



Westinghouse Electric Company LLC  
Hematite Decommissioning Project  
3300 State Road P  
Festus, MO 63028  
USA

ATTN: Document Control Desk  
Director, Office of Federal and State Materials and  
Environmental Management Programs  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

Direct tel: 314-810-3353  
E-mail: pallagke@westinghouse.com  
Our ref: HEM-17-73  
Date: December 19, 2017

Subject: Westinghouse Hematite Decommissioning Project - Request for NRC Review of Final Status Survey Final Report Volume 7, Chapter 1, Final Status Survey Final Report Summary (License No. SNM-00033, Docket No. 070-00036)

The purpose of this letter is to provide for the U.S. Nuclear Regulatory Commission (NRC) review of Final Status Survey Final Report (FSSFR) Volume 7, Chapter 1, Final Status Survey Final Report Summary.

FSSFR Volume 7, Chapter 1 provides a summary of the Final Status Survey results for the Hematite Decommissioning Project (HDP) that has been completed in accordance with the NRC approved HDP Decommissioning Plan and Associated Documents. The radiological survey data as submitted in the FSSFR Volumes 1 through 6, as summarized in FSSFR Volume 7, Chapter 1, demonstrate that the site is suitable for release in accordance with the criteria of 10 CFR 20.1402, *Radiological criteria for unrestricted release*.

Also, the completed Final Status Survey of the HDP fulfills certain requirements of 10 CFR 70.38, *Expiration and termination of licenses and decommissioning of sites and separate buildings or outdoor areas*, which supports the forthcoming request for termination of License SNM-00033.

Please contact me at 314-810-3353, should you have questions or need additional information.

Sincerely,

A handwritten signature in black ink, appearing to read 'Kenneth E. Pallagi'.

Kenneth E. Pallagi  
Licensing Manager,  
Hematite Decommissioning Project

NMSS 20

Attachment: 1) Final Status Survey Final Report Volume 7, Chapter 1, Final Status Survey  
Final Report Summary (HDP-RPT-FSS-600)

cc: V. J. Kelmeckis, Westinghouse  
S. S. Koenick, NRC/DUWP/MDB  
J. A. Smith, NRC/DUWP/MDB

**Attachment 1**

**Final Status Survey Final Report Volume 7, Chapter 1**

**Final Status Survey Final Report Summary**

**Westinghouse Electric Company LLC, Hematite Decommissioning Project**

**Docket No. 070-00036**



## Final Status Survey Report

### Hematite Decommissioning Project

### Final Status Survey Final Report Volume 7, Chapter 1

**TITLE:** Final Status Survey Final Report Summary

**REVISION:** 0

**EFFECTIVE DATE:** DEC 19 2017

#### Approvals:

Author: *Kenneth E. Pallagi* 12-19-2017  
Kenneth E. Pallagi Date

Owner/Manager: *W. Clark Evers* 12/19/17  
W. Clark Evers Date

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**LIST OF ACRONYMS AND SYMBOLS**

BSA	Building Survey Area
CSM	Conceptual Site Model
DCGL	Derived Concentration Guideline Level
DCGL <sub>BP</sub>	Derived Concentration Guideline Level Buried Piping
DCGL <sub>SO</sub>	Derived Concentration Guideline Level Small Office
DP	Hematite Decommissioning Plan
EPA	U.S. Environmental Protection Agency
FSS	Final Status Survey
FSSFR	Final Status Survey Final Report
HDP	Hematite Decommissioning Project
HSA	Historical Site Assessment
LSA	Land Survey Area
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
NRC	U.S. Nuclear Regulatory Commission
PSA	Piping Survey Area
SOF	Sum of Fractions
Westinghouse	Westinghouse Electric Company LLC

## 1.0 FINAL STATUS SURVEY FINAL REPORT – EXECUTIVE SUMMARY

The Westinghouse Electric Company LLC (Westinghouse) Hematite Decommissioning Project (HDP) goal was to reduce residual radioactivity across all areas of the site to residual radioactivity levels that permit termination of the U.S. Nuclear Regulatory Commission (NRC) License SNM-0033 in accordance with 10 Code of Federal Regulation (CFR) 70.38, *Expiration and termination of licenses and decommissioning of sites and separate buildings or outdoor areas*, and 10 CFR 20.1402, Subpart E, *Radiological criteria for unrestricted use*.

This report, the Final Status Survey Report Summary, for the HDP summarizes the results of the Final Status Survey (FSS) conducted at HDP as submitted to the NRC in the various FSSFR Volume Chapters. To meet the requirements of 10 CFR 70.38, *Expiration and termination of licenses and decommissioning of sites and separate buildings or outdoor areas*, the FSSFR Volume Chapters provide the necessary radiological data to demonstrate that the residual radioactivity levels at the HDP site meet the criteria of 10 CFR 20.1402 and therefore is acceptable for unrestricted use and will support Westinghouse's request for the termination of NRC License SNM-00033.

## 2.0 REPORT BACKGROUND

As a result of NRC feedback regarding the submittal of FSS survey area release records, Westinghouse and the NRC agreed that Westinghouse would develop an outline presenting the format and content of FSS documents required for NRC review. Westinghouse provided the outline to the NRC for discussion during the August 19, 2015, publicly noticed teleconference and the format was agreed upon {ML15238B032}.

Subsequently Westinghouse submitted FSSFR Volume 1, Chapter 1, *Final Status Survey Final Report* {ML15257A307} to the NRC which implemented the agreed upon format. The agreed upon format is contained in Section 6.0, *Final Status Survey Final Report Organization*. This report, FSSFR Volume 7, Chapter 1 follows the agreed upon format.

## 3.0 SUMMARY OF LAND SURVEY AREA (LSA) SURVEY UNITS

FSSFR Volume 3, Chapter 1, *Land Survey Area (LSA) Overview*, provides information that is common and pertinent to the FSS of the LSAs. FSSFR Volume 3, Chapter 1, discusses; 1) Remediation Activities; 2) Release Criteria; 3) Data Quality Objectives; 4) Final Status Survey Design; 5) Final Status Survey; and 6) Survey Area Release record Organization.

The survey area release records for the survey units within the various Land Survey Areas are provided in FSSFR Volume 3, Chapters 2 through 23. All sources of dose were considered when determining the overall dose contribution from each survey unit. In addition to the dose contribution of the soil the overall dose contributions for a survey unit including all remaining structures, piping, the placement of onsite reuse, and groundwater within a survey unit.

As post-remediation groundwater monitoring would be conducted over four (4) calendar quarters (commencing in the 2<sup>nd</sup> quarter of 2016) the actual groundwater dose contribution could not be determined until post-remediation ground water monitoring was complete. Therefore to support the timely submittal of FSSFR Volume 3, Chapters 2 through 23, for the purposes of demonstration that the estimated total dose contribution to a survey unit met the criteria for unrestricted use, reporting the groundwater dose contribution for all survey units was assigned the maximum allowable dose set by the U.S. Environmental Protection Agency (EPA) drinking water standard of 4 mrem/year.

As provided in FSSFR Volume 6, Chapter 1, *Groundwater Overview*, at the conclusion of the post-remediation groundwater monitoring period the actual groundwater dose contribution to a survey unit would be determined and replace the assumed 4 mrem/year groundwater dose contribution which was based upon the EPA drinking water standard. Section 4.0 of this report provides a summary of groundwater monitoring at HDP.

At the conclusion of post-remediation groundwater monitoring period, the groundwater data was evaluated and the actual groundwater dose contribution was determined to be 0.68 mrem/year. Therefore total dose estimate for each survey unit has been updated to reflect the actual groundwater dose contribution.

