	5.2E-18	5.7E-18	1.6E-17	8.6E-05
		Total Fraction of the Limit		7.4E-04

Note 1: Th-228 and Ra-228 were assumed to be in equilibrium with Th-232. Pb-210 was assumed to be in equilibrium with Ra-226. Th-231 was assumed to be in equilibrium with U-235. Th-234 was assumed to be in equilibrium with U-238.
Note 2: Average sample results are reported at each fixed location during the monitoring period
Note 3: The LLD was calculated by averaging the LLD for all samples.
Note 4: Consistent with the guidance provided in Regulatory Guide 4.20, the average environmental sample result demonstrates that an individual member of the public did not receive a TEDE in excess of 10 mrem as the result is less than 20% of the values in 10 CFR 20 Appendix B Table 2 Column 1.
Note 5: Air sample-5 is located at an offsite location to assess background concentrations.
Note 6: Negative values are reported as zero.

III. Conclusion

The effluent monitoring results summarized above confirm that quantities of radioactive materials released from Hematite in liquid and air effluents during the reporting period are significantly below License limits for liquid and gaseous effluents. Thus, the maximum potential radiation dose to the public resulting from liquid and air effluent releases during the reporting period is well below the limits of 10 CFR 20.1301 and 10 CFR 20.1101(d).