



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: 314-810-3368  
Direct fax: 636-937-6380  
E-mail: [hackmack@westinghouse.com](mailto:hackmack@westinghouse.com)  
Our ref: HEM-10-126  
Date: December 10, 2010

Subject: Partial Responses to Requests for Additional Information on Decommissioning  
Plan Chapters 1, 4, 6 and 7 (License No. SNM-00033, Docket No. 070-00036)

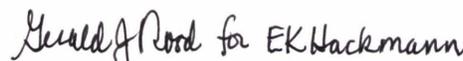
Reference: 1) NRC (J. J. Hayes) letter to Westinghouse (E. K. Hackmann), dated October  
14, 2010, ADAMS Accession No. ML102810455, "Westinghouse Hematite  
Decommission Plan Review Requests for Additional Information for  
Decommissioning Plan Chapters 1, 4, 6 and 7"

Reference 1 issued NRC Requests for Additional Information (RAI) concerning Hematite  
Decommissioning Plan (DP) Chapters 1, 4, 6 and 7. Westinghouse Electric Company LLC  
submits responses to the majority of those RAIs herein.

Attachment 1 provides responses to 13 of the 22 Reference 1 RAIs (HDP-1.3-Q1, 4.1.4-Q2,  
4.1.4-Q3, 4.2-Q4, 4.5.4-Q5, 4-Q6, 4-Q7, 4-Q10, 6-Q1, 6-Q2, 6-Q3, 7-Q1, and 7-Q2), including  
an explanation of anticipated changes to the DP resulting from the responses. Responses to the  
nine remaining RAIs will be provided under separate correspondence. The actual changes to the  
DP will also be provided under separate cover.

Please contact Mark Michelsen, Acting Licensing Manager of my staff at 314-810-3376 should  
you have questions or need any additional information.

Sincerely,

  
E. Kurt Hackmann  
Director, Hematite Decommissioning Project

Attachment: 1) Partial Responses to Decommissioning Plan Requests for Additional  
Information on Chapters 1, 4, 6 and 7

cc: J. J. Hayes, NRC/FSME/DWMEP/DURLD  
J. W. Smetanka, Westinghouse, w/o attachment  
J. E. Tapp, NRC Region III/DNMS/MCID, w/o attachment

## **ATTACHMENT 1**

### **Partial Responses to Decommissioning Plan Requests for Additional Information on Chapters 1, 4, 6 and 7**

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

**Docket No. 070-00036**

### **Responses to Decommissioning Plan Requests for Additional Information on Chapters 1, 4, 6 and 7**

NRC issued requests for additional information (RAI) concerning Decommissioning Plan Chapters 1, 4, 6 and 7 in letter dated October 14, 2010. Westinghouse Electric Company LLC (Westinghouse) provides responses to RAIs HDP-1.3-Q1, 4.1.4-Q2, 4.1.4-Q3, 4.2-Q4, 4.5.4-Q5, 4-Q6, 4-Q7, 4-Q10, 6-Q1, 6-Q2, 6-Q3, 7-Q1, and 7-Q2. Some of the responses will result in changes, as noted, to the Decommissioning Plan (DP; Hematite Decommissioning Plan, DO-08-004, Revision 0.0). Those changes will be provided under separate cover, and will be denoted by vertical lines in the right margin of the document. Responses to the nine remaining RAIs of the October 14, 2010, letter will also be provided under separate correspondence.

These RAI responses are organized in the same manner as the RAIs of NRC letter dated October 14, 2010. For each RAI, the NRC's Comment, Basis and Path Forward is reiterated, followed by the Westinghouse Response.

#### **Hematite Decommissioning Plan Chapter 1 - Executive Summary**

1. (HDP-1.3-Q1) Comment: In Section 1.3 Westinghouse Electric Company (WEC) stated that the groundwater is demonstrably not contaminated, therefore the Hematite Site meets the Decommissioning Group 4 criteria specified in NUREG-1757, Volume 1.

Basis: Groundwater is defined in NUREG-1757, Vol. 2 as water contained in pores or fractures in either the unsaturated or saturated zones below ground level. Westinghouse's utilization of the term leachate does not negate the fact that there is radiological contamination in the groundwater. The radiological contamination in the groundwater of the overburden unit is the result of activities performed during the period in which Hematite's was licensed. This must be considered as residual radioactivity. To meet the unrestricted release criteria of §20.1402, groundwater sources of drinking water and residual radioactivity must be accounted for in Westinghouse's assessment of the contamination of the site and in their performance assessment. Figure 1.1 of Volume 1 of NUREG-1757 specifies that sites with residual contamination resulting in TEDE doses less than or equal to 25 mrem/yr without institutional controls and groundwater contamination are Group 5 Decommissioning.