In summary, the average residual radioactivity dose contribution for all LSA survey units is 5.98 mrem/year, with a maximum LSA survey unit dose of 15.93 mrem/year (LSA 08-10) which is below the unrestricted release criteria of 25 mrem/year.

Table 3-1, *Final LSA Survey Unit Dose*, provides the dose associated with residual radioactivity in each LSA survey unit for the HDP site.



**Table 3-1**  
**Final LSA Survey Unit Dose**

LSA-SU	MARSSIM Class	DCGL	Ave. SU Soil Residual Radioactivity (SOF)	Ave. SU Soil Residual Radioactivity (mrem/year)	EMC Contribution (SOF)	EMC Contribution (mrem/year)	Remaining Structure Contribution (SOF)	Remaining Structure Contribution (mrem/year)	Buried Piping Contribution (SOF)	Buried Piping Contribution (mrem/year)	Reuse Soil Contribution (SOF)	Reuse Soil Contribution (mrem/year)	Ground Water (SOF)	Ground Water (mrem/year)	Total SU SOF	Total SU Dose (mrem/year)
01-01	3	Uniform	0.01	0.25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.04	0.93
01-02	2	Uniform	0.03	0.75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.06	1.43
01-03	1	Uniform	0.08	2.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.11	2.68
02-01	1	Uniform	0.09	2.25	0.24	6.00	N/A	N/A	0.02	0.50	N/A	N/A	0.03	0.68	0.38	9.43
02-02	1	Uniform	0.17	4.25	0.25	6.25	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.45	11.18
02-03	1	Uniform	0.11	2.75	0.19	4.75	0.03	0.75	N/A	N/A	0.17	4.25	0.03	0.68	0.53	13.18
03-01	3	Uniform	0.09	2.25	N/A	N/A	N/A	N/A	N/A	N/A	0.17	4.25	0.03	0.68	0.29	7.18
03-02	2	Uniform	0.20	5.00	N/A	N/A	N/A	N/A	N/A	N/A	0.17	4.25	0.03	0.68	0.40	9.93
04-01	3	Uniform	0.08	2.00	N/A	N/A	0.03	0.75	0.00	0.00	N/A	N/A	0.03	0.68	0.14	3.43
04-02	1	Uniform	0.11	2.75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.14	3.43
04-03	1	Uniform	0.09	2.25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.12	2.93
04-04	1	Uniform	0.11	2.75	N/A	N/A	N/A	N/A	0.26	6.50	N/A	N/A	0.03	0.68	0.40	9.93
04-05	2	Uniform	0.06	1.50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.09	2.18
05-01	1	Uniform	0.14	3.50	0.35	8.75	0.01	0.25	N/A	N/A	N/A	N/A	0.03	0.68	0.53	13.18
05-02	1	Uniform	0.34	8.50	N/A	N/A	0.03	0.75	N/A	N/A	0.10	2.50	0.03	0.68	0.50	12.43
05-03	1	Uniform	0.12	3.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.15	3.68
05-04	1	Uniform	0.11	2.75	N/A	N/A	N/A	N/A	0.02	0.50	0.17	4.25	0.03	0.68	0.33	8.18
06-01	3	Uniform	0.06	1.50	N/A	N/A	0.01	0.25	0.015	0.40	N/A	N/A	0.03	0.68	0.11	2.83
06-02	2	Uniform	0.08	2.00	N/A	N/A	0.03	0.75	0.03	0.80	N/A	N/A	0.03	0.68	0.17	4.23
07-01	2	Uniform	0.11	2.75	N/A	N/A	0.04	1.00	0.01	0.02	N/A	N/A	0.03	0.68	0.18	4.45
08-01	1	3 Layer	0.05	1.25	0.22	5.50	N/A	N/A	N/A	N/A	0.25	6.25	0.03	0.68	0.55	13.68
08-02	1	3 Layer	0.06	1.50	N/A	N/A	N/A	N/A	N/A	N/A	0.25	6.25	0.03	0.68	0.34	8.43
08-03	1	Uniform	0.05	1.25	N/A	N/A	0.001	0.10	0.022	0.60	N/A	N/A	0.03	0.68	0.10	2.63
08-04	1	Uniform	0.14	3.50	N/A	N/A	0.01	0.25	0.002	0.10	0.12	3.00	0.03	0.68	0.30	7.53
08-05	1	Uniform	0.18	4.50	N/A	N/A	N/A	N/A	N/A	N/A	0.12	3.00	0.03	0.68	0.33	8.18
08-06	1	Uniform	0.19	4.75	N/A	N/A	0.03	0.75	N/A	N/A	0.22	5.50	0.03	0.68	0.47	11.68
08-07	1	Uniform	0.17	4.25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.20	4.93
08-08	1	Uniform	0.25	6.25	N/A	N/A	N/A	N/A	N/A	N/A	0.25	6.25	0.03	0.68	0.53	13.18
08-09	1	3 Layer	0.15	3.75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.18	4.43
08-10	1	Uniform	0.22	5.50	0.11	2.75	0.02	0.50	0.26	6.50	N/A	N/A	0.03	0.68	0.64	15.93
08-11	1	3 Layer	0.17	4.25	0.21	5.25	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.41	10.18
08-12	1	3 Layer	0.30	7.50	0.05	1.25	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.38	9.43
08-13	1	3 Layer	0.23	5.75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.26	6.43
08-14	1	Uniform	0.23	5.75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.26	6.43

**Table 3-1  
Final LSA Survey Unit Dose (Continued)**

LSA-SU	MARSSIM Class	DCGL	Ave. SU Soil Residual Radioactivity (SOF)	Ave. SU Soil Residual Radioactivity (mrem/year)	EMC Contribution (SOF)	EMC Contribution (mrem/year)	Remaining Structure Contribution (SOF)	Remaining Structure Contribution (mrem/year)	Buried Piping Contribution (SOF)	Buried Piping Contribution (mrem/year)	Reuse Soil Contribution (SOF)	Reuse Soil Contribution (mrem/year)	Ground Water (SOF)	Ground Water (mrem/year)	Total SU SOF	Total SU Dose (mrem/year)
08-15	2	Uniform	0.09	2.25	N/A	N/A	0.01	0.25	0.26	6.50	N/A	N/A	0.03	0.68	0.39	9.68
08-16	1	Uniform	0.13	3.25	N/A	N/A	0.02	0.50	0.032	0.90	N/A	N/A	0.03	0.68	0.21	5.33
08-17	1	Uniform	0.15	3.75	N/A	N/A	0.03	0.75	0.02	0.50	N/A	N/A	0.03	0.68	0.23	5.68
09-01	3	Uniform	0.05	1.25	N/A	N/A	0.02	0.50	N/A	N/A	N/A	N/A	0.03	0.68	0.10	2.43
09-02	1	3 Layer	0.11	2.75	N/A	N/A	0.01	0.25	N/A	N/A	N/A	N/A	0.03	0.68	0.15	3.68
09-03	1	3 Layer	0.11	2.75	N/A	N/A	0.02	0.50	N/A	N/A	N/A	N/A	0.03	0.68	0.16	3.93
10-01	1	Uniform	0.19	4.75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.22	5.43
10-02	1	Uniform	0.07	1.75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.10	2.43
10-03	1	Uniform	0.34	8.50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.37	9.18
10-04	1	Uniform	0.14	3.50	0.14	3.50	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.31	7.68
10-05	1	Uniform	0.29	7.25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.32	7.93
10-06	1	Uniform	0.11	2.75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.14	3.43
10-07	1	Uniform	0.16	4.00	0.01	0.25	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.20	4.93
10-08	1	Uniform	0.05	1.25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.08	1.93
10-09	1	Uniform	0.09	2.25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.12	2.93
10-10	1	Uniform	0.14	3.50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.17	4.18
10-11	1	Uniform	0.15	4.75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.18	5.43
10-12	1	3 Layer	0.23	5.75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.26	6.43
10-13	1	Uniform	0.19	4.75	N/A	N/A	N/A	N/A	N/A	N/A	0.14	3.50	0.03	0.68	0.36	8.93
10-14	1	Uniform	0.13	3.25	N/A	N/A	N/A	N/A	N/A	N/A	0.10	2.50	0.03	0.68	0.26	6.43
11-01	2	Uniform	0.03	0.75	N/A	N/A	N/A	N/A	N/A	N/A	0.31	7.75	0.03	0.68	0.37	9.18
11-02	3	Uniform	0.07	1.75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.10	2.43
11-03	3	Uniform	0.18	4.50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.21	5.18
11-04	3	Uniform	0.17	4.25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.20	4.93
11-05	3	Uniform	0.04	1.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.07	1.68
11-06	1	Uniform	0.15	3.75	0.07	1.75	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.25	6.18
12-01	2	Uniform	0.04	1.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.07	1.68
12-02	2	Uniform	0.09	2.25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.12	2.93
12-03	1	Uniform	0.08	2.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.11	2.68
12-04	1	Uniform	0.09	2.25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.12	2.93
12-05	1	Uniform	0.11	2.75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.14	3.43
12-06	1	Uniform	0.11	2.75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.14	3.43
12-07	1	Uniform	0.06	1.50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.09	2.18
12-08	1	Uniform	0.08	2.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.11	2.68
12-09	1	Uniform	0.10	2.50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.68	0.13	3.18

