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Hematite Decommissioning Project  
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Our ref: HEM-12-101  
Date: August 16, 2012

Subject: REQUEST FOR AMENDMENT OF THE HEMATITE LICENSE TO REVISE  
CONDITION 15 REGARDING EXEMPTION FROM CRITICALITY  
MONITORING SYSTEMS (License No. SNM-00033, Docket No. 070-00036)

Reference: 1) Westinghouse (Copp) letter to NRC (Document Control), HEM-12-78, dated  
July 25, 2012, "Request for Amendment of the Hematite License to Clarify  
Condition 15 Regarding Exemption from Criticality Monitoring Systems"  
2) NRC (McConnell) letter to Westinghouse (Hackmann), dated November 9,  
2011, "Approval of Westinghouse Hematite Physical Security Plan, dated July 28,  
2011, Category I Contingency Safeguards Contingency Response and Contingency  
Security Training and Qualification Plans, dated July 28, 2011, and Fundamental  
Nuclear Material Control Plan, dated February 18, 2011; and Issuance of Hematite  
Amendment 59 (SNM-33)"

The purpose of this letter is two-fold:

- Retract the request made in Reference 1, and
- Request an exemption per 10 CFR 70.17(a) and an amendment of Westinghouse Electric Company LLC (Westinghouse) nuclear materials license SNM-33. The exemption and amendment are to add criteria to the exemption from 10 CFR 70.24 requirements for criticality monitoring systems at the Hematite Decommissioning Project (HDP).

Reference 1 is retracted in favor of the request contained in this letter.

In Reference 2, the U.S. Nuclear Regulatory Commission (NRC) approved the license amendment, number 59, which is currently applicable to HDP. Amendment 59 contains Condition 15, which exempts HDP from the requirements of 10 CFR 70.24 for criticality monitoring systems for special nuclear material meeting certain criteria. HDP has identified additional criteria that are needed to reflect the intent of the criteria already approved. The intent was to exempt decommissioning activities where the risk of a criticality accident was not credible.

Attachment 1 is a license amendment request in the form of a revised license application with additional criteria for the exemption from 10 CFR 70.24. Attachment 2 is a justification for additional 10 CFR 70.24 exemption criteria in the HDP license amendment request. Attachment 3 is a proposed revision to Condition 15 and Attachment 4 is the justification for the revision to Condition 15. Attachments 2 and 4 justify that the absence of a criticality monitoring system for

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the criteria added to Condition 15 will not endanger life or property or the common defense and security of the public. Attachments 1 and 3 are provided in redline to highlight the changes.

Please contact Dennis Richardson of my staff at 314-810-3376 should you have questions or need any additional information.

Respectfully,



Robert D. Copp, Project Director  
Hematite Decommissioning Project

Attachments:    1) Special Nuclear Material License Application for the Hematite Decommissioning Project (redline)  
                      2) Justification for Additional 10 CFR 70.24 Exemption Criteria in Section 1.6.2 of HDP License Amendment Request  
                      3) Revised Condition 15 in SNM-33 (redline)  
                      4) Justification for the Revised Condition 15 in SNM-33

cc:    J. J. Hayes, NRC/FSME/DWMRP/DURLD  
       J. W. Smetanka, Westinghouse  
       M. M. LaFranzo, NRC Region III/DNMS/MCID  
       S. A. Whaley, NRC/NMSS/FCSS/TSB

**ATTACHMENT 1**

**WESTINGHOUSE ELECTRIC COMPANY LLC**

**SPECIAL NUCLEAR MATERIAL LICENSE APPLICATION  
FOR THE  
HEMATITE DECOMMISSIONING PROJECT**

**08/16/2012**

**FESTUS, MISSOURI**

**LICENSE NUMBER  
SNM-00033**

**U. S. NUCLEAR REGULATORY COMMISSION  
DOCKET 070-00036**

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## **1 STANDARD CONDITIONS AND SPECIAL AUTHORIZATIONS**

### **1.1 NAME, ADDRESS AND CORPORATE INFORMATION**

The name of the applicant is Westinghouse Electric Company LLC. The applicant is a limited liability company under the laws of the state of Delaware with principal offices located at 1000 Westinghouse Drive, Cranberry Township, PA 16066 USA. The address at which the licensed activities will be conducted is:

Westinghouse Electric Company LLC  
3300 State Road P  
Festus, Missouri 63028

### **1.2 SITE LOCATION**

The Hematite facility of Westinghouse Electric Company LLC is located on a site of about 228 acres in Jefferson County, Missouri, approximately 3/4 mile northeast of the unincorporated town of Hematite, Missouri, and 35 miles south of the city of St. Louis, Missouri. Activities involving special nuclear material are conducted within the fenced controlled area near the center of the site and adjacent to the access road, State Road P. These activities include preparation and shipment of scrap and wastes, and related processes incident to the decommissioning of the facility.

### **1.3 LICENSE NUMBER AND PERIOD OF LICENSE**

This application is for Special Nuclear Material License (SNM) No. SNM-00033 (NRC Docket 070-00036). The expiration date for License No. SNM-00033 was revised in Amendment No. 50, issued March 23, 2006, to specify that the license is continued until decommissioning is complete and the NRC notifies Westinghouse Electric Company LLC in writing that the license is terminated.

