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September 3, 2009

SUBJECT: REPLY TO A NOTICE OF VIOLATION
REFERENCE: REPORT NO: 70-1151/2009-201

References: 1) Letter, Patricia Silva to Cary Alstadt, Inspection Report No: 70-1151/2009-201 and Notice of Violation, April 23, 2009
2) Reply to a Notice of Violation, Report No: 70-1151/2009-201, Westinghouse LTR RAC-09-42, May 20, 2009
3) EA-09-185, Response to Disputed Violation 70-1151/2009-201-01, August 7, 2009

Pursuant to the provisions of 10 CFR 2.201, Westinghouse Electric Company LLC (WEC) herein provides formal response to your letters of April 23, 2009 (Ref. 1), regarding your inspection of the Columbia Fuel Fabrication Facility conducted onsite March 23-26, 2009.

WEC does not contest the violation and the reasons for the violation and corrective actions to prevent recurrence are addressed in the attached.

WEC had contested this enforcement action in Reference 2. Reference 3 addressed the WEC response and determined the cited violation was valid and requires corrective action to prevent recurrence. WEC herein provides additional information on our reasoning and basis for originally disputing the Notice of Violation. The underlying issue of this cited violation is the classification of passive design features noted in the Criticality Safety Evaluations (CSE's) pertaining to incredibility arguments. WEC and the other fuel cycle industry facilities have noted a differing of opinion in the interpretation of 10 CFR Part 70 when addressing passive design features. WEC is engaged in a Nuclear Energy Institute initiative to address this issue.

Should you have any questions or require additional information, please telephone Marc A. Rosser of my Staff at (803) 647-3174.

Sincerely,

09/03/09

J.L. NORRELL FOR C.D. ALSTADT

Cary D. Alstadt, Manager
Columbia Fuel Fabrication Facility
Westinghouse Electric Company LLC

Attachment: Appendix A

IE07
RGN II

cc: U. S. Nuclear Regulatory Commission
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Atlanta, Georgia 30303-3415

U. S. Nuclear Regulatory Commission
Chief, Technical Support Branch
Division of Fuel Cycle Safety and Safeguards
Nuclear Material Safety and Safeguards
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Director, Office of Enforcement
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

APPENDIX A

WESTINGHOUSE RESPONSE TO NOTICE OF VIOLATION

A.1 Contested Violation

In an April 23, 2009, Inspection Report (70-1151/2009-201) and a Notice of Violation, NRC stated that during a U.S. Nuclear Regulatory Commission (NRC) inspection from March 23 through 26, 2009, a violation of NRC requirements was identified. NRC described the violation as listed below.

Safety Condition S-1 of Special Nuclear Material License No. 1107 requires that material be used in accordance with the statements, representations, and conditions in the license application dated June 27, 2007, and supplements thereto.

Section 4.1.2 of the License Application states, in part, that the ISA "is developed in accordance with methods acceptable to the Columbia Fuel Fabrication Facility (CFFF) management, as approved by the Handbook [titled "Baseline ISA and ISA Summary Handbook"]...Subsection 7.2 activities are specific commitments to the NRC and must be executed, as described, for each ISA."

Section 7.2.3 of the ISA Handbook states, in part: "Any one of the following three independent acceptable sets of qualities could define an event as not credible, and therefore do not have to be considered in the ISA...Process deviations for which there is a convincing argument, given physical laws, that they are not possible, or are unquestioningly extremely unlikely. (The validity of the argument must not depend on any feature of the design or materials controlled by the facility's system of safety significant controls (SSCs) or management measures.)"

Contrary to the above, on and before March 23, 2009, the licensee performed Criticality Safety Evaluations (CSEs) in which events were classified as incredible based on the dependence on features of the design or materials controlled by the facility's system of SSCs or management measures.

Three examples were provided and this was identified as a Severity Level IV Violation (Supplement VI). The specific examples follow:

"..... the licensee performed Criticality Safety Evaluations (CSEs) in which events were classified as incredible based on the dependence on features of the design or materials controlled by the facility's system of SSCs or management measures.

A. CSE-3-G, "UF6 Cylinder Vaporizer and Condensate System Upsets," Rev. 0, dismissed criticality in the vaporizer trench as incredible based on dimensions of the trench and a volume limiter in the trench sump.