#### 4.0 SUMMARY OF GROUNDWATER MONITORING

FSSFR Volume 6, Chapter 1, *Groundwater Overview*, provides information that is pertinent to groundwater at the site. FSSFR Volume 6, Chapter 1, discusses; 1) Subsurface Geology; 2) Characterization of Groundwater; 3) Excavation of Overburden Clay; and 4) Groundwater Monitoring.

FSSFR Volume 6, Chapter 7, *Post-remediation Groundwater Monitoring Summary*, provides the calculated groundwater dose contribution which is based upon the results of the four (4) quarters of post-remediation groundwater monitoring. FSSFR Volume 6, Chapter 3 through 6 provides the post-remediation groundwater monitoring results for the respective quarterly monitoring period.

FSSFR Volume 6, Chapter 2, *Groundwater Monitoring Results During Remediation*, along with FSSFR Volume 6, Chapters 8 and 9, provide additional groundwater monitoring data to support the conclusions as stated in FSSFR Volume 6, Chapter 7, *Post-remediation Groundwater Monitoring Summary*.

In summary, at the conclusion of post-remediation groundwater monitoring period, the groundwater data was evaluated and determined that remediation activities did not impact groundwater [Jefferson City-Cotter and the Roubidoux Hydrostratigraphic Units (HSU)], and the actual groundwater dose contribution to the LSA survey units was assigned the dose contribution of 0.68 mrem/year of the Jefferson City-Cotter Hydrostratigraphic Unit.

Table 4-1, *Groundwater Final Dose*, provides the dose associated with residual radioactivity, by radionuclide, for each Hydrostratigraphic Unit.

**Table 4-1  
Final Groundwater Dose**

Groundwater Formation	Monitoring Period Average Tc-99 (pCi/L)	x	DSR <sub>GW</sub> (mrem/year per pCi/L)	=	Dose Contribution from Radionuclide	Monitoring Period Average U233/234 (pCi/L)	x	DSR <sub>GW</sub> (mrem/year per pCi/L)	=	Dose Contribution from Radionuclide	Monitoring Period Average U-235/236 (pCi/L)	x	DSR <sub>GW</sub> (mrem/year per pCi/L)	=	Dose Contribution from Radionuclide	Monitoring Period Average U-238 (pCi/L)	x	DSR <sub>GW</sub> (mrem/year per pCi/L)	=	Dose Contribution from Radionuclide	Calculated Groundwater Dose (mem/year)
Sand/Gravel HSU	5.994	x	9.374 E-04	=	0.0056	0.218	x	0.1532	=	0.0334	0.0124	x	0.1448	=	0.0018	0.165	x	0.1455	=	0.024	0.06
Jefferson City-Cotter HSU	0.131	x	9.374 E-04	=	0.0001	3.825	x	0.1532	=	0.586	0.0474	x	0.1448	=	0.0069	0.5794	x	0.1455	=	0.0843	0.68
Roubidoux HSU	0.0682	x	9.374 E-04	=	0.00006	2.8768	x	0.1532	=	0.4407	0.0252	x	0.1448	=	0.0036	0.3024	x	0.1455	=	0.044	0.49

## 5.0 SUMMARY OF BUILDING SURVEY AREAS (BSA) SURVEY UNITS

FSSFR Volume 4, Chapter 1, *Building Survey Area (BSA) Overview*, provides information that is common and pertinent to the FSS of the BSAs. FSSFR Volume 4, Chapter 1, discusses; 1) Remediation Activities; 2) Release Criteria; 3) Data Quality Objectives; 4) Final Status Survey Design; 5) Final Status Survey; 6) Data Quality Assessment; and 7) Survey Area Release record Organization.

The survey area release records for the survey units within the various Building Survey Areas are provided in FSSFR Volume 4, Chapters 2 through 16. As described in the HDP Decommissioning Plan three major structures (Buildings) remain after the completion of remediation activities, Building 110, Building 230, and Building 231. FSSFR Volume 4, Chapters 6 and 7 contain the survey area release records for Building 110. FSSFR Volume 4, Chapters 2 through 5 contain the survey area release records for Building 230. FSSFR Volume 4, Chapter 8 contains the survey area release records for Building 231.

FSSFR Volume 4, Chapter 16 contains the survey area release records for the building ventilation systems within Building 110 and Building 230. No ventilation systems are present in Building 231. In Table 5-1 below the dose contribution for the building ventilation system has been added to the respective building interior survey units for each remaining building structure.

In summary, the average residual radioactivity dose contribution for all BSA survey units is 0.71 mrem/year, with a maximum BSA survey unit dose of 5.25 mrem/year (BSA 01-01) which is below the unrestricted release criteria of 25 mrem/year.

Table 5-1, *Final BSA Survey Unit Dose*, provides the dose associated with residual radioactivity in each BSA survey unit for the HDP site.