#### 1.4 **POSSESSION LIMITS**

Westinghouse Electric Company LLC requests authorization to possess the following quantities of byproduct, source and special nuclear material under License No. SNM-00033 (see also the possession limit exemption requested in Section 1.6.4 below). The licensee may possess any Special Nuclear Material (SNM), either Category I or Category II, during decommissioning if handled in accordance with the approved Physical Security Plan, Fundamental Nuclear Material Control Plan, and Nuclear Criticality Contingency Plan for Remediating Contingency Hot Spots.

| <b>Item</b> | <b>Material</b>   | <b>Form</b>  | <b>Maximum Quantity</b>  |
|-------------|---|--|--|
| A           | Uranium enriched to a maximum of less than 10 weight percent in the $^{235}\text{U}$ isotope                                | Any (including only metal powders existing at the Hematite Site on July 1, 2001) | 10,000 kilograms $^{235}\text{U}$  |
| B           | Uranium enriched greater than or equal to 10 weight percent and less than 20 weight percent in the $^{235}\text{U}$ isotope | Any (including only metal powders existing at the Hematite Site on July 1, 2001) | 9,999 grams $^{235}\text{U}$   |
| C           | Uranium enriched greater than or equal to 20 weight percent in the $^{235}\text{U}$ isotope                                 | Any (including only metal powders existing at the Hematite Site on July 1, 2001) | 4,999 grams $^{235}\text{U}^*$   |
| D           | Uranium (natural or depleted)   | Any (including only metal powders existing at the Hematite Site on July 1, 2001) | 2,000 kilograms  |
| E           | Cobalt 60   | Sealed Sources   | 40 millicuries total   |
| F           | Cesium 137  | Sealed Sources   | 500 millicuries total  |
| G           | Byproduct Material including $^{241}\text{Am}$  | Any  | 400 microcuries total  |
| H           | Special Nuclear Material, Source and Byproduct Material as residual contamination   | Any  | All residual contamination existing at the Hematite site on July 1, 2001 |

\* License conditions for Category III HEU (for less than 1000 grams  $^{235}\text{U}$ ) and Category II HEU (1000 to 4999 grams of  $^{235}\text{U}$ ) are defined in the Fundamental Nuclear Material Control Plan and the Physical Security Plan.

## **1.5 AUTHORIZED ACTIVITIES**

This license application requests authorization for Westinghouse Electric Company LLC to conduct the following activities at the Hematite Decommissioning Project:

- 1) Receive, possess, use, store and transfer Special Nuclear Material under Part 70 of the Regulations of the Nuclear Regulatory Commission
- 2) Receive, possess, use, store, and transfer Source Material under Part 40 of the Regulations of the Nuclear Regulatory Commission
- 3) Receive, possess, use, store, and transfer Byproduct Material under Part 30 of the Regulations of the Nuclear Regulatory Commission

The authorized principal licensed activity is to decommission the site in accordance with the Decommissioning Plan (DP) to reduce residual radioactivity to a level that permits termination of the license. With the cessation of all nuclear fuel manufacturing operations on the site, authorized activities are limited to those associated with decommissioning in accordance with 10 CFR 70.38(d). These activities are being undertaken to allow termination of License No. SNM-00033 and release of the site for unrestricted use in accordance with NRC Regulations (10 CFR 20, Subpart E, Radiological Criteria for License Termination). These authorized activities are conducted at any location on the Hematite site.

With respect to the specific possession limits of Section 1.4:

- 1) Items A, B, C and D – use of this Special Nuclear Material and Source Material is limited to those activities necessary to process and package the materials into forms suitable for transfer to other licensed operations or approved recipients. Receipt of any additional materials in these categories is limited to that necessary to complete the decommissioning of the site and facilities. Examples of such receipts would be calibration sources and residual contamination on shipping containers and packages.
- 2) Item E – for instrument calibration and testing.
- 3) Item F – for instrument calibration and testing.
- 4) Item G – for instrument calibration and testing and as residual contamination on shipping containers and packages.
- 5) Item H – for possession of residual contamination on building and equipment surfaces or contaminated waste/materials or contaminated soil/sediment.
- 6) SNM is either Diffuse Material or Potentially Recoverable SNM; these terms are defined in the Fundamental Nuclear Material Control Plan. Diffuse Material is counted in the Line Item H category. Potentially Recoverable SNM is counted against the appropriate Line Item A, B, or C limit.

## 1.6 EXEMPTIONS AND SPECIAL AUTHORIZATIONS

The following are specific exemptions and special authorizations of this license application:

1.6.1 Release of equipment and materials from restricted areas to controlled areas or off-site in accordance with the NRC's "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," dated April 1993.

1.6.2 Notwithstanding the requirements of 10 CFR 70.24, licensed activity ~~involving any materials described below~~ shall be exempted from the "monitoring system" requirements under any of the conditions specified below:

1. Low concentration materials ( $1.4 \text{ g}^{235}\text{U/L}$  for solids, and  $11.6 \text{ g}^{235}\text{U/L}$  for liquids) that are safely subcritical by virtue of their low concentration, irrespective of any other physical conditions, including mass, geometry, moderation, reflection, etc.

BASIS: This exemption is necessary because HDP decommissioning operations routinely involve the handling and consolidation of large volumes of solid and/or liquid waste materials that comprise only low (subcritical) concentrations of fissile material. These low concentrations represent no credible risk.

2. Materials that are contained in authorized packages as defined in NRC/DOT regulations, including 10 CFR 71 and 49 CFR 173.

BASIS: This exemption is necessary because HDP decommissioning operations routinely involve material packaged for transport for disposal, but the material is not yet being transported. This exemption is consistent with the requirements of 10 CFR 70.24, which exempts monitoring systems for special nuclear material that is being transported when packaged in accordance with the requirements of 10 CFR 71. This exemption is consistent with the safety basis of 10 CFR 71 and 49 CFR 173.

3. Materials within neutronically separate areas containing less than the following isotopic mass amount per separate area:

A.  $700 \text{ g}^{235}\text{U}$  in uranium enriched to more than 5 wt.%  $^{235}\text{U/U}$ , and

B.  $1640 \text{ g}^{235}\text{U}$  in uranium enriched to no more than 5 wt.%  $^{235}\text{U/U}$ ;

Notes: (1) Structure surfaces within the separate area that contain residual  $^{235}\text{U}$  surface contamination below an areal density of  $10 \text{ g}^{235}\text{U/ft}^2$  are not included in the mass amount for the separate area.