B. CSE-03-M, "Conversion Quarantine Tank System," Rev. 3, dismissed criticality in the non-favorable geometry Q-Tanks based on the presence of Raschig rings.

C. CSE-03-E, "CSE for the CFFF Decanter (De-Watering Decanter D-x07, Decanter Solids Discharge Receiver Tank V-x19, Intermediate Liquid Discharge Receiver Tank V-x12)," Rev. 1, dismissed criticality in the nitrogen system based, in part, on the presence of two valves on the nitrogen supply line.

A.2 Basis for Contesting

The following information was provided in response to Violation (VIO) 70-1151/2009-201. The ISA Handbook defines the system Integrated Safety Analysis (below) as being comprised of the Criticality Safety Evaluation (CSE) and the additional baseline documentation [such as fault trees, fire hazard analysis, radiological consequences analysis, etc.].

"System Integrated Safety Analysis (ISA) ==> CSE + a comprehensive version of the baseline document described within this Handbook"

Criticality Safety Evaluations are therefore recognized in the handbook as the ISA baseline document for the nuclear criticality safety discipline. The applicable CSE for the systems are summarized and endorsed specifically by reference in the published system Integrated Safety Analysis. This is consistent with analyses for the other safety disciplines and safety basis documents as well, such as the Process Hazards Analysis (PHA), or Radiological Consequence Calculations. The system ISA summarizes and references the safety basis documents.

The section of the ISA handbook (7.2.3) described within the violation is the initial (*Unmitigated*) screen to determine if an ISA is even warranted for an operation. The screen is conducted during the initial hazard identification described in Section 7.1.5 and 7.1.6 of the Handbook. In the case of the three (3) cited examples, this initial screening identified the potential for credible events. Thus the ISA considered these events and appropriate analysis was completed; in this case the referenced Criticality Safety Evaluations were conducted. As such, the requirement to consider the events within the ISA was satisfied and no violation occurred as stated in VIO 70-1151/2009-201-01.

As noted by the inspection team, the referenced CSEs were completed in accordance with WEC procedures and SNM-1107 License requirements. The detailed analysis conducted within the CSEs is in accordance with criteria established within procedure NCS-010. NCS-010 defines and allows for the use of the incredibility arguments within the stated examples. NCS-010 is compliant with SNM-1107 License Application Section 6, Nuclear Criticality Safety Program.

A.3 NRC Response (Summary of Reference 3)

The following discussion addresses each of WECs reasons for denying the violation above:

1: CSEs are the baseline document for the nuclear criticality safety discipline:

This fact is not relevant to the non-compliance cited in the Notice. At issue is not whether these events were considered as part of the initial screening process, or whether that screening was documented in the ISA, but the technical basis on which those events were determined to be incredible.

2: Section 7.2.3 of the ISA Handbook applies to the initial screening as conducted during the initial hazard identification to determine if an ISA is even warranted for an operation:

Section 7.1 of the ISA Handbook is the section concerned with the initial hazard identification process. With regard to the ISA Handbook, Section 4.1.2 of the License Application states:

"Section 7.2 activities are specific commitments to the NRC and must be executed, as described, for each ISA". ISA Handbook Section 7.2, "Accident Sequence Evaluation," states that this section "describes the process for analyzing all credible accident sequences that have the potential to result in intermediate or high consequences." Criticality is considered a high consequence event, and therefore covered by this section of the ISA Handbook. ISA Handbook Figure 7.1 shows likelihood analysis is performed for all events that have high unmitigated consequences. The determination of credibility is an integral part of the likelihood analysis process. ISA Handbook Section 7.2.3, "Accident Sequence Likelihood Scoring," states, in part:

To ensure an acceptable level of risk at a facility, 10 CFR 70.61 requires that sufficient controls be in place so that occurrence of any credible high consequence event is "highly unlikely," and the occurrence of any credible intermediate consequence event is "unlikely."

Any one of the following three independent acceptable sets of qualities could define an event as not credible, and therefore do not have to be considered in the ISA:

- An external event for which the frequency of occurrence can conservatively be estimated as less than once in a million years
- A process deviation which consists of a sequence of many unlikely human actions or errors for which there is no reason or motive
- Process deviations for which there is a convincing argument, given physical laws, that they are not possible, or are unquestionably extremely unlikely. (The validity of the argument must not depend on any feature of the design or materials controlled by the facility's system of SSCs or management measures.) (Emphasis added)

The likelihood estimation procedure consists of assigning index scores to the initiating event element and mitigating event elements in each accident sequence and calculating an accident sequence likelihood score.