Path Forward: The Hematite Decommissioning Plan (HDP) should reflect a Group 5 decommissioning. Appropriate changes should be made to the HDP.

#### **Westinghouse Response:**

##### **Summary:**

As discussed with the NRC during the conference call conducted on October 29, 2010, HDP's position is that contaminated water within the pore space of the clay overburden is not a credible groundwater source of drinking water. HDP provided that based upon the site characteristics described in the discussion section that follows, the Hematite facility does not

meet any of the three characteristics listed in Section 12.1 of NUREG 1757, Volume 1, for Group 5 Decommissioning.

**Discussion:**

The Westinghouse evaluation of site hydrogeological conditions and radiological data from groundwater wells monitoring the facility resulted in the Decommissioning Group 4 classification. The Decommissioning Group 4 classification was based on:

- 1) the site did not meet NUREG 1757, Volume 1, Section 12.1 characteristics for a Group 5 classification; and
- 2) application of the definition of groundwater based on 10 CFR 20.1402.

Section 12.1 of NUREG 1757, Volume 1, Revision 2 states:

“Sites with both groundwater contamination and any of the following characteristics are in Group 5:

- The near surface ground water is either potable or allowed to be used for irrigation, and provides sufficient yields for these purposes.
- Aquifer volume is sufficient to provide the necessary yields.
- Current and informed consideration of future land use patterns do not preclude ground water use (i.e., material either has a long half-life, with peak exposures occurring later than 1000 years, or the site is in non-industrial areas).”

Westinghouse considers the near surface ground water to be not potable. The Hematite plant area is immediately underlain by a predominantly silty and clayey aquitard with an average thickness of approximately 28 feet based on borings that fully penetrated the overburden to bedrock. The aquitard layer has limited hydrologic potential for water production. The silt/clay is underlain by alluvial sand and gravel deposits that thicken from 0 feet in the northern facility area to approximately 20 feet approaching Joachim Creek to the south. Quantities of shallow groundwater in the sand and gravel unit underlying the immediate facility area are insufficient to sustain feasible production based on limited extent and thickness and do not comprise an economically feasible irrigation water source. Greater accumulations of sand south of the facility area, while providing suitable thickness for irrigation purposes, are not fully saturated and similarly is not likely to provide sufficient yield for these purposes. In the Hematite region, the Jefferson City-Cotter formation or the deeper Roubidoux Formation bedrock units are used for potable water rather than near surface ground water.

The aquifer volume is insufficient to provide the necessary yields. The saturated aquifer volume varies by season and is limited locally by the thickness and distribution of the alluvial sand/gravel unit that overlies the bedrock. The State of Missouri Well Construction Code (10 CSR 23-3) for the Hematite location requires “No less than twenty feet of casing shall be set above the screened or perforated interval of the well”. This restriction would preclude development of a water supply for domestic or irrigation purposes from the sand.

Groundwater is broadly defined in NUREG-1757, Volume 2 as water contained in pores or fractures in either the unsaturated or saturated zones below ground level. In essence, this broad definition includes any water below the ground surface regardless of the potential for it being extracted from the ground and used either as drinking water or for irrigation. This definition substantially differs from 10 CFR 20.1402 which states more specifically that the TEDE resulting from groundwater sources of drinking water must be included (emphasis added):

“A site will be considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in a TEDE to an average member of the critical group that does not exceed 25 mrem (0.25 mSv) per year, *including that from groundwater sources of drinking water*, and the residual radioactivity has been reduced to levels that are as low as reasonably achievable (ALARA). Determination of the levels which are ALARA must take into account consideration of any detriments, such as deaths from transportation accidents, expected to potentially result from decontamination and waste disposal.”

The above information supports the Westinghouse position that near surface ground water is typified as leachate in overburden and is not a credible source of drinking water at the Hematite site.

Additionally, in support of the conclusion of a Decommissioning Group 4 classification Westinghouse referenced Appendix A to 10 CFR 40 which provides the following definitions:

“Aquifer means a geologic formation, group of formations, or part of a formation *capable of yielding a significant amount of ground water to wells or springs*. Any saturated zone created by uranium or thorium recovery operations would not be considered an aquifer unless the zone is or potentially is (1) hydraulically interconnected to a natural aquifer, (2) capable of discharge to surface water, or (3) reasonably accessible because of migration beyond the vertical projection of the boundary of the land transferred for long-term government ownership and care in accordance with Criterion 11 of this appendix.”