(2) Any  $^{235}\text{U}$  in undisturbed subsurface areas is not included in the isotopic mass amount for the separate area.

(3) Neutronically separated areas are to be considered effectively neutronically isolated from all other areas used to store fissile



material when either of the following conditions are satisfied:

- (a) A minimum edge-to-edge separation distance of 12 feet is maintained between each area used to store fissile material; or
- (b) The configuration of each area used to store fissile material, in conjunction with any ~~present~~ fixed shielding ~~that may be present~~ (e.g., concrete block walls) between the areas, is demonstrated by neutron transport calculations to result in effective neutron isolation between each area.

BASIS: This exemption is necessary because HDP decommissioning operations involve exhumation, handling, and interim storage of small quantities of fissile material pending shipment for off-site disposal. These mass limits are set at or below the subcritical mass limits specified in Table 1 and Table 6 of ANSI/ANS-8.1-1998. In summary, the specified mass limits do not exceed the maximum subcritical mass limits for the corresponding  $^{235}\text{U}$  enrichment, provided each area used to store fissile materials is deemed to be neutronically isolated from all other areas used to store fissile material.

- 4. Residual materials on surfaces of the site buildings or installed equipment in those buildings including removal and transit of those SNM-bearing materials from the buildings. (Any SNM-bearing materials brought into site buildings must satisfy another provision in this Section 1.6.2 to meet the exemption.)

BASIS: This exemption is necessary because HDP decommissioning operations involve dismantling of buildings and equipment with surfaces that have been characterized and shown to present no credible risk of a criticality event due to their highly dispersed fissile contamination.

- 5. A Contingency Hot Spot that is in secure storage, is neutronically isolated from other SNM, and is intrinsically safe due to two of its physical parameters (e.g., mass, volume, enrichment, geometry, moderation) being in a known state that is sufficient to render the item safely subcritical. The term 'Contingency Hot Spot' is defined in the Nuclear Criticality Safety Contingency Plan for Remediating Contingency Hot Spots. The term 'secure storage' is defined as an area in which dual controlled entry is required as well as tandem operations with oversight.

BASIS: This exemption is necessary because HDP has extensive measures established for the safe and secure storage of a Contingency Hot Spot that keep the item safety subcritical. Prior to placement in secure storage the Contingency Hot Spot is thoroughly evaluated, characterized, and packaged so the double contingency principle is inherently met. Secure storage provides a quiescent state that is effectively neutronically isolated.

- 6. NCS Exempt Materials not otherwise exempted by paragraph 1.6.2.1 above. NCS Exempt Materials are defined as: "Unless otherwise defined and justified within a nuclear criticality safety evaluation, NCS Exempt Material is conservatively

defined as material containing  $^{235}\text{U}$  with an average nuclide fissile concentration not exceeding  $0.1 \text{ g } ^{235}\text{U/L}$ , or material that comprises no greater than  $15 \text{ g } ^{235}\text{U}$  and is enclosed within a container with a volume of at least 5 liters.”

BASIS: This exemption is necessary because, in addition to the low concentration exemption included in paragraph (1) above, HDP decommissioning operations may involve the identification of item(s) comprising fissile materials in concentrations exceeding the established maximum subcritical concentration, but are nonetheless safely subcritical by virtue of their low fissile mass. Other attributes of the item(s) may assure its subcriticality when established and justified in a nuclear criticality safety evaluation.

7. Non-NCS Exempt Materials in the process of exhumation from a burial area and characterization (e.g., in a Waste Evaluation Area and/or Material Assay Area), that have an unknown or inestimable fissile material content (e.g., intact drums), provided the following criteria are met:
  - A. In-situ radiological survey equipment does not identify the item as a Contingency Hot Spot, and
  - B. The item is not consistent with the calibration basis of the radiological survey equipment used (e.g., dense shielded items, intact drums), and
  - C. A 12 foot separation distance (effective neutronic isolation) is maintained between the exhumed item and other exhumed items that are not exempt from Nuclear Criticality Safety (NCS) control (distance may be between 3 feet and 12 feet if effective neutronic isolation at the smaller distance is demonstrated by neutron transport calculations), and
  - D. The item is moved from exhumation to a Waste Evaluation Area and/or Material Assay Area without being placed in a storage area in-between, and
  - E. Only one container (or one item if it is too large for a collared drum) not exempt from NCS control is allowed at a time in a Waste Evaluation Area or Material Assay Area with minimum separation of 12 feet from other Non-NCS Exempt material (distance may be between 3 feet and 12 feet if effective neutronic isolation at the smaller distance is demonstrated by neutron transport calculations), and
  - F. Controls for a Contingency Hot Spot per Condition 17 are applied if the additional characterization (e.g., shielding removed) determines that a Contingency Hot Spot is present.

BASIS: This exemption is necessary to address material in a configuration that prevents the ability to estimate by field instruments its fissile material content at the time of exhumation. This material has a demonstrated history of being subcritical while buried with other fissile containing material, and the specified controls provide additional margin in the material remaining subcritical until evaluation and characterization activities are complete.

1.6.3 Notwithstanding the requirements of Title 10, Code of Federal Regulations, Part 70, §70.22(a)(4), the licensed activity shall be exempted from the possession limit requirements of Section 1.4 Item C above with respect to the SNM covered by the Westinghouse - U. S. Government Settlement Agreement-In-Principle. If the licensee discovers any such SNM during decommissioning, the SNM shall be handled in accordance with the approved Physical Security Plan, Fundamental Nuclear Material Control Plan, and Nuclear Criticality Contingency Plan for Remediating Contingency Hot Spots.