The title and contents of Section 7.2 of the ISA Handbook (see excerpt above) indicate that this section pertains to the whole process of evaluating accident sequences, and not just to the initial screening of sequences (whereas Section 7.1 is the section concerned with the initial hazard identification process). Section 7.2.3 (which contains the criteria for credibility cited in the Notice) is a subsection of Section 7.2, and is therefore part of the process of analyzing the sequences that were previously identified. This is more clearly illustrated in Figure 7.1 of the ISA Handbook. The decision box that includes "Unmitigated Accident Sequence Credible?" is part of the penultimate step (entitled "likelihood analysis") in the accident sequence evaluation process, and not part of the first step (entitled "accident sequence generation").

Also, Table 1 of the ISA Handbook contains a cross-reference between regulatory requirements and those sections of the ISA Handbook intended to implement them. According to this table, Section 7.2.3 is the section that implements 10 CFR 70.65(b)(9), which states that the ISA Summary must contain "a description of the definitions of unlikely, highly unlikely, and credible as used in the evaluations of the integrated safety analysis." From this, it is apparent that the definitions cited in the Notice, as excerpted above, are the definitions intended to meet 10 CFR 70.65(b)(9). There are no other definitions of these terms in the ISA Handbook.

3) The initial screening identified the potential for credible events and so the ISA appropriately considered and analyzed these events:

The violation concerns whether the analysis of the events mentioned in the Notice was conducted in accordance with the ISA Handbook as required by the License Application. The analysis incorrectly determined that the three cited events were incredible, which resulted in the failure to identify SSCs as IROFS and include the events in the ISA Summary. The determination of incredibility was incorrect in that, contrary to ISA Handbook Section 7.2.3, it did "depend on features of the design or materials controlled by the facility's system of SSCs or management measures."

4) The detailed CSE analyses were conducted in accordance with procedure NCS-010, which allows for the use of the incredibility argument within the stated examples:

The violation does not concern non-compliance with procedure NCS-010. The ISA Handbook is specifically committed to in the License Application and must be complied with regardless of what any other internal procedure may permit. As stated in Inspection Report 70-1151/2009- 201: "The licensee stated that it did not follow the ISA Handbook, but rather followed the (less explicit) guidance in the NCS Handbook and in procedure NCS-010,'Categorizing Potential Criticality Scenarios and Criticality Safety Significant Controls.'" The violation cited in the Notice is for non-compliance with the more specific requirements of the ISA Handbook.

A.4 WEC Additional Information on the issue

The underlying issue of this cited violation is the classification of passive design features noted in the Criticality Safety Evaluations (CSE's) pertaining to incredibility arguments. NRC and WEC interpretation of Section 7.2.3 of the ISA Handbook is currently not in alignment. NRC interpretation as WEC understands it is that such system features are required to be IROFS. WEC and the other fuel cycle industry facilities have noted a differing of opinion in the interpretation of 10 CFR Part 70 when addressing passive design features. WEC is engaged in a Nuclear Energy Institute initiative to address this issue. WEC is also aware NRC is cognizant of this difference of opinion, and that the overall topic of "design features" is scheduled to be discussed in the near future at an NEI sponsored conference with NRC representatives.

More specific to this exact violation, the ISA handbook section called out in the violation is very specific to "initiating events" versus "accidents". In the case of the described procedure used at CFFF to comply with the ISA Handbook and 10 CFR70, the initiating event was properly evaluated in the identified CSEs, and the result of that evaluation was that an accidental criticality was not credible. The CSEs do not claim that the potential initiating event was not credible. The CSEs were conducted in full compliance with the requirements contained within the ISA Handbook.

The pertinent sections of the ISA Handbook as they relate to this violation are repeated below. Note that while "incredible" is not defined, Section 6.3.2 of the handbook outlines the information contained in the CSEs for those accidents that are classified as not credible.