“Ground water means water below the land surface in a zone of saturation. For purposes of this appendix, *ground water is the water contained within an aquifer as defined above.*”

In the Basis section of this RAI, the NRC stated that in order to meet the unrestricted release criteria of §20.1402, groundwater sources of drinking water and residual radioactivity must be accounted for in Westinghouse’s assessment of the contamination of the site and in their performance assessment. Westinghouse has accounted for this residual radioactivity as follows. First, the excavation of the impacted soils will remove the pore space water concurrent with the contaminated soil. Second, Westinghouse has also evaluated groundwater results, which are discussed in detail in DP Chapter 4, Section 4.5.4, Discussion of Results. Very low, insignificant, concentrations of radionuclides of concern (ROCs) are potentially present in site groundwater sources of drinking water; i.e., the sand-gravel and bedrock aquifers. Westinghouse has specified a method for determining dose from

groundwater in DP Chapter 5 Section 5.3.8. The concluding statement in Section 5.3.8 reads “Groundwater dose will be calculated by multiplying the groundwater concentration identified, if any, for a given ROC by the corresponding  $DSR_{GW}$  listed in Table 5-14.”

In light of the above, the Decommissioning Group 4 designation for the Hematite facility is conclusively supported.

#### **Hematite Decommissioning Plan Chapter 4 - Radiological Status of the Facility**

1. (HDP-4-Q1) Comment: Section 4.1.3 does not provide a summary of the Remaining Site Structures -soil beneath buildings sampling findings. Table 4-24 provides the statistical results of soils beneath buildings to remain, however, the locations are not provided. This appears to be mirrored in RCR-09. Tables 4-46 and 4-47 provide data on subsurface soil samples, but other than GPS IDs, it is not clear where the samples were collected, i.e., under which buildings. Table 4-46 page 1 lists the statistical and analytical sample results for one sample. The significance of the one sample is not clear.

Path forward: Provide a summary of subsurface soil sample results in Chapter 4. Update the Tables in RCR-09 to include a description of the locations. Provide a figure(s) showing the locations of the samples.

#### **Westinghouse Response:**

Response to this RAI will be provided under separate correspondence.

2. (HDP-4.1.4-Q2) Comment: There are several structures listed in Section 4.1.5 of the HDP as "structures that may remain or be demolished." It is stated that "three of the remaining structures, Building 115, the Sanitary Wastewater Treatment Plant (SWTP) Shed and Building 235, may be demolished at some point after the HDP approval or, if deemed economically advantageous, remain intact after license termination." Additional information is needed on the current radiological status of these facilities.

Basis: Information needed on the radiological status of contaminated structures is enumerated in NUREG-1757, Vol. 1, Rev. 2, Appendix D, Section IV.a. The checklist in NUREG-1757 specifies the following:

- A list or description of all structures at the facility where licensed activities occurred that contain residual radioactive material in excess of site background levels.
- A summary of the structures and locations at the facility that the licensee has concluded have not been impacted by licensed operations and the rationale for the conclusion.
- A list or description of each room or work area within each of these structures.
- A summary of the background levels used during scoping or characterization surveys.
- A summary of the locations of contamination in each room or work area.
- A summary of the radionuclides present at each location, the maximum and average radionuclide activities in dpm/100cm<sup>2</sup>, and, if multiple radionuclides are present, the radionuclide ratios.
- The mode of contamination for each surface (i.e., whether the radioactive material is present only on the surface of the material or if it has penetrated the material).
- The maximum and average radiation levels in mrem/hr in each room or work area.

- A scale drawing or map of the rooms or work areas showing the locations of radionuclide material contamination.

Path Forward: Following guidance in NUREG-1757, Vol. 1, Rev. 2, Appendix D, Section IV.a, provide additional details on the characterization of structures that may remain at the Hematite site. Provide the rationale for concluding that certain areas are non-impacted, and provide the necessary characterization data for contaminated areas. This request for additional information refers specifically to Building 115, the SWTP Shed and Building 235, but applies to any other structure that may remain after decommissioning.

**Westinghouse Response:**

The structural characterization information requested for Buildings 115, 235 and the Sanitary Wastewater Treatment Plant (SWTP) Shed, and rationale for concluding that certain areas are non-impacted is provided below. Of the buildings at Hematite, Building 110 (Security Building), Building 230 (Rod Loading Building), Building 231 (Warehouse), are planned to remain and be subject to Final Status Survey (FSS). Building 115 (Fire Pump House) and the SWTP Shed may potentially remain and, if so, be subject to FSS. Building 235 (West Storage Building) may be demolished prior to license termination as a more cost effective measure than decontamination and FSS. DP Section 4.1.3 provides the requested information for Buildings 110, 230 and 231. Additional details on the characterization of Buildings 115, 235 and the SWTP Shed are provided below using the guidance in NUREG-1757, Vol. 1, Rev. 2, Appendix D, Section IV.a.

- A list or description of all structures at the facility where licensed activities occurred that contain residual radioactive material in excess of site background levels.