1.6.4 Dismantlement and demolition of site buildings.

## **1.7 FREQUENCIES**

When audit, measurement, surveillance, and/or other frequencies are specified in license documents, the following time spans apply:

- *Daily* means once each 24-hour period, with each covering a span of 30-hours or less
- *Weekly* means once each 7-consecutive-days, with each covering a span of 8-days or less
- *Monthly* means 12-per-year, with each covering a span of 40-days or less
- *Quarterly* means 4-per-year, with each covering a span of 115-days or less
- *Semiannual* means 2-per-year, with each covering a span of 225-days or less
- *Annual* means 1-per-year, with each covering a span of 15-months or less
- *Biennial* means once every 2-years, with each covering a span of 30-months or less
- *Triennial* means once every 3-years, with each covering a span of 45-months or less
- For unspecified time periods, an extension of 0.25 times the period will apply

## **1.8 DECOMMISSIONING CHANGES**

Changes to decommissioning activities shall be evaluated to ensure they are consistent with license conditions and the intent of the NRC approved Decommissioning Plan (DP) and may be made without prior NRC approval subject to the following condition. Revision of any of the following activities described in Chapter 14 of the DP requires NRC approval prior to implementation:

- Increasing the approved radionuclide-specific DCGLs or area factors;
- Increasing the probability of making a Type I decision error above the level stated in the DP;
- Increasing the investigation level thresholds for a given survey unit classification;
- Changing the classification of a survey unit from a more restrictive classification to a less restrictive classification (e.g., Class 1 to Class 2);
- Reducing the coverage requirements for scan measurements; and
- Using statistical tests other than the Sign test or Wilcoxon Rank Sum test for data evaluation.

## **2 ORGANIZATION AND ADMINISTRATION**

See Chapter 9, Project Management and Organization, and Chapter 13, Quality Assurance, of the DP.

## **3 RADIATION PROTECTION**

See DP Chapter 10, Health and Safety Program During Decommissioning.

## **4 NUCLEAR CRITICALITY SAFETY**

See Chapter 10, Health and Safety Program During Decommissioning, and specifically 10.9.1, of the DP.

## **5 EFFLUENT CONTROL AND MONITORING PROGRAM AND ENVIRONMENTAL MONITORING PROGRAM**

See Chapter 11, Environmental Monitoring Program, of the DP.

## **6 RADIOACTIVE WASTE MANAGEMENT**

See Chapter 12, Radioactive Waste Management, of the DP.

## **7 DECOMMISSIONING PLAN**

Westinghouse Electric Company LLC has submitted for NRC approval a DP for the Hematite facility, including a Decommissioning Funding Plan, as required by 10 CFR 70.38, License Conditions 9.E. and 15 (e.g., of SNM-00033, Amendment 53) and §70.25.

## **8 EMERGENCY MANAGEMENT**

The Westinghouse Hematite site is in the progress of decommissioning and has ceased manufacturing operations. Westinghouse has submitted an analysis of the consequences associated with postulated accidents (Westinghouse letter dated August 22, 2002; approved by the NRC in License SNM-00033, Amendment 43). That evaluation showed that the maximum dose to a member of the public due to the release of radioactive material would not exceed the provisions of 10CFR70.22(i)(1)(i). An Emergency Plan is therefore not required to meet the provisions of 10CFR70.22(i)(1)(ii).

## **ATTACHMENT 2**

### **Justification for Additional 10 CFR 70.24 Exemption Criteria in Section 1.6.2 of HDP License Amendment Request**

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

**Docket No. 070-00036**

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**Justification for Additional 10 CFR 70.24 Exemption Criteria in Section 1.6.2 of HDP License Amendment Request**

| <b>Section</b> | <b>Revision</b>   | <b>Basis</b>  |
|----------------|---|---|
| 1.6.2          | <p>Was: “Notwithstanding the requirements of 10 CFR 70.24, the licensed activity involving any materials described below shall be exempted from the “monitoring system” requirements under any of the conditions specified below.”</p> <p>Now: “Notwithstanding the requirements of 10 CFR 70.24, licensed activity shall be exempted from the “monitoring system” requirements under any of the conditions specified below.”</p> | <p><u>Need for Change</u>: The wording needs to be consistent with wording contained in Amendment 59 to SNM-33. As written, the text could be misinterpreted to apply to depleted and natural uranium.</p> <p><u>Safety Basis for Change</u>: This wording clarification does not change the safety basis established for Condition 15 in Amendment 59.</p> |
| 1.6.2.1 Basis  | <p>Was: N/A</p> <p>Now: <u>BASIS</u>: This exemption is necessary because HDP decommissioning operations routinely involve the handling and consolidation of large volumes of solid and/or liquid waste materials that comprise only low (subcritical) concentrations of fissile material. These low concentrations represent no credible risk.</p>   | <p><u>Need for Change</u>: The addition of a summary basis statement assists understanding of the exemption criterion.</p>  |
| 1.6.2.2 Basis  | <p>Was: N/A</p> <p>Now: <u>BASIS</u>: This exemption is necessary because HDP decommissioning operations routinely involve material packaged for transport for disposal, but the material is not yet being transported. This exemption is consistent with the requirements of 10 CFR 70.24, which exempts</p>   | <p><u>Need for Change</u>: The addition of a summary basis statement assists understanding of the exemption criterion.</p>  |