**Table 5-1**  
**Final BSA Survey Unit Dose**

BSA-SU	MARSSIM Class	Ave. SU Residual Radioactivity (Fraction of DCGL <sub>50</sub> )	Ave. SU Residual Radioactivity (mrem/year)	Buried Piping Contribution (Fraction of DCGL <sub>50</sub> )	Buried Piping Contribution (mrem/year)	Remaining Ventilation Contribution (Fraction of DCGL <sub>50</sub> )	Remaining Ventilation Contribution (mrem/year)	Total SU Fraction of DCGL <sub>50</sub>	Total SU Dose (mrem/year)
01-01	2	0.19	4.75	0.02	0.50	N/A	N/A	0.21	5.25
01-02	3	0.05	1.20	0.007	0.20	N/A	N/A	0.06	1.40
01-03	3	0.01	0.25	N/A	N/A	0.002	0.05	0.01	0.30
01-04	2	0.02	0.50	N/A	N/A	0.002	0.05	0.02	0.55
01-05	3	0.002	0.05	N/A	N/A	N/A	N/A	(Ventilation*)	
02-01	2	0.05	1.25	0.02	0.05	N/A	N/A	0.07	1.75
02-02	3	0.05	1.20	0.007	0.20	N/A	N/A	0.06	1.40
02-03	1	0.04	1.00	N/A	N/A	0.004	0.09	0.04	1.09
02-04	1	0.03	0.75	N/A	N/A	0.004	0.09	0.03	0.84
02-05	1	0.06	1.50	N/A	N/A	0.004	0.09	0.06	1.59
02-06	1	0.04	1.00	N/A	N/A	0.004	0.09	0.04	1.09
02-07	1	0.02	0.50	N/A	N/A	0.004	0.09	0.02	0.59
02-08	2	0.02	0.50	N/A	N/A	0.004	0.09	0.02	0.59
02-09	1	0.02	0.50	N/A	N/A	0.004	0.09	0.02	0.59
02-10	2	0.01	0.25	N/A	N/A	0.004	0.09	0.01	0.34
02-11	1	0.02	0.50	N/A	N/A	0.004	0.09	0.02	0.59
02-12	2	0.003	0.10	N/A	N/A	0.004	0.09	0.01	0.19
02-13	2	0.04	1.00	N/A	N/A	0.004	0.09	0.04	1.09
02-14	2	0.02	0.50	N/A	N/A	0.004	0.09	0.02	0.59

\* BSA release criteria for ventilation systems in accordance with approved HDP DP. See FSSFR Volume 4, Chapter 16.

**Table 5-1**  
**Final BSA Survey Unit Dose (Continued)**

BSA-SU	MARSSIM Class	Ave. SU Residual Radioactivity (Fraction of DCGL <sub>50</sub> )	Ave. SU Residual Radioactivity (mrem/year)	Buried Piping Contribution (Fraction of DCGL <sub>50</sub> )	Buried Piping Contribution (mrem/year)	Remaining Ventilation Contribution (Fraction of DCGL <sub>50</sub> )	Remaining Ventilation Contribution (mrem/year)	Total SU Fraction of DCGL <sub>50</sub>	Total SU Dose (mrem/year)
02-15	1	0.04	1.00	N/A	N/A	0.004	0.09	0.04	1.09
02-16	1	0.02	0.50	N/A	N/A	0.004	0.09	0.02	0.59
02-17	3	0.004	0.10	N/A	N/A	0.004	0.09	0.01	0.19
02-18	2	0.01	0.25	N/A	N/A	0.004	0.09	0.01	0.34
02-19	3	0.003	0.08	N/A	N/A	0.004	0.09	0.01	0.17
02-20	2	0.004	0.09	N/A	N/A	N/A	N/A	(Ventilation*)	
02-21	2	0.04	1.00	N/A	N/A	0.004	0.09	0.04	1.09
02-22	1	0.04	1.00	N/A	N/A	0.004	0.09	0.04	1.09
02-23	1	0.03	0.75	N/A	N/A	0.004	0.09	0.03	0.84
02-24	1	0.00	0.00	N/A	N/A	0.004	0.09	0.00	0.09
02-25	1	0.00	0.00	N/A	N/A	0.004	0.09	0.00	0.09
02-26	2	0.01	0.25	N/A	N/A	0.004	0.09	0.01	0.34
02-27	2	0.02	0.50	N/A	N/A	0.004	0.09	0.02	0.59
03-01	2	0.05	1.25	N/A	N/A	N/A	N/A	0.05	1.25
03-02	3	0.03	0.70	0.007	0.20	N/A	N/A	0.04	0.90
03-03	2	0.03	0.75	N/A	N/A	N/A	N/A	0.03	0.75
03-04	2	1.00	0.25	N/A	N/A	N/A	N/A	1.00	0.25

\* BSA release criteria for ventilation systems in accordance with approved HDP DP. See FSSFR Volume 4, Chapter 16.

### 5.1 Ancillary Structures

As provided in FSSFR Volume 4, Chapter 1, *Building Survey Areas (BSA) Overview*, "There will be a number of ancillary structures that will remain at the time of license termination. These structures are primarily concrete and/or asphalt and provide an existing function. Examples are the Site Pond Dam, the Rail Scale foundation, parking lots and walkways." FSS of ancillary structures is conducted in accordance with HDP-PO-FSS-700, *Final Status Survey Program*.

In addition to the BSA survey units listed in Section 5.0, several other ancillary structures not specifically identified in the HDP DP were identified during decommissioning efforts. To ensure compliance with the HDP and for the purpose of demonstration of meeting the unrestricted release criteria these ancillary structures were also subjected to FSS. The resulting dose contribution has been added to the LSA in which the ancillary structure resides, with the exception of BSA 04-05. In the case of BSA 04-05, this ancillary structure, a portion of the Building 230 exterior, was surveyed as part of the exterior surfaces (exterior wall) of Building 230. As such the dose contribution of the survey unit was not added to the total dose contribution any LSA survey unit.

Table 5-, *Final Ancillary Structure BSA Survey Unit Dose*, provides the dose associated with residual radioactivity in each Ancillary Structure BSA survey unit as well as the LSA survey unit in which the ancillary structure resides for the HDP site.

**Table 5-2**  
**Final Ancillary Structure BSA Survey Unit Dose**

BSA-SU	MARSSIM Class	Ave. SU Residual Radioactivity (Fraction of DCGL <sub>50</sub> )	Ave. SU Residual Radioactivity (mrem/year)	Misc. BSA Dose Contribution Added to:
04-01	1	0.03	0.75	LSA 02-03
04-02	1	0.03	0.75	LSA 08-17
04-03	3	0.01	0.25	LSA 06-01
04-04	2	0.03	0.75	LSA 06-02
04-05	1	0.001	0.10	(Bld 230 Exterior)
04-06	2	0.04	0.95	LSA 07-01
04-07	1	0.02	0.50	LSA 08-10
04-08	2	0.01	0.25	LSA 08-15
04-09	3	0.03	0.75	LSA 04-01
04-10	1	0.03	0.75	LSA 08-06
04-11	1	0.02	0.50	LSA 08-16
04-12	1	0.001	0.10	LSA 08-03
04-13	1	0.01	0.25	LSA 08-04
04-14	2	0.01	0.25	LSA 07-01
04-15	2	0.02	0.50	LSA 09-01
04-16	1	0.01	0.25	LSA 09-02
04-17	1	0.02	0.50	LSA 09-03



## 6.0 SUMMARY OF PIPING SURVEY AREAS (PSA) SURVEY UNITS

FSSFR Volume 5, Chapter 1, *Piping Survey Areas (PSA) Overview*, provides information that is common and pertinent to the FSS of the PSAs. FSSFR Volume 5, Chapter 1, discusses; 1) Remediation Activities; 2) Release Criteria; 3) Data Quality Objectives; 4) Final Status Survey Design; 5) Final Status Survey; 6) Data Quality Assessment; and 7) Survey Area Release record Organization.

The survey area release records for the survey units within the various Piping Survey Areas are provided in FSSFR Volume 5, Chapters 2, 3 and 4. The dose contribution for piping that is subterranean has been added to the total dose in each LSA survey unit in which the piping resides. The dose contribution above ground utility piping has been added in each BSA survey unit in which the piping resides.

Upon review of the dose contribution from PSA survey units it was noted that the dose contribution for PSA 03-02 (gutters and downspouts) was inadvertently omitted from the total dose estimate for BSA 04-06 (Building 115). As such, the dose contribution for PSA 03-02 (0.15 mrem/year) has been added to the total dose for BSA 04-06 (updated to 0.9 mrem/year) as shown in Table 5-2 above. This also resulted in a small increase to the total dose contribution in LSA 07-01 shown in Table 3-1 above.