As provided in HDP 4.1.5 Building 115, Building 235 and the SWTP Shed are considered to be impacted with contamination in excess of background..

- A summary of the structures and locations at the facility that the licensee has concluded have not been impacted by licensed operations and the rationale for the conclusion.

As provided in HDP 4.1.5 Building 115, Building 235 and the SWTP Shed are considered to be impacted by license operations.

- A list or description of each room or work area within each of these structures.

Building 115 was built in 1992 and housed a diesel-powered generator and fire water pump, and has no history of structural contamination. This 770 ft<sup>2</sup> building is divided by a single partition into roughly equal sizes. Evaluation of Building 115 during the Historical Site Assessment provides that no activities with radioactive material occurred in this building. Building 115 is considered to be impacted due to its location within the Controlled Access Area.

The SWTP Shed houses the SWTP system process components. This 325 ft<sup>2</sup> building is a single room, and has no history of structural contamination. As the

SWTP Shed houses sewage treatment system components that are discharged to Outfall 001 the SWTP Shed is considered to be impacted.

Building 235 is a storage building utilized as a uranium storage building. This 715 ft<sup>2</sup> building is a single room with four partial height interior walls. Operational survey results indicate that residual radioactive material exists on the surfaces in excess of background levels. .

- A summary of the background levels used during scoping or characterization surveys.

Typical background values for alpha and beta contamination were less than 1 cpm and less than 5 cpm, respectively for all three buildings. Total activity measurements were not corrected for the contribution from background radiation. The background values for removable surface contamination measurements were based on the blank sample counts as a part of daily performance checks for the Tennelec stationary counter.

- A summary of the locations of contamination in each room or work area.

Building 115 and the SWTP Shed are clean areas, with no posted fixed or removable contamination.

Fixed and removable contamination has been identified during operational radiological surveys on floor and wall surfaces within the ranges indicated in the next bullet. Historical assessment of the building provides that the interior surfaces of Building 235 were coated with a fixative to prevent the spread of contamination. The current operational radiological surveys reflect the radiological conditions on the surface of the fixative.

- A summary of the radionuclides present at each location, the maximum and average radionuclide activities in dpm/100cm<sup>2</sup>, and, if multiple radionuclides are present, the radionuclide ratios.

Building 115 and the SWTP Shed are clean areas, with no posted fixed or removable contamination.

For Building 235 operational radiological surveys of the floor surfaces have identified the following: total alpha contamination ranging from less than minimum detectable activity (MDA) to 321 dpm/100cm<sup>2</sup>; total beta contamination ranging from 2,489 dpm/100cm<sup>2</sup> to 5,502 dpm/100cm<sup>2</sup>; no detectable removable alpha or beta contamination.

Operational radiological surveys of the wall and ceiling surfaces have identified the following: total alpha contamination ranging from less than MDA to 116 dpm/100cm<sup>2</sup>; total beta contamination ranging from less than MDA to 2,627 dpm/100cm<sup>2</sup>; removable alpha contamination was identified in one location on an overhead I-beam up to 28.2 dpm/100cm<sup>2</sup>. No detectable removable beta contamination has been identified.

A majority of the activity in Building 235 can be attributed to uranium. The isotopic ratios of the radionuclides identified within the process buildings is utilized for the isotopic ratios of Building 235 as they contained similar materials.

- The mode of contamination for each surface (i.e., whether the radioactive material is present only on the surface of the material or if it has penetrated the material).

Building 115 and the SWTP Shed are clean areas, with no posted fixed or removable contamination.

Contamination was introduced into Building 235 during storage and handling of radioactive material (primarily uranium). As stated above, fixative has been applied to the interior surfaces of this building. Although total surface contamination is present, there is minimal removable contamination. Given the historical use and an absence of wet operations, it is believed any penetration of contamination into the original concrete surfaces is minimal.

- The maximum and average radiation levels in mrem/hr in each room or work area.

Building 115 and the SWTP Shed are clean areas with background radiation levels.

Operational radiological surveys of Building 235 have identified general area radiation levels ranging from 10  $\mu$ R/hr to 30  $\mu$ R/hr.

- A scale drawing or map of the rooms or work areas showing the locations of radionuclide material contamination.

Building 115 and the SWTP Shed are clean areas, with no posted fixed or removable contamination therefore maps of the room are not provided.

The most recent radiological surveys of Building 235 are attached below.