| Section              | Revision   | Basis   |
|----------------------|--|---|
|                      | monitoring systems for special nuclear material that is being transported when packaged in accordance with the requirements of 10 CFR 71. This exemption is consistent with the safety basis of 10 CFR 71 and 49 CFR 173.  |   |
| 1.6.2.3 Notes (3)(b) | <p>Was: “The configuration of each area used to store fissile material, in conjunction with any present fixed shielding (e.g., concrete block walls) between the areas, is demonstrated by neutron transport calculations to result in effective neutron isolation between each area”</p> <p>Now: “The configuration of each area used to store fissile material, in conjunction with any fixed shielding that may be present (e.g., concrete block walls) between the areas, is demonstrated by neutron transport calculations to result in effective neutron isolation between each area.”</p> | <p><u>Need for Change:</u> Wording needs to be changed to more clearly reflect the original intent, which is that fixed shielding is not always required (i.e., distance isolating stored fissile material alone may be sufficient).</p> <p><u>Safety Basis for Change:</u> This wording clarification does not change the safety basis established for Condition 15 in Amendment 59.</p> |
| 1.6.2.3 Basis        | <p>Was: N/A</p> <p>Now: <u>BASIS:</u> This exemption is necessary because HDP decommissioning operations involve exhumation, handling, and interim storage of small quantities of fissile material pending shipment for off-site disposal. These mass limits are set at or below the subcritical mass limits specified in Table 1 and Table 6 of ANSI/ANS-8.1-1998. In summary, the specified mass limits do not exceed the maximum subcritical mass limits for the corresponding <math>^{235}\text{U}</math> enrichment, provided each area used to store fissile materials is deemed to be</p> | <p><u>Need for Change:</u> The addition of a summary basis statement assists understanding of the exemption criterion.</p>  |

| Section       | Revision  | Basis   |
|---------------|---|---|
|               | neutronically isolated from all other areas used to store fissile material.   |   |
| 1.6.2.4 Basis | <p>Was: N/A</p> <p>Now: <u>BASIS</u>: This exemption is necessary because HDP decommissioning operations involve dismantling of buildings and equipment with surfaces that have been characterized and shown to present no credible risk of a criticality event due to their highly dispersed fissile contamination.</p>  | <u>Need for Change</u> : The addition of a summary basis statement assists understanding of the exemption criterion.  |
| 1.6.2.5 Basis | <p>Was: N/A</p> <p>Now: <u>BASIS</u>: This exemption is necessary because HDP has extensive measures established for the safe and secure storage of a Contingency Hot Spot that keep the item safety subcritical. Prior to placement in secure storage the Contingency Hot Spot is thoroughly evaluated, characterized, and packaged so the double contingency principle is inherently met. Secure storage provides a quiescent state that is effectively neutronically isolated.</p> | <u>Need for Change</u> : The addition of a summary basis statement assists understanding of the exemption criterion.  |
| 1.6.2.6 new   | <p>Was: N/A</p> <p>Now: “NCS Exempt Materials not otherwise exempted by paragraph 1.6.2.1 above. ‘NCS Exempt Materials are defined as: ‘Unless otherwise defined and justified within a nuclear criticality safety evaluation, NCS Exempt Material is conservatively defined as material containing</p>   | <u>Need for Change</u> : Condition 15 needs to be consistent with Condition 16B, which invokes Westinghouse letter dated July 5, 2011. Page 9 of Enclosure 5 to this letter defines NCS Exempt Material as “Unless otherwise defined and justified within a nuclear criticality safety evaluation, NCS Exempt Material is conservatively defined as material containing $^{235}\text{U}$ with an average nuclide fissile concentration not exceeding $0.1 \text{ g } ^{235}\text{U/L}$ , or material that comprises no greater than $15 \text{ g } ^{235}\text{U}$ and is |



| Section     | Revision   | Basis  |
|-------------|--|--|
|             | <p><math>^{235}\text{U}</math> with an average nuclide fissile concentration not exceeding 0.1 g <math>^{235}\text{U}/\text{L}</math>, or material that comprises no greater than 15 g <math>^{235}\text{U}</math> and is enclosed within a container with a volume of at least 5 liters.’</p> <p>BASIS: This exemption is necessary because, in addition to the low concentration exemption included in paragraph (1) above, HDP decommissioning operations may involve the identification of item(s) comprising fissile materials in concentrations exceeding the established maximum subcritical concentration, but are nonetheless safely subcritical by virtue of their low fissile mass. Other attributes of the item(s) may assure its subcriticality when established and justified in a nuclear criticality safety evaluation.”</p> | <p>enclosed within a container with a volume of at least 5 liters.”</p> <p>Without this additional criterion, NCS Exempt Material exceeding 1.4 g/L in 5L or larger containers would have to be tracked against the criterion in Condition 15C since the criterion in 15A would be exceeded. This administrative burden for materials already exempt from NCS controls would be unnecessary and would detract from the intent of NCS controls.</p> <p><u>Safety Basis for Change:</u> NCS Exempt Material has been determined to not pose a credible criticality risk before it is exempted from NCS controls. Material that has been determined to not pose a credible criticality risk and allowed to be exempt from NCS controls should not be subject to 10 CFR 70.24 monitoring system requirements.</p> <p>This additional criterion is the same as the criterion evaluated and approved as part of the existing Condition 16B to SNM-33. This addition to Condition 15 does not change the existing safety basis established for Condition 16B in Amendment 59.</p> |
| 1.6.2.7 new | <p>Was: N/A.</p> <p>Now: “Non-NCS Exempt Materials in the process of exhumation from a burial area and characterization (e.g., in a Waste Evaluation Area and/or Material Assay Area), that have an unknown or inestimable fissile material content (e.g., intact drums), provided the following criteria are met:</p> <p>A. In-situ radiological survey equipment does not identify the item as a Contingency Hot Spot, and</p>   | <p><u>Need for Change:</u> These additional criteria are needed to correct a potential situation that fits neither Condition 15 nor Condition 17 of SNM-33. Conditions 15 and 17 were based on HDP planning that was intended to cover all aspects of the remaining decommissioning work with respect to criticality alarm systems. In essence, Condition 15 was to address all work activities except for the contingency situation where measurements identify a contingency hot spot and Condition 17 is carried out.</p> <p>Condition 15 exempts specific material from requiring criticality alarm systems. All of the exemptions applicable to excavation and characterization of buried material are numerically based. Condition 17 invokes the <i>Nuclear Criticality Contingency Plan</i></p>  |