Table 6-1, *Final PSA Survey Unit Dose*, provides the dose associated with residual radioactivity in each PSA survey unit and the LSA and/or BSA survey unit in which the piping resides.

**Table 6-1**  
**Final PSA Survey Unit Dose**

PSA-SU	MARSSIM Class	DP Description	Ave. SU Residual Radioactivity (Fraction of DCGL <sub>50</sub> )	Ave. SU Residual Radioactivity (mrem/year)	PSA Dose Contribution added to:
01-01	1	STM-1	0.00	0.0	LSA 07-01 / LSA 06-01
01-02	1	STM-2	0.002	0.1	LSA 06-01 / LSA 08-03 / LSA 08-04 / LSA 08-16
01-03	1	STM-3	0.013	0.3	LSA 06-01 / LSA 06-02 / LSA 08-16
01-04	1	STM-4	0.00	0.0	LSA 06-02
01-05	1	STM-5	0.00	0.0	LSA 06-02
01-06	1	STM-6	0.02	0.5	LSA 06-02 / LSA 05-04 / LSA 02-01
01-07	1	STM-7	0.00	0.0	LSA 05-04
01-08	1	STM-8	0.00	0.0	LSA 04-01 / LSA 06-02 / LSA 08-15
01-09	1	STM-9	0.00	0.0	LSA 08-06 / LSA 08-10 / LSA 08-15
02-01	1	SAN-1	0.26	6.5	LSA 08-10 / LSA 08-15 / LSA 04-04
03-01	3	WAT-1-8	0.02	0.5	LSA 08-03 / LSA 08-16 / LSA 08-17 / BSA 01-01 / BSA 02-01
03-02	3	DRN-X	0.007	0.2	BSA 01-02 / BSA 02-02 / BSA 03-02 / BSA 04-06

## 7.0 SUMMARY OF REUSE SOIL STOCKPILES AND OFF-SITE BORROW MATERIAL

FSSFR Volume 2, Chapter 1, *Reuse Soil and Off-site Borrow Material Overview*, provides information that is common and pertinent to the FSS of the Reuse Soil used to backfill excavations. FSSFR Volume 2, Chapter 1 also provides information on the assessment of off-site soil used as backfill. FSSFR Volume 2, Chapter 1, discusses; 1) Background Information Regarding Reuse Soil; 2) Reuse Soil Release Criteria; 3) Survey Methodology; 4) Quality Control; 5) Soil Sorting Operations; 6) Management of Reuse Soil as Backfill; and 7) Off-site Borrow Material.

The radiological release records for the various soil stockpiles are provided in FSSFR Volume 2, Chapters 2 through 7. FSSFR Volume 2, Chapter 8 provides the data summary for off-site soil.

Table 7-1, *Final Reuse Stockpile Dose*, provides the dose associated with residual radioactivity in each Reuse Stockpile and the LSA survey unit in which the Reuse Soil was placed.

**Table 7-1**  
**Final Reuse Stockpile Dose**

<b>Reuse Stockpile</b>	<b>Dose (mrem)</b>	<b>SOF</b>	<b>Reuse Soil Placement Survey Unit Location</b>
Combined 1-2	2.5	0.10 <sup>1</sup>	LSA 10-14 and 05-02
3	3.5	0.14	LSA 10-13
Combined 4-7	6.3	0.25 <sup>1</sup>	LSA 08-01, 08-02 and 08-08
Combined 5-6	7.75	0.31 <sup>1</sup>	LSA 11-01
8a	5.5	0.22	LSA 08-06
8b	4.25	0.17	LSA 02-03, 03-01 and 05-04
9	3.0	0.12	LSA 08-04 and 08-05

<sup>1</sup>Weighted Mean SOF of Combined Reuse Stockpiles

## 8.0 CONCLUSION

An adequate quantity and quality of radiological surveys and samples, as well as the corresponding laboratory analysis has been performed, evaluated and documented to demonstrate that the dose associated with all sources within all SUs of the Hematite Site does not exceed the dose criterion for unrestricted release in accordance with 10 CFR 20.1402 of 25 mrem/year.

The stated dose presented in the tables within this summary report are considered to be the final dose, and therefore supersede any minor differences presented in previously submitted FSSFR Volumes and Chapters.

## 9.0 REFERENCES

- 9.1 DO-08-004, Hematite Decommissioning Plan (DP) {ML092330123}
- 9.2 Westinghouse letter HEM-11-37, *Response to Remaining NRC Request for Additional Information on the Hematite Decommissioning Plan Chapter 9* {ML110810978}
- 9.3 NUREG-1575, Multi-Agency Radiation Survey and Site Investigation Manual
- 9.4 License SNM-33 Amendment 57 {ML112101640}

## 10.0 APPENDICES

- APPENDIX A: LSA FSSFR DOCUMENT MATRIX
- APPENDIX B: GROUNDWATER MONITORING FSSFR DOCUMENT MATRIX
- APPENDIX C: BSA FSSFR DOCUMENT MATRIX
- APPENDIX D: PSA FSSFR DOCUMENT MATRIX
- APPENDIX E: REUSE SOIL AND OFF-SITE BORROW MATERIAL DOCUMENT MATRIX

Hematite Decommissioning Project	FSSFR Volume 7, Chapter 1: <i>Final Status Survey Final Report Summary</i>	
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**APPENDIX A**  
**LSA FSSFR DOCUMENT MATRIX**

Survey Unit	Description	FSS Complete Date	FSSFR Volume 3 Chapter Number	Westinghouse Letter and Date Submitted to NRC
<b>Overview</b>				
Vol 3 Ch 1	LSA Overview	N/A	1 Rev 0	HEM-16-13, 01/27/2016
Vol 3 Ch 1	Revise to address NRC review comments	N/A	1 Rev 1	HEM-16-50, 05/17/2016
Vol 3 Ch 1	Revise to address NRC review comments	N/A	1 Rev 2	HEM-16-72, 10/27/2017
Vol 3 Ch 1	Revise to address NRC review comments	N/A	1 Rev 3	HEM-17-9, 02/13/2017
<b>LSA-01 South Site Waterways</b>				
LSA 01-01	Site Creek/Joachim Creek	12/16/2015	20	HEM-17-27, 04/13/2017
LSA 01-02	South Section of Site Creek	01/14/2016	20	HEM-17-27, 04/13/2017
LSA 01-03	North Section of Site Creek	01/14/2016	20	HEM-17-27, 04/13/2017
<b>LSA-02 Site Pond</b>				
LSA 02-01	North Section of Site Pond	09/29/2015	22	HEM-17-50, 08/15/2017
LSA 02-02	Central Section of Site Pond	09/29/2015	22	HEM-17-50, 08/15/2017
LSA 02-03	South Section of Site Pond	09/29/2015	22	HEM-17-50, 08/15/2017
LSA 03-01	Area West of Site Pond	11/06/2015	23	HEM-17-35, 05/15/2017
LSA 03-02	Area Southwest of Site Pond	11/12/2015	23	HEM-17-35, 05/15/2017
<b>LSA-04 Southwest Open Land Area</b>				
LSA 04-01	Area between Buildings 230/231 and Site Pond	04/5/2016	15	HEM-17-46, 07/24/2017
LSA 04-02	Area East of North Section of Site Pond (west soil laydown area)	04/22/2016	15	HEM-17-46, 07/24/2017
LSA 04-03	Area East of Central Section of Site Pond (west soil laydown area)	04/21/2016	15	HEM-17-46, 07/24/2017
LSA 04-04	Area South of Building 231	04/12/2016	15	HEM-17-46, 07/24/2017
LSA 04-05	Wooded Area South of Building 231	06/21/2016	15	HEM-17-46, 07/24/2017
<b>LSA-05 Barns and Cistern Open Land Area</b>				
LSA 05-01	Site Spring Area adjacent to State Road P	03/09/2014	16	HEM-17-24, 03/29/2017
LSA 05-02	Tile Barn and Red Room Roof	09/13/2013	16	HEM-17-24, 03/29/2017
LSA 05-03	Wood Barn	11/07/2013	16	HEM-17-24, 03/29/2017
LSA 05-04	Site Spring and Cistern	04/27/2016	16	HEM-17-24, 03/29/2017
<b>LSA-06 North Open Land Area</b>				
LSA 06-01	Main Parking Lot	06/24/2016	17	HEM-17-47, 08/02/2017
LSA 06-02	West Parking Lot	06/17/2016	17	HEM-17-47, 08/02/2017
<b>LSA-07 North Central Open Land Area</b>				
LSA 07-01	Truck Scale Area	05/03/2016	17	HEM-17-47, 08/02/2017