**Appendix A  
 Radiological Survey Report**

<b>Purpose of Survey:</b> Characterization of Direct Readings on W. Vault Floors & Walls							<b>Log Number:</b> 0092 CH 100205							
<b>Surveyed By:</b> Keith Halley			<i>Keith Halley 2/5/10</i>								<b>Reviewed By:</b> Charles Frinkenbine		<i>Charles Frinkenbine 2/5/10</i>	
<b>Instrument &amp; Probe</b>	<b>Serial Number</b>	<b>Calibration Due</b>	<b>Probe Area (cm<sup>2</sup>)</b>	<b>Alpha Bkg (cpm)</b>	<b>Alpha Efficiency</b>	<b>Alpha MDA (dpm)</b>	<b>Beta Bkg (cpm)</b>	<b>Beta Efficiency</b>	<b>Beta MDA (dpm)</b>	<b>Date:</b> 2/5/2010				
Lud 2360 43-89 U	237310	5/4/10	125	5.0	14.4%	74.2	202.0	8.7%	635	<b>Time:</b> 14:30				
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>Smear Area:</b> ~ 100 cm <sup>2</sup>				
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>Batch #:</b> N/A				
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>RWP:</b> RP-10-G003				
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>Misc:</b> N/A				

**Remarks:** The floor has thick yellow & magenta paint & is marked fixed contamination area. The cinderblock walls have a thin coat of green paint on them. Survey location corresponds to the number on the map.

#	Description	Removable Alpha		Removable Beta		Total Alpha		Total Beta		βy Dose Rate		Limit Exceeded
		Net CPM	DPM / 100cm <sup>2</sup>	Net CPM	DPM / 100cm <sup>2</sup>	Gross CPM	DPM / 100cm <sup>2</sup>	Gross CPM	DPM / 100cm <sup>2</sup>	Contact uR/hr	Gen. Area uR/hr	
1	Floor Location # 1	N/A	N/A	N/A	N/A	10	<MDA	666	4262	N/A	N/A	N/A
2	Floor Location # 2	N/A	N/A	N/A	N/A	63	321	801	5502	N/A	N/A	N/A
3	Floor Location # 3	N/A	N/A	N/A	N/A	22	94	794	5438	N/A	N/A	N/A
4	Floor Location # 4	N/A	N/A	N/A	N/A	13	<MDA	605	3702	N/A	N/A	N/A
5	Floor Location # 5	N/A	N/A	N/A	N/A	24	105	776	5273	N/A	N/A	N/A
6	Floor Location # 6	N/A	N/A	N/A	N/A	10	<MDA	478	2535	N/A	N/A	N/A
7	Floor Location # 7	N/A	N/A	N/A	N/A	23	100	473	2489	N/A	N/A	N/A
8	Floor Location # 8	N/A	N/A	N/A	N/A	12	<MDA	777	5282	N/A	N/A	N/A
9	Floor Location # 9	N/A	N/A	N/A	N/A	22	94	628	3913	N/A	N/A	N/A
10	Wall Location # 10	N/A	N/A	N/A	N/A	6	<MDA	187	<MDA	N/A	N/A	N/A
11	Wall Location # 11	N/A	N/A	N/A	N/A	9	<MDA	221	<MDA	N/A	N/A	N/A
12	Wall Location # 12	N/A	N/A	N/A	N/A	15	<MDA	207	<MDA	N/A	N/A	N/A
13	Wall Location # 13	N/A	N/A	N/A	N/A	11	<MDA	196	<MDA	N/A	N/A	N/A
14	Wall Location # 14	N/A	N/A	N/A	N/A	5	<MDA	150	<MDA	N/A	N/A	N/A
15	Wall Location # 15	N/A	N/A	N/A	N/A	11	<MDA	488	2627	N/A	N/A	N/A
16	Wall Location # 16	N/A	N/A	N/A	N/A	5	<MDA	211	<MDA	N/A	N/A	N/A
17	Wall Location # 17	N/A	N/A	N/A	N/A	10	<MDA	175	<MDA	N/A	N/A	N/A
18	Wall Location # 18	N/A	N/A	N/A	N/A	13	<MDA	206	<MDA	N/A	N/A	N/A
19	Wall Location # 19	N/A	N/A	N/A	N/A	8	<MDA	191	<MDA	N/A	N/A	N/A
20	Wall Location # 20	N/A	N/A	N/A	N/A	10	<MDA	203	<MDA	N/A	N/A	N/A

Appendix A  
 Radiological Survey Report

<b>Purpose of Survey:</b> Characterization of Direct Readings on W. Vault Floors & Walls							<b>Log Number:</b> 0092 CH 100205			
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<b>Instrument &amp; Probe</b>	<b>Serial Number</b>	<b>Calibration Due</b>	<b>Probe Area (cm<sup>2</sup>)</b>	<b>Alpha Bkg (cpm)</b>	<b>Alpha Efficiency</b>	<b>Alpha MDA (dpm)</b>	<b>Beta Bkg (cpm)</b>	<b>Beta Efficiency</b>	<b>Beta MDA (dpm)</b>	<b>Date:</b> 2/5/2010
Lud 2360 43-89 U	237310	5/4/10	125	5.0	14.4%	74.2	202.0	8.7%	635	<b>Time:</b> 14:30
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>Smear Area:</b> ~ 100 cm <sup>2</sup>
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>Batch #:</b> N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>RWP:</b> RP-10 G003
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>Misc:</b> N/A