| Section | Revision  | Basis  |
|---------|---|--|
|         | <p>B. The item is not consistent with the calibration basis of the radiological survey equipment used (e.g., dense shielded items, intact drums), and</p> <p>C. A 12 foot separation distance (effective neutronic isolation) is maintained between the exhumed item and other exhumed items that are not exempt from Nuclear Criticality Safety (NCS) control (distance may be between 3 feet and 12 feet if effective neutronic isolation at the smaller distance is demonstrated by neutron transport calculations), and</p> <p>D. The item is moved from exhumation to a Waste Evaluation Area and/or Material Assay Area without being placed in a storage area in-between, and</p> <p>E. Only one container (or one item if it is too large for a collared drum) not exempt from NCS control is allowed at a time in a Waste Evaluation Area or Material Assay Area with minimum separation of 12 feet from other Non-NCS Exempt material (distance may be between 3 feet and 12 feet if effective neutronic isolation at the smaller distance is demonstrated by neutron transport calculations), and</p> <p>F. Controls for a Contingency Hot Spot per Condition 17 are applied if the additional</p> | <p><i>for Remediating Contingency Hot Spots</i> (NCCP). The NCCP requires the use of a criticality monitoring system upon determination that a Contingency Hot Spot is discovered. A Contingency Hot Spot is defined as a discrete item with a <math>^{235}\text{U}</math> mass estimate exceeding 700 g <math>^{235}\text{U}</math>. Thus, this requirement for criticality monitoring system is numerically based.</p> <p>As long as the material can be measured or conservatively estimated, Conditions 15 and 17 meet the planned intent. As long as material is consistent with the burial logs, where the highest <math>^{235}\text{U}</math> content in a single item is 44 g, Conditions 15 and 17 meet the planned intent. However, contingency planning cannot rule out the situation where a Contingency Hot Spot cannot be initially measured during exhumation due to shielding (e.g., metal containers). A shielded Contingency Hot Spot may not be known until exhumed material is hand sorted, evaluated and assayed at an on-site location separate from the burial area. These on-site locations are called the Waste Evaluation Area and the Material Assay Area. HDP criticality safety controls have been established and implemented to maintain criticality safety for a potentially shielded and unknown Contingency Hot Spot until the exhumed waste can be processed and measured. Additional criteria are needed in Condition 15 (License Amendment Request Section 1.6.2.7) to address the situation where a Contingency Hot Spot is not discovered until later in the process.</p> <p><u>Safety Basis for Change:</u> There is no credible risk of a criticality accident associated with buried materials that are exhumed and characterized as described in Section 1.6.2.7. The exhumed material has been buried in an environment potentially comprising other uranium containing materials, moderators (e.g., water), and</p> |

| Section | Revision   | Basis  |
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|         | <p>characterization (e.g., shielding removed) determines that a Contingency Hot Spot is present.</p> <p><u>BASIS:</u> This exemption is necessary to address material in a configuration that prevents the ability to estimate by field instruments its fissile material content at the time of exhumation. This material has a demonstrated history of being subcritical while buried with other fissile containing material, and the specified controls provide additional margin in the material remaining subcritical until evaluation and characterization activities are complete.</p> | <p>reflectors. No criticality accident has occurred for over 40 years in this state. This safety state is improved by the exhumation of the item since it is lifted from being adjacent to other still buried items that could contain <math>^{235}\text{U}</math>, moderators and reflectors. Any risk is further reduced by maintaining the distances described in Section 1.6.2.7 after exhumation to provide effective neutronic isolation for the item.</p> <p>Paragraphs 1.6.2.7A and B restrict the application of Section 1.6.2.7 to specific situations: (1) in-situ surveys do not identify a Contingency Hot Spot, and (2) as-exhumed configurations are not consistent with the calibration basis, e.g., because of metal that shields the radiation from uranium and prevents/limits its detection. These restrictions ensure proper application of Section 1.6.2.7.</p> <p>Paragraphs 1.6.2.7C and E establish a separation distance between exhumed items that provides neutronic isolation. This ensures that a container with an unknown amount of uranium is not brought close enough to another container of uranium to achieve a critical configuration. These restrictions provide the configuration control to ensure a criticality accident is not credible in this decommissioning project.</p> <p>Paragraph 1.6.2.7D prohibits interim storage of containers where the as-exhumed configurations are not consistent with the calibration basis. This paragraph supports neutronic isolation of the unknown amount of <math>^{235}\text{U}</math> in preventing the creation of an inventory of containers with unknown amounts of <math>^{235}\text{U}</math>.</p> <p>Paragraph 1.6.2.7F requires that controls per Condition 17 are applied when a Contingency Hot Spot is determined to be present.</p> |

## **ATTACHMENT 3**

### **Revised Condition 15 in SNM-33**

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

**Docket No. 070-00036**

15. Notwithstanding the requirement of 10 CFR 70.24, the licensee shall be exempted from the "monitoring system" requirements in the areas, and under the conditions specified below:
- A. Low concentration materials (1.4 g U-235/L for solids, and 11.6 g U-235/L for liquids) that are safely subcritical by virtue of their low concentration, irrespective of any other physical conditions, including mass, geometry, moderation, reflection, etc.
  - B. Materials that are contained in authorized packages as defined in NRC/DOT regulations, including 10 CFR 71 and 49 CFR 173.
  - C. Materials within neutronically separate areas containing less than the following isotopic mass amount per separate area:

- 1. 700 g U-235 in uranium enriched to more than 5 wt% U-235/U, and
- 2. 1640 g U-235 in uranium enriched to no more than 5 wt.% U-235/U.

Notes: (1) Structure surfaces within the separate area that contain residual U-235 surface contamination below an areal density of 10 g U-235/ft<sup>2</sup> are not included in the mass amount for the separate area.

(2) Any U-235 in undisturbed subsurface areas is not included in the isotopic mass amount for the separate area.