**APPENDIX A**

**LSA FSSFR DOCUMENT MATRIX**

<b>Survey Unit</b>	<b>Description</b>	<b>FSS Complete Date</b>	<b>FSSFR Volume 3 Chapter Number</b>	<b>Westinghouse Letter and Date Submitted to NRC</b>
<b>LSA-08 Central Open Land Area</b>				
LSA 08-01	Process Building Area Section 1	03/15/2016	12	HEM-17-25, 04/03/2017
LSA 08-02	Process Building Area Section 2	02/04/2016	12	HEM-17-25, 04/03/2017
LSA 08-03	Process Building Area Section 3	03/18/2016	11	HEM-17-43, 07/06/2017
LSA 08-04	Process Building Area Section 4	04/07/2016	10	HEM-17-38, 06/05/2017
LSA 08-05	Process Building Area Section 5	04/12/2016	10	HEM-17-38, 06/05/2017
LSA 08-06	Process Building Area Section 6	01/06/2016	11	HEM-17-43, 07/06/2017
LSA 08-07	Process Building Area Section 7	01/07/2016	11	HEM-17-43, 07/06/2017
LSA 08-08	Process Building Area Section 8	04/07/2016	10	HEM-17-38, 06/05/2017
LSA 08-09	Process Building Area Section 9	04/28/2016	21	HEM-17-39, 06/07/2017
LSA 08-10	Process Building Area Section 10	07/13/2016	14	HEM-17-44, 07/12/2017
Vol 3 Ch 14	Revise to add PSA 02-01 soil data LSA 08-10 and LSA 08-15	N/A	14 Rev 1	HEM-17-65, 10/31/2017
LSA 08-11	Process Building Area Section 11	12/16/2015	13	HEM-17-41, 06/27/2017
LSA 08-12	Process Building Area Section 12	04/22/2016	21	HEM-17-39, 06/07/2017
LSA 08-13	Process Building Area Section 13	04/21/2016	21	HEM-17-39, 06/07/2017
LSA 08-14	Process Building Area Section 14	05/24/2016	10	HEM-17-38, 06/05/2017
LSA 08-15	Process Building Area Section 15	07/18/2016	14	HEM-17-44, 07/12/2017
Vol 3 Ch 14	Revise to add PSA 02-01 soil data LSA 08-10 and LSA 08-15	N/A	14 Rev 1	HEM-17-65, 10/31/2017
LSA 08-16	Process Building Area Section 16	03/17/2016	11	HEM-17-43, 07/06/2017
LSA 08-17	Process Building Area Section 17	01/19/2016	11	HEM-17-43, 07/06/2017
<b>LSA-09 Rail Spur open Land Area</b>				
LSA 09-01	East Rail Spur Area	05/24/2016	18	HEM-17-34, 05/11/2017
LSA 09-02	Central Rail Spur Area	07/05/2016	18	HEM-17-34, 05/11/2017
LSA 09-03	West Rail Spur Area	05/24/2016	18	HEM-17-34, 05/11/2017
<b>LSA-10 Burial Pits Open Land Area</b>				
LSA 10-01	Burial Pit Area Section 1	06/17/2015	2	HEM-16-72, 10/27/2016
LSA 10-02	Burial Pit Area Section 2	06/17/2015	2	HEM-16-72, 10/27/2016
Vol 3 Ch 2	Revise for WRS Test and revise report format consistent with all other reports for LSA 10-01 and LSA 10-02	N/A	2 Rev 1	HEM-17-71, 12/05/2017
LSA 10-03	Burial Pit Area Section 3	06/17/2015	3	HEM-16-74, 11/07/2016
LSA 10-04	Burial Pit Area Section 4	06/17/2015	3	HEM-16-74, 11/07/2016
Vol 3 Ch 3	Revise for WRS Test for LSA 10-03 and LSA 10-04	N/A	3 Revision 1	HEM-17-68, 11/20/2017
LSA 10-05	Burial Pit Area Section 5	02/13/2014	6	HEM-17-72, 12/13/2017
LSA 10-06	Burial Pit Area Section 6	01/10/2014	6	HEM-17-72, 12/13/2017
LSA 10-07	Burial Pit Area Section 7	01/10/2014	6	HEM-17-72, 12/13/2017
LSA 10-08	Burial Pit Area Section 8	09/02/2013	6	HEM-17-72, 12/13/2017

**APPENDIX A**

**LSA FSSFR DOCUMENT MATRIX**

<b>Survey Unit</b>	<b>Description</b>	<b>FSS Complete Date</b>	<b>FSSFR Volume 3 Chapter Number</b>	<b>Westinghouse Letter and Date Submitted to NRC</b>
LSA 10-09	Burial Pit Area Section 9	10/21/2013	6	HEM-17-72, 12/13/2017
LSA 10-10	Burial Pit Area Section 10	02/20/2014	6	HEM-17-72, 12/13/2017
LSA 10-11	Burial Pit Area Section 11	05/21/2015	7	HEM-16-79, 12/12/2016
Vol 3 Ch 7	Revise for WRS Test	N/A	7 Rev 1	HEM-17-66, 11/02/2017
LSA 10-12	Burial Pit Area Section 12	06/17/2015	4	HEM-16-75, 11/14/2016
Vol 3 Ch 4	Revise for WRS Test for LSA 10-12	N/A	4 Revision 1	HEM-17-69, 11/21/2017
LSA 10-13	Burial Pit Area Section 13	06/10/2015	5	HEM-16-76, 11/16/2016
LSA 10-14	Burial Pit Area Section 14	06/10/2015	5	HEM-16-76, 11/16/2016
Vol 3 Ch 5	Revise for WRS Test for LSA 10-13 and LSA 10-14	N/A	5 Revision 1	HEM-17-70, 11/29/2017
<b>LSA-11 East Open Land Area</b>				
LSA 11-01	Northeast Site Creek	10/29/2015	7	HEM-16-79, 12/12/2016
Vol 3 Ch 7	Revise for WRS Test	N/A	7 Rev 1	HEM-17-66, 11/02/2017
LSA 11-02	Rail Road Line	07/05/2016	19	HEM-17-17, 03/06/2017
LSA 11-03	East Site Wooded Area	06/24/2015	19	HEM-17-17, 03/06/2017
LSA 11-04	Small East Site Wooded area	04/24/2015	19	HEM-17-17, 03/06/2017
LSA 11-05	Northeast Site Creek East Section	06/03/2015	19	HEM-17-17, 03/06/2017
LSA 11-06	Rail Road Line Elevated Area	07/05/2016	19	HEM-17-17, 03/06/2017
<b>LSA-12 Lay Down Area</b>				
LSA 12-01	Reuse Soil Laydown Area Section 1	07/13/2016	8	HEM-17-3, 01/05/2016
LSA 12-02	Reuse Soil Laydown Area Section 2	07/13/2016	8	HEM-17-3, 01/05/2016
Vol 3 Ch 8	Revise for WRS Test for LSA 12-01 and LSA 12-02	N/A	8 Rev 1	HEM-17-15, 02/27/2017
LSA 12-03	Reuse Soil Laydown Area Section 3	07/12/2016	9	HEM-17-3, 01/05/2016
LSA 12-04	Reuse Soil Laydown Area Section 4	07/12/2016	9	HEM-17-3, 01/05/2016
LSA 12-05	Reuse Soil Laydown Area Section 5	07/12/2016	9	HEM-17-3, 01/05/2016
LSA 12-06	Reuse Soil Laydown Area Section 6	07/12/2016	9	HEM-17-3, 01/05/2016
LSA 12-07	Reuse Soil Laydown Area Section 7	07/12/2016	9	HEM-17-3, 01/05/2016
LSA 12-08	Reuse Soil Laydown Area Section 8	07/12/2016	9	HEM-17-3, 01/05/2016
LSA 12-09	Reuse Soil Laydown Area Section 9	07/12/2016	9	HEM-17-3, 01/05/2016
Vol 3 Ch 9	Revise for WRS Test for LSA 12-03, LSA 12-04, LSA 12-05, LSA 12-06, LSA 12-07, LSA 12-08 and LSA 12-09	N/A	9 Rev 1	HEM-17-16, 03-01-2017