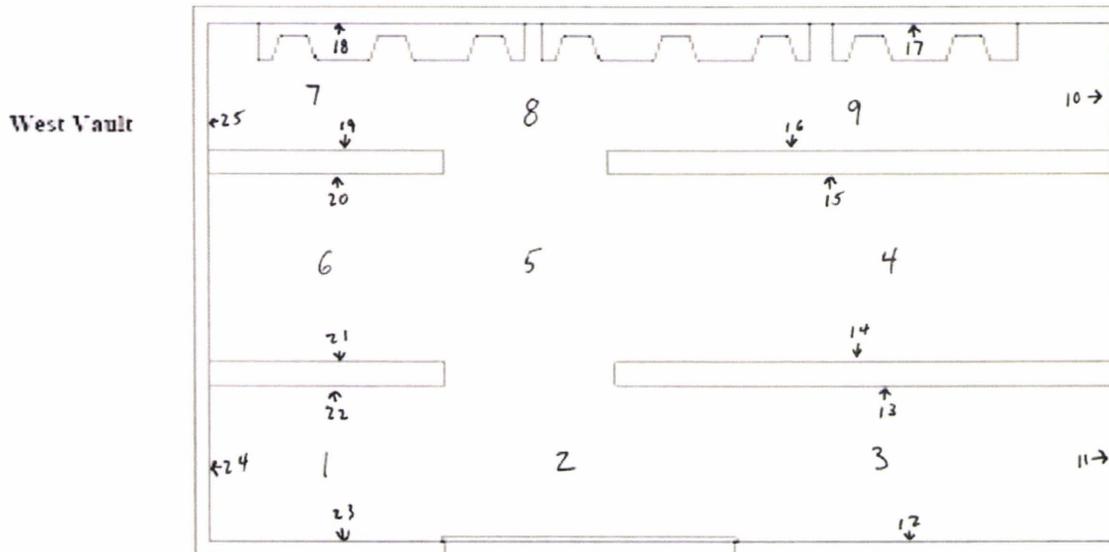
**Remarks:** The floor has thick yellow & magenta paint & is marked fixed contamination area. The cinderblock walls have a thin coat of green paint on them. Survey location corresponds to the number on the map.

#	Description	Removable Alpha		Removable Beta		Total Alpha		Total Beta		β Dose Rate		Limit Exceeded
		Net CPM	DPM / 100cm <sup>2</sup>	Net CPM	DPM / 100cm <sup>2</sup>	Gross CPM	DPM / 100cm <sup>2</sup>	Gross CPM	DPM / 100cm <sup>2</sup>	Contact uR/hr	Gen. Area uR/hr	
21	Wall Location # 21	N/A	N/A	N/A	N/A	26	116	240	<MDA	N/A	N/A	N/A
22	Wall Location # 22	N/A	N/A	N/A	N/A	14	<MDA	221	<MDA	N/A	N/A	N/A
23	Wall Location # 23	N/A	N/A	N/A	N/A	17	<MDA	212	<MDA	N/A	N/A	N/A
24	Wall Location # 24	N/A	N/A	N/A	N/A	14	<MDA	240	<MDA	N/A	N/A	N/A
25	Wall Location # 25	N/A	N/A	N/A	N/A	10	<MDA	218	<MDA	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**Appendix A  
 Radiological Survey Report (Map)**

<b>Purpose of Survey:</b> Characterization of Direct Readings on W. Vault Floors & Walls							<b>Log Number:</b> 0092 CH 100205				
<b>Surveyed By:</b> Keith Halley <i>Keith Halley 2/5/10</i>			<b>Reviewed By:</b> <i>Charles Finkenbine 2/5/10</i>								
Instrument	Serial Number	Calibration Due	Probe Area (cm <sup>2</sup> )	Alpha Bkg (cpm)	Alpha Efficiency	Alpha MDA (dpm)	Beta Bkg (cpm)	Beta Efficiency	Beta MDA (dpm)	Date: 02/05/10	
Lud 2360 43-89 U	237310	5/4/10	125	5.0	14.4%	74.2	202.0	8.7%	635	Time: 14:30	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Smear Area: ~ 100 cm <sup>2</sup>	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Batch #: N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	RWP: RP-10-G003	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Misc: N/A	

**Remarks:** The floor has thick yellow & magenta paint & is marked fixed contamination area. The cinderblock walls have a thin coat of green paint on them. Survey location corresponds to the number on the map.