(3) Neutronically separated areas are to be considered effectively neutronically isolated from all other areas used to store fissile material when either of the following conditions are satisfied:

a. A minimum edge-to-edge separation distance of 12 feet is maintained between each area used to store fissile material; or

b. The configuration of each area used to store fissile material, in conjunction with any ~~present~~ fixed shielding ~~that may be present~~ (e.g., concrete block walls) between the areas, is demonstrated by neutron transport calculations to result in effective neutron isolation between each area.

- D. Residual materials on surfaces of the site buildings or installed equipment in those buildings including removal and transit of those SNM-bearing materials from the buildings. (Any SNM-bearing materials brought into site buildings must satisfy another provision in this Section 1.6.2 to meet the exemption.)
- E. A Contingency Hot Spot that is in secure storage, is neutronically isolated from other SNM, and is intrinsically safe due to two of its physical parameters (e.g., mass, volume, enrichment, geometry, moderation) being in a known state that is sufficient to render the item safely subcritical. The term 'Contingency Hot Spot' is defined in the Nuclear Criticality Safety Contingency Plan for Remediating Contingency Hot Spots. The term 'secure storage' is defined as an area in which dual controlled entry is required as well as tandem operations with oversight.
- F. ~~NCS Exempt Materials not otherwise exempted by paragraph 15.A above. NCS Exempt Materials are defined as: "Unless otherwise defined and justified within a nuclear criticality safety evaluation, NCS Exempt Material is conservatively defined as material containing <sup>235</sup>U with an average nuclide fissile concentration not exceeding 0.1 g <sup>235</sup>U/L, or material that~~

comprises no greater than 15 g<sup>235</sup>U and is enclosed within a container with a volume of at least 5 liters.”

G. Non-NCS Exempt Materials in the process of exhumation from a burial area and characterization (e.g., in a Waste Evaluation Area and/or Material Assay Area), that have an unknown or indeterminate fissile material content (e.g., intact drums), provided the following criteria are met:

1. In-situ radiological survey equipment does not identify the item as a Contingency Hot Spot, and
2. The item is not consistent with the calibration basis of the radiological survey equipment used (e.g., dense shielded items, intact drums), and
3. A 12 foot separation distance (effective neutronic isolation) is maintained between the exhumed item and other exhumed items that are not exempt from Nuclear Criticality Safety (NCS) control (distance may be between 3 feet and 12 feet if effective neutronic isolation at the smaller distance is demonstrated by neutron transport calculations), and
4. The item is moved from exhumation to a Waste Evaluation Area and/or Material Assay Area without being placed in a storage area in-between, and
5. Only one container (or one item if it is too large for a collared drum) not exempt from NCS control is allowed at a time in a Waste Evaluation Area or Material Assay Area with minimum separation of 12 feet from other Non-NCS Exempt material (distance may be between 3 feet and 12 feet if effective neutronic isolation at the smaller distance is demonstrated by neutron transport calculations), and
6. Controls for a Contingency Hot Spot per Condition 17 are applied if the additional characterization (e.g., shielding removed) determines that a Contingency Hot Spot is present.

## **ATTACHMENT 4**

### **Justification for the Revised Condition 15 in SNM-33**

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

**Docket No. 070-00036**

| Condition 15 Paragraph | Revision  | Basis  |
|------------------------|---|--|
| C Notes (3)b.          | <p>Was: “The configuration of each area used to store fissile material, in conjunction with any present fixed shielding (e.g., concrete block walls) between the areas, is demonstrated by neutron transport calculations to result in effective neutron isolation between each area”</p> <p>Now: “The configuration of each area used to store fissile material, in conjunction with any fixed shielding that may be present (e.g., concrete block walls) between the areas, is demonstrated by neutron transport calculations to result in effective neutron isolation between each area.”</p>      | <p><u>Need for Change:</u> Wording needs to be changed to more clearly reflect the original intent, which is that fixed shielding is not always required (i.e., distance isolating stored fissile material alone may be sufficient).</p> <p><u>Safety Basis for Change:</u> This wording clarification does not change the safety basis established for Condition 15 in Amendment 59.</p>  |
| F                      | <p>Was: N/A</p> <p>Now: “NCS Exempt Materials not otherwise exempted by paragraph 15.A above. NCS Exempt Materials are defined as: ‘Unless otherwise defined and justified within a nuclear criticality safety evaluation, NCS Exempt Material is conservatively defined as material containing <math>^{235}\text{U}</math> with an average nuclide fissile concentration not exceeding <math>0.1 \text{ g }^{235}\text{U/L}</math>, or material that comprises no greater than <math>15 \text{ g }^{235}\text{U}</math> and is enclosed within a container with a volume of at least 5 liters.’”</p> | <p><u>Need for Change:</u> Condition 15 needs to be consistent with Condition 16B, which invokes Westinghouse letter dated July 5, 2011. Page 9 of Enclosure 5 to this letter defines NCS Exempt Material as “Unless otherwise defined and justified within a nuclear criticality safety evaluation, NCS Exempt Material is conservatively defined as material containing <math>^{235}\text{U}</math> with an average nuclide fissile concentration not exceeding <math>0.1 \text{ g }^{235}\text{U/L}</math>, or material that comprises no greater than <math>15 \text{ g }^{235}\text{U}</math> and is enclosed within a container with a volume of at least 5 liters.”</p> <p>Without this additional criterion, NCS Exempt Material exceeding <math>1.4 \text{ g/L}</math> in 5L or larger containers would have to be tracked against the criterion in Condition 15C since the criterion in 15A would be exceeded. This administrative burden for materials already exempt from NCS controls would be unnecessary and would detract from the intent of NCS controls.</p> <p><u>Safety Basis for Change:</u> NCS Exempt Material has been determined to not pose a credible criticality risk before it is exempted from NCS controls. Material that has been determined</p> |