**APPENDIX B**

**GROUNDWATER MONITORING FSSFR DOCUMENT MATRIX**

<b>Monitoring Period</b>	<b>Report Complete Date</b>	<b>FSSFR Volume 6 Chapter Number</b>	<b>Westinghouse Letter and Date Submitted to NRC</b>
Groundwater Overview	02/20/2016	1 Rev 0	HEM-16-15, 02/10/2016
Groundwater Overview Revise to address NRC review comments	10/05/2016	1 Rev 1	HEM-16-70, 10/10/2016
Groundwater Monitoring Results During Remediation	10/10/2016	2	HEM-16-70, 10/10/2016
Post-remediation Groundwater Monitoring 1 <sup>st</sup> Quarter Results	10/05/2016	3	HEM-16-70, 10/10/2016
Post-remediation Groundwater Monitoring 2 <sup>nd</sup> Quarter Results	11/16/2016	4	HEM-16-76, 11/16/2016
Post-remediation Groundwater Monitoring 3 <sup>rd</sup> Quarter Results	01/16/2017	5	HEM-17-6, 01/16/2017
Post-remediation Groundwater Monitoring 4 <sup>th</sup> Quarter Results	05/17/2017	6	HEM-17-36, 05/17/2017
Post-remediation Groundwater Monitoring Summary	08/09/2017	7	HEM-17-48, 08/09/2017
Post-remediation Groundwater Monitoring 5 <sup>th</sup> Quarter Results	08/24/2017	8	HEM-17-53, 08/24/2017
Post-remediation Groundwater Monitoring 6 <sup>th</sup> Quarter Results	11/08/2017	9	HEM-17-67, 11/08/2017



**APPENDIX C****BSA FSSFR DOCUMENT MATRIX**

<b>Survey Unit</b>	<b>Description</b>	<b>FSS Complete Date</b>	<b>FSSFR Volume 4 Chapter Number</b>	<b>Westinghouse Letter and Date Submitted to NRC</b>
<b>Overview</b>				
Vol 4 Ch 1	BSA Overview	N/A	1 Rev 0	HEM-16-33, 03/22/2016
Vol 4 Ch 1	Revise to address NRC review comments	N/A	1 Rev 1	HEM-17-26, 04/04/2017
<b>BSA-01 Building 110</b>				
BSA 01-01	Subsurface Soil	05/22/2015	6	HEM-17-57, 09/06/2017
BSA 01-02	Exterior	06/25/2015	7	HEM-17-58, 09/27/2017
BSA 01-03	Interior Walls and Ceiling	06/25/2015	7	HEM-17-58, 09/27/2017
BSA 01-04	Interior Floors	05/04/2015	6	HEM-17-57, 09/06/2017
BSA 01-05	Ventilation Interiors	07/18/2016	16	HEM-17-64, 10/24/2017
<b>BSA-02 Building 230</b>				
BSA 02-01	Subsurface Soils	09/04/2015	5	HEM-17-58, 09/27/2017
BSA 02-02	Exterior Walls and Roof	04/27/2016	5	HEM-17-58, 09/27/2017
BSA 02-03	Rod Load Area - Section 1 Floor and Lower Walls	07/21/2015	2	HEM-17-52, 08/23/2017
BSA 02-04	Rod Load Area - Section 2 Floor and Lower Walls	08/12/2015	2	HEM-17-52, 08/23/2017
BSA 02-05	Rod Load Area - Section 3 Floor and Lower Walls	07/14/2015	2	HEM-17-52, 08/23/2017
BSA 02-06	Rod Load Area - Section 4 Floor and Lower Walls	08/07/2015	2	HEM-17-52, 08/23/2017
BSA 02-07	Rod Load Area Kardex Walls	08/19/2015	2	HEM-17-52, 08/23/2017
BSA 02-08	Upper Rod Load Area Upper Walls and Ceiling	08/22/2015	2	HEM-17-52, 08/23/2017
BSA 02-09	Cushman Room Lower (N)	09/01/2015	4	HEM-17-61, 10/12/2017
BSA 02-10	Cushman Room Upper	07/09/2015	4	HEM-17-61, 10/12/2017
BSA 02-11	Gadolinium Room Lower (N)	06/29/2015	4	HEM-17-61, 10/12/2017
BSA 02-12	Gadolinium Room Upper	07/06/2015	4	HEM-17-61, 10/12/2017
BSA 02-13	U-Shaped Area (NW) Section 6 Floor and Walls	11/05/2015	3	HEM-17-59, 10/03/2017
BSA 02-14	U-Shaped Area (SE) Section 7 Floor and Walls	10/25/2015	3	HEM-17-59, 10/03/2017
BSA 02-15	U-Shaped Area Section 8 Trench	06/15/2015	3	HEM-17-59, 10/03/2017
BSA 02-16	U-Shaped Area Section 9 Spill Area	09/10/2015	3	HEM-17-59, 10/03/2017
BSA 02-17	U-Shaped Area All Upper Walls Ceiling	06/16/2016	3	HEM-17-59, 10/03/2017
BSA 02-18	Warehouse Area (W)	06/17/2016	3	HEM-17-59, 10/03/2017
BSA 02-19	Mezzanine	03/15/2016	3	HEM-17-59, 10/03/2017
BSA 02-20	Ventilation	06/27/2016	16	HEM-17-64, 10/24/2017