**Appendix A  
 Radiological Survey Report**

<b>Purpose of Survey:</b> Characterization Survey of West Vault for Smearable Contamination after Lock-down of Ceiling				<b>Log Number:</b> 1174 CH 100927						
<b>Surveyed By:</b> David W. Duffey <i>DW Duffey</i> 9-28-10				<b>Reviewed By:</b> Charles Finkenbine <i>CF Finkenbine</i> 9-29-10						
<b>Instrument &amp; Probe</b>	<b>Serial Number</b>	<b>Calibration Due</b>	<b>Probe Area (cm<sup>2</sup>)</b>	<b>Alpha Bkg (cpm)</b>	<b>Alpha Efficiency</b>	<b>Alpha MDA (dpm)</b>	<b>Beta Bkg (cpm)</b>	<b>Beta Efficiency</b>	<b>Beta MDA (dpm)</b>	<b>Date:</b> 9/27/2010
Tennelec LB 2 GFPC	68819-1	1/1/11	N/A	1.0	27.6%	21.7	4.0	33.2%	28	<b>Time:</b> 10:00
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>Smear Area:</b> ~ 100 cm <sup>2</sup>
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>Batch #:</b> 13649
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>RWP:</b> RP-10-G003 Rev.0
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>Misc:</b> N/A

Remarks: N/A

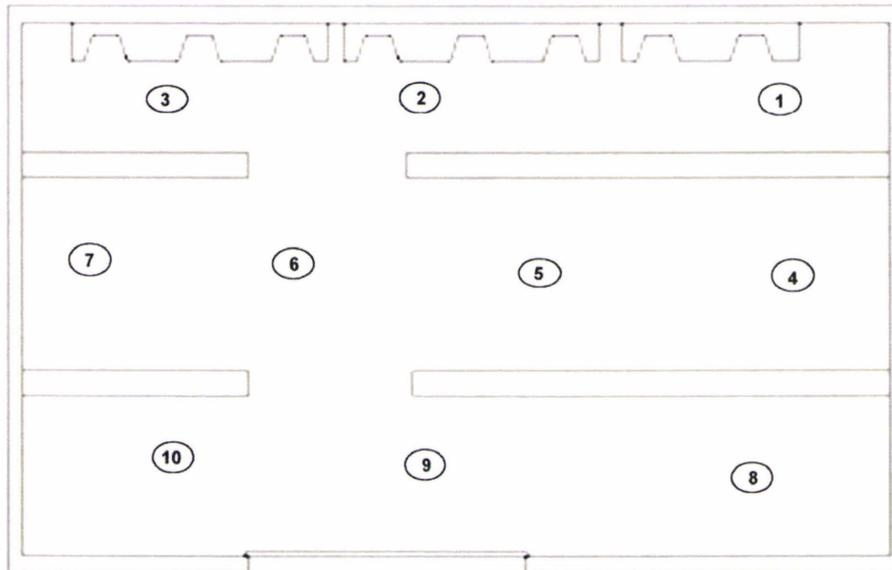
#	Description	Removable Alpha		Removable Beta		Total Alpha		Total Beta		βy Dose Rate		Limit Exceeded
		Net CPM	DPM / 100cm <sup>2</sup>	Net CPM	DPM / 100cm <sup>2</sup>	Gross CPM	DPM / 100cm <sup>2</sup>	Gross CPM	DPM / 100cm <sup>2</sup>	Contact uR/hr	Gen. Area uR/hr	
1	See Attached Map for Location	2.0	<MDA	5.3	<MDA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	See Attached Map for Location	1.0	<MDA	2.6	<MDA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	See Attached Map for Location	-1.0	<MDA	1.3	<MDA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	See Attached Map for Location	-1.0	<MDA	1.3	<MDA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	See Attached Map for Location	0.0	<MDA	2.0	<MDA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	See Attached Map for Location	3.0	<MDA	-1.0	<MDA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	See Attached Map for Location	-1.0	<MDA	-0.7	<MDA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8	See Attached Map for Location	3.0	<MDA	0.0	<MDA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	See Attached Map for Location	0.1	<MDA	-2.1	<MDA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10	See Attached Map for Location	2.0	<MDA	1.3	<MDA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**Appendix A  
 Radiological Survey Report (Map)**