| Condition 15 Paragraph | Revision  | Basis  |
|------------------------|---|--|
|                        |   | <p>to not pose a credible criticality risk and allowed to be exempt from NCS controls should not be subject to 10 CFR 70.24 monitoring system requirements.</p> <p>This additional criterion is the same as the criterion evaluated and approved as part of the existing Condition 16B to SNM-33. This addition to Condition 15 does not change the existing safety basis established for Condition 16B in Amendment 59.</p>   |
| G                      | <p>Non-NCS Exempt Materials in the process of exhumation from a burial area and characterization (e.g., in a Waste Evaluation Area and/or Material Assay Area), that have an unknown or inestimable fissile material content (e.g., intact drums), provided the following criteria are met:</p> <ol style="list-style-type: none"> <li>1. In-situ radiological survey equipment does not identify the item as a Contingency Hot Spot, and</li> <li>2. The item is not consistent with the calibration basis of the radiological survey equipment used (e.g., dense shielded items, intact drums), and</li> <li>3. A 12 foot separation distance (effective neutronic isolation) is maintained between the exhumed item and other exhumed items that are not exempt from Nuclear Criticality Safety (NCS) control (distance may be between 3 feet and 12 feet if effective neutronic isolation at the smaller distance is demonstrated by neutron transport calculations), and</li> <li>4. The item is moved from exhumation to a Waste Evaluation Area and/or Material Assay</li> </ol> | <p><u>Need for Change:</u> These additional criteria are needed to correct a potential situation that fits neither Condition 15 nor Condition 17 of SNM-33. Conditions 15 and 17 were based on HDP planning that was intended to cover all aspects of the remaining decommissioning work with respect to criticality alarm systems. In essence, Condition 15 was to address all work activities except for the contingency situation where measurements identify a Contingency Hot Spot and Condition 17 is carried out.</p> <p>Condition 15 exempts specific material from requiring criticality alarm systems. All of the exemptions applicable to excavation and characterization of buried material are numerically based. Condition 17 invokes the <i>Nuclear Criticality Contingency Plan for Remediating Contingency Hot Spots</i> (NCCP). The NCCP requires the use of a criticality monitoring system upon determination that a Contingency Hot Spot is discovered. A Contingency Hot Spot is defined as a discrete item with a <math>^{235}\text{U}</math> mass estimate exceeding 700 g <math>^{235}\text{U}</math>. Thus, this requirement for criticality monitoring system is numerically based.</p> <p>As long as the material can be measured or conservatively estimated, Conditions 15 and 17 meet the planned intent. As long as material is consistent with the burial logs, where the highest <math>^{235}\text{U}</math> content in a single item is 44 g, Conditions 15 and 17 meet the planned intent. However, contingency planning cannot rule</p> |

| Condition 15 Paragraph | Revision  | Basis  |
|------------------------|---|--|
|                        | <p>Area without being placed in a storage area in-between, and</p> <p>5. Only one container (or one item if it is too large for a collared drum) not exempt from NCS control is allowed at a time in a Waste Evaluation Area or Material Assay Area with minimum separation of 12 feet from other Non-NCS Exempt material (distance may be between 3 feet and 12 feet if effective neutronic isolation at the smaller distance is demonstrated by neutron transport calculations), and</p> <p>6. Controls for a Contingency Hot Spot per Condition 17 are applied if the additional characterization (e.g., shielding removed) determines that a Contingency Hot Spot is present.</p> | <p>out the situation where a Contingency Hot Spot cannot be initially measured during exhumation due to shielding (e.g., metal containers). A shielded Contingency Hot Spot may not be known until exhumed material is hand sorted, evaluated and assayed at an on-site location separate from the burial area. These on-site locations are called the Waste Evaluation Area and the Material Assay Area. HDP criticality safety controls have been established and implemented to maintain criticality safety for a potentially shielded and unknown Contingency Hot Spot until the exhumed waste can be processed and measured. Additional criteria are needed in Condition 15 to address the situation where a Contingency Hot Spot is not discovered until later in the process.</p> <p><u>Safety Basis for Change:</u> There is no credible risk of a criticality accident associated with buried materials that are exhumed and characterized as described in Condition 15.G. The exhumed material has been buried in an environment potentially comprising other uranium containing materials, moderators (e.g., water), and reflectors. No criticality accident has occurred for over 40 years in this state. This safety state is improved by the exhumation of the item since it is lifted from being adjacent to other still buried items that could contain <sup>235</sup>U, moderators and reflectors. Any risk is further reduced by maintaining the distances described in Condition 15.G after exhumation to provide effective neutronic isolation for the item.</p> <p>Paragraphs G.1 and G.2 restrict the application of 15.G to specific situations: (1) in-situ surveys do not identify a Contingency Hot Spot, and (2) as-exhumed configurations are not consistent with the calibration basis, e.g., because of metal that shields the radiation from uranium and prevents/limits its detection. These restrictions ensure proper application of paragraph 15.G.</p> <p>Paragraphs G.3 and G.5 establish a separation distance between</p> |

| Condition 15<br>Paragraph | Revision | Basis  |
|---------------------------|----------|--|
|                           |          | <p>exhumed items that provides neutronic isolation. This ensures that a container with an unknown amount of uranium is not brought close enough to another container of uranium to achieve a critical configuration. These restrictions provide the configuration control to ensure a criticality accident is not credible in this decommissioning project.</p> <p>Paragraph G.4 prohibits interim storage of containers where the as-exhumed configurations are not consistent with the calibration basis. This paragraph supports neutronic isolation of the unknown amount of <math>^{235}\text{U}</math> in preventing the creation of an inventory of containers with unknown amounts of <math>^{235}\text{U}</math>.</p> <p>Paragraph G.6 requires that controls per Condition 17 are applied when a Contingency Hot Spot is determined to be present.</p> |