**APPENDIX C**

**BSA FSSFR DOCUMENT MATRIX**

<b>Survey Unit</b>	<b>Description</b>	<b>FSS Complete Date</b>	<b>FSSFR Volume 4 Chapter Number</b>	<b>Westinghouse Letter and Date Submitted to NRC</b>
BSA 02-21	U-Shaped Area (SW) Storage Floor and Walls	11/04/2015	3	HEM-17-59, 10/03/2017
BSA 02-22	Cushman Room Lower (S)	08/31/2015	4	HEM-17-61, 10/12/2017
BSA 02-23	Gadolinium Room Lower (S)	06/29/2015	4	HEM-17-61, 10/12/2017
BSA 02-24	Rod Load East and South Lower Walls	07/23/2015	2	HEM-17-52, 08/23/2017
BSA 02-25	Rod Load West and North Lower Walls	07/16/2015	2	HEM-17-52, 08/23/2017
BSA 02-26	Warehouse Area (E)	06/16/2016	3	HEM-17-59, 10/03/2017
BSA 02-27	U-Shaped Area (NW) FSS Floor and Walls	09/11/2015	3	HEM-17-59, 10/03/2017
<b>BSA-03 Building 231</b>				
BSA 03-01	Subsurface Soils	03/04/2016	8	HEM-17-62, 10/17/2017
BSA 03-02	Exterior Walls and Roof	03/28/2016	8	HEM-17-62, 10/17/2017
BSA 03-03	Lower Interior Walls and Floor	03/16/2016	8	HEM-17-62, 10/17/2017
BSA 03-04	Upper Interior Walls and Ceiling	03/16/2016	8	HEM-17-62, 10/17/2017
<b>BSA-04 Ancillary Structures</b>				
BSA 04-01	Site Pond Dam (LSA 02-03)	08/21/2015	9	HEM-17-50, 08/15/2017
BSA 04-02	Septic Tank (LSA 08-17)	10/13/2015	10	HEM-17-43, 07/06/2017
BSA 04-03	Parking Lot East (LSA 06-01)	05/21/2016	11	HEM-17-47, 08/02/2017
BSA 04-04	Parking Lot West (LSA 06-02)	05/22/2016	11	HEM-17-47, 08/02/2017
BSA 04-05	Vault Wall – Exterior wall portion of Building 230	11/11/2015	5	HEM-17-58, 09/27/2017
BSA 04-06	Building 115 (LSA 07-01)	03/02/2016	11	HEM-17-47, 08/02/2017
BSA 04-07	Concrete (LSA 08-10)	06/17/2016	12	HEM-17-44, 07/12/2017
BSA 04-08	Concrete (LSA 08-15)	05/29/2016	12	HEM-17-44, 07/12/2017
BSA 04-09	Asphalt in LSA 04-01	02/26/2016	13	HEM-17-46, 07/24/2017
BSA 04-10	Slab in LSA 08-06	08/08/2016	10	HEM-17-43, 07/06/2017
BSA 04-11	Concrete LSA 08-16	02/26/2016	10	HEM-17-43, 07/06/2017
BSA 04-12	Concrete LSA 08-03	04/15/2016	10	HEM-17-43, 07/06/2017
BSA 04-13	Transformer pad outside 110 (LSA 08-04)	04/15/2016	14	HEM-17-38, 06/05/2017
BSA 04-14	Truck Scale Foundation (LSA 07-01)	06/16/2016	11	HEM-17-47, 08/02/2017
BSA 04-15	Rail Line in LSA 09-01	06/16/2016	15	HEM-17-34, 05/11/2017
BSA 04-16	Rail Line and Rail Scale Foundations LSA 09-02	05/13/2016	15	HEM-17-34, 05/11/2017
BSA 04-17	Rail Line in LSA 09-03	05/12/2016	15	HEM-17-34, 05/11/2017

**APPENDIX D**

**PSA FSSFR DOCUMENT MATRIX**

Survey Unit	Description	FSS Complete Date	FSSFR Volume 5 Chapter Number	Westinghouse Letter and Date Submitted to NRC
<b>Overview</b>				
Vol 5 Ch 1	PSA Overview	N/A	1 Rev 0	HEM-16-31, 03/16/2016
Vol 5 Ch 1	Revise to address NRC review comments	N/A	1 Rev 1	HEM-16-59, 06/06/2016
<b>PSA-01 Storm Drains</b>				
PSA 01-01	Building 110 Storm Drain (STM-1)	11/24/15	3	HEM-17-32, 05/08/2017
PSA 01-02	Building 110 to Building 230 Storm Drain (STM-2)	02/11/16	3	HEM-17-32, 05/08/2017
PSA 01-03	Building 230 North Storm Drain (STM-3)	01/29/16	3	HEM-17-32, 05/08/2017
PSA 01-04	Building 230 North Storm Drain (STM-4)	06/07/16	3	HEM-17-32, 05/08/2017
PSA 01-05	Building 230 North Storm Drain (STM-5)	06/08/16	3	HEM-17-32, 05/08/2017
PSA 01-06	Building 230 North Storm Drain (STM-6)	06/08/16	3	HEM-17-32, 05/08/2017
PSA 01-07	Building 230 North Storm Drain (STM-7)	06/07/16	3	HEM-17-32, 05/08/2017
PSA 01-08	Building 230 West Storm Drain (STM-8)	02/17/2016	3	HEM-17-32, 05/08/2017
PSA 01-09	Building 230 South Storm Drain (STM-9)	12/03/2015	3	HEM-17-32, 05/08/2017
Vol 5 Ch 3	Resend, original not found in ADAMS	N/A	N/A	HEM-17-32, 05/08/2017 Resend date 07/07/2017
<b>PSA-02 Sanitary Treatment Piping</b>				
PSA 02-01	Former SWTP Discharge Line (SAN-1)	11/15/2015	2 Rev 0	HEM-17-8, 02/07/2017
PSA 02-01	Revise for NRC Comments	11/15/2015	2 Rev 1	HEM-17-20, 03/21/2017
<b>LSA-03 West Open Land Area</b>				
PSA 03-01	Water Supply Lines (WAT 1-8)	03/22/16	4	HEM-17-14, 02/27/2017
PSA 03-02	Building 110/230 Downspouts (DRN-X)	01/25/16	4	HEM-17-14, 02/27/2017

**APPENDIX E**

**REUSE SOIL AND OFF-SITE BORROW MATERIAL DOCUMENT MATRIX**

<b>Stockpile Number</b>	<b>Description</b>	<b>FSS Complete Date</b>	<b>FSSFR Volume 2 Chapter Number</b>	<b>Westinghouse Letter and Date Submitted to NRC</b>
<b>Overview</b>				
Vol 2 Ch 1	Reuse and Offsite Soil Overview	N/A	1 Rev 0	HEM-15-129, 12/16/2015
Vol 2 Ch 1	Revise to address NRC review comments	N/A	1 Rev 1	HEM-16-58, 05/26/2016
Vol 2 Ch 1	Revise to address NRC review comments	N/A	1 Rev 2	HEM-17-2, 01/03/2017
<b>Reuse and Off-site Soil</b>				
1-2	Reuse Soil	03/2014	2 Rev 0	HEM-16-68, 09/13/2016
Vol 2 Ch 2	Submit Errata Page. Sample identification number 2426-RU-120404-02-04 the Sample Uniform SOF (sum of Fractions) corrected.	03/2014	2 Rev 1	HEM-17-5, 01/09/2017
3	Reuse Soil	03/2014	3 Rev 0	HEM-16-68, 09/13/2016
Vol 2 Ch 3	Submit Errata Page. Sample identification number 2426-RU-120404-02-04 corrected single cell calculation.	03/2014	3 Rev 1	HEM-17-5, 01/09/2017
4-7	Reuse Soil	03/2014	4	HEM-16-68, 09/13/2016
5-6	Reuse Soil	03/2014	5	HEM-16-68, 09/13/2016
8a-8b	Reuse Soil	10/2015	6 Rev 0	HEM-16-68, 09/13/2016
8a-8b	Revision to correct a typographical error that indicated an incorrect Ra-226 background value for the soil sample data.	10/2015	6 Rev 1	HEM-17-2, 01/03/2017
9	Reuse Soil	05/2015	7	HEM-16-68, 09/13/2016
Offsite Borrow	Offsite Soil	09/2015	8	HEM-16-68, 09/13/2016