<b>Purpose of Survey:</b> Characterization Survey of West Vault for Smearable Contamination after Lock-down of Ceiling				<b>Log Number:</b> 1174 CH 100927						
<b>Surveyed By:</b> David W. Duffey <i>[Signature]</i> 9-28-10				<b>Reviewed By:</b> Charles Finkenbine <i>[Signature]</i> 9-29-10						
Instrument	Serial Number	Calibration Due	Probe Area (cm <sup>2</sup> )	Alpha Bkg (cpm)	Alpha Efficiency	Alpha MDA (dpm)	Beta Bkg (cpm)	Beta Efficiency	Beta MDA (dpm)	Date:
Tennelec LB 2 GFPC	68819-1	1/1/11	N/A	1.0	27.6%	21.7	4.0	33.2%	28	09/27/10
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>Time:</b> 10:00
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>Smear Area:</b> ~ 100 cm <sup>2</sup>
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>Batch #:</b> 13649
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>RWP:</b> RP-10-G003 Rev.0
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>Misc:</b> N/A

Remarks: N/A

West Vault



**Appendix A  
 Radiological Survey Report**

<b>Purpose of Survey:</b> Characterization Survey of West Vault Post Lock-Down of Ceiling for Smearable Activity				<b>Log Number:</b> 1186 CH 100929						
<b>Surveyed By:</b> David W. Duffey <i>[Signature]</i> 9-29-10				<b>Reviewed By:</b> Charles Finkenbine <i>[Signature]</i> 10/27/10						
<b>Instrument &amp; Probe</b>	<b>Serial Number</b>	<b>Calibration Due</b>	<b>Probe Area (cm<sup>2</sup>)</b>	<b>Alpha Bkg (cpm)</b>	<b>Alpha Efficiency</b>	<b>Alpha MDA (dpm)</b>	<b>Beta Bkg (cpm)</b>	<b>Beta Efficiency</b>	<b>Beta MDA (dpm)</b>	<b>Date:</b> 9/29/2010
Tennelec LB 2 GFPC	68819-1	1/1/11	N/A	1.1	27.6%	22.7	3.2	33.2%	26	<b>Time:</b> 11:45
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>Smear Area:</b> - 100 cm <sup>2</sup>
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>Batch #:</b> 13690
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>RWP:</b> <i>10-6003 N/A 9-30-10</i>
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>Misc:</b> N/A

**Remarks:** Survey focused on Bevels of Ceiling Beams in area to be accessed by Aschinger Electrical to Install Camera and Card Reader (see Survey # 1186 CH 100929)

#	Description	Removable Alpha		Removable Beta		Total Alpha		Total Beta		By Dose Rate		Limit Exceeded
		Net CPM	DPM / 100cm <sup>2</sup>	Net CPM	DPM / 100cm <sup>2</sup>	Gross CPM	DPM / 100cm <sup>2</sup>	Gross CPM	DPM / 100cm <sup>2</sup>	Contact uR/hr	Gen. Area uR/hr	
1	See Attached Map for Location	-0.2	<MDA	2.9	<MDA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	See Attached Map for Location	1.8	<MDA	5.2	<MDA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	See Attached Map for Location	4.8	<MDA	5.2	<MDA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	See Attached Map for Location	-0.2	<MDA	3.9	<MDA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	See Attached Map for Location	2.9	<MDA	-0.1	<MDA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	See Attached Map for Location	4.8	<MDA	2.2	<MDA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	See Attached Map for Location	3.8	<MDA	2.6	<MDA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8	See Attached Map for Location	0.9	<MDA	0.5	<MDA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	See Attached Map for Location	7.8	28.2	8.2	<MDA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10	See Attached Map for Location	-0.2	<MDA	2.9	<MDA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**Appendix A  
 Radiological Survey Report (Map)**

<b>Purpose of Survey:</b> Characterization Survey of West Vault Post Lock-Down of Ceiling for Smearable Activity							<b>Log Number:</b> 1186 CH 100929			
<b>Surveyed By:</b> David W. Duffey <i>DW Duffey</i> 9-29-10				<b>Reviewed By:</b> Charles Finkenbine <i>C Finkenbine</i> 10/27/10						
Instrument	Serial Number	Calibration Due	Probe Area (cm <sup>2</sup> )	Alpha Bkg (cpm)	Alpha Efficiency	Alpha MDA (dpm)	Beta Bkg (cpm)	Beta Efficiency	Beta MDA (dpm)	Date: 09/29/10
Tennelec LB 2 GFPC	68819-1	1/1/11	N/A	1.1	27.6%	22.7	3.2	33.2%	26	Time: 11:45
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Smear Area: ~ 100 cm <sup>2</sup>
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Batch #: 13690
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	RWP: <i>EP-10-0103</i> <i>Real D</i> <i>N/A</i> 9-30-10
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Misc: N/A

**Remarks:** Survey focused on Bevels of Ceiling Beams in area to be accessed by Aschinger Electrical to Install Camera and Card Reader (see Suvey # 1186 CH 100929)

West Vault