6.3 NUCLEAR CRITICALITY SAFETY AND MEASUREMENT CONTROL SAFEGUARDS ANALYSIS

This section provides guidelines for performing a Criticality Safety Evaluation (CSE) for the ISA. Nuclear criticality safety measurements are under the same level of safeguards as measurement control and accounting (MC&A) programs. The level of detail for a particular CSE will be determined based on the complexity of the system or proposed change and will be documented by the nuclear criticality safety function engineer and approved by the nuclear criticality safety function manager. Therefore, the scope and content of any particular CSE will reflect the needs and characteristics of the system being analyzed and will include the appropriate information in the documentation.

6.3.1 TERMS, DEFINITIONS, RULES, AND ASSUMPTIONS
To document a safety analysis in a consistent and structured manner, the following terms and definitions are to be used:

Analysis (Described in License): (Documentation may be called a criticality safety analysis or a criticality safety evaluation.) The name given to the work that is done to (1) establish the minimum critical configuration of a given system, equipment, or component and (2) determine the margin of subcriticality of same when varying different controlled parameters.

Initiating Event (IE): An event that challenges a criticality safety control and, therefore, a criticality safety limit. Examples of IEs are listed in Table 6.2.

Section 7.2.3 of the ISA handbook states: The likelihood estimation procedure consists of assigning index scores to the initiating event element and mitigating event elements in each accident sequence and calculating an accident sequence likelihood score. The ISA Team should select the best estimate index scores for these elements. Table 7.2 provides guidance for scoring the frequency of initiating events, considering the failure of prevention measures to prevent the accident initiation. When applying the frequency scores in Table 7.2, the following definitions apply:

Highly Unlikely events are those with an index score less than (more negative than) or equal to -4.

Unlikely events are those with index scores less than or equal to -2 and greater than -4 (i.e., $-4 < \text{Score} \leq -2$).

Section 6.3.2 of the ISA handbook contains the following description of what is expected within a CSE:

Events Determined to Be Not Credible
This subsection lists the process upsets that are not credible. The bounding assumptions for the system are derived from these conditions. This subsection may also give a qualitative explanation for the process upsets that are classified as not credible. Some may, in fact, be possible, but the narrative should explain how certain factors (system arrangement, physical elevation, total amount of material available to system, time factors required for some process upsets to develop, structural strength of vessels, etc.) render them not credible. (elements of system design feature added for emphasis)

The expectation of the ISA handbook is clearly to evaluate the "system" under consideration, as is the case with the CSEs identified in the violation. The system description is a required element of the analysis and the SSC designation ensures it is configuration controlled. The analyst must identify the boundaries of the CSE as it relates to the system being analyzed. The role of the SSC designation within the incredibility section of the CSEs is to clearly define that configuration control management measures apply to that part of the system. As long as that passive design remains in place, the incredibility of an accident (consequence occurs) is assured. In effect, this defines the system arrangement for which the analysis was conducted and the "Not Credible" determination remains valid. The "system" is not in place to prevent or mitigate the consequence, the "system" is the potential source of the consequence. If the operation of the system could result in a credible accident (consequence) then it would require the installation of IROFS to prevent or mitigate the consequence to ensure the performance requirements remained satisfied.

Section 7.2.5 of the ISA Handbook states in part:

SSC Management Systems
"The ISA process alone cannot ensure the effective design and implementation of the controls and their proper operation. Other elements of CFFF's safety program are relied on to provide this assurance. "

Appropriate management measures to ensure that the safety controls implemented satisfy the design criteria are identified in the License Application and the ISA Summary.

Table 1 of the ISA Handbook, in addition to the line item cited in Reference 3, also includes the following:

Describe Safety Significant Controls (SSCs)	70.65(b)(6)	3.4.3.2(6)	7.2.5
Demonstrate compliance with 10 CFR 70.61	70.65(b)(6)	3.4.3.2(4) and (6)	7.2.4
Describe SSC management measures	70.65(b)(4)	3.4.3.2(4B) and (6)	7.2.5

Section 7.2.4: Accident Sequence Risk Evaluation

The risk zone assigned to an accident sequence is determined by where it is located on a matrix of overall likelihood index and its consequence level. Table 7.4 provides accident sequence risk acceptance criteria. Accident sequences with unacceptable risk (i.e., Risk Zones 1 and 2) require that one or more SSCs be identified and considered for IROFS designation in the risk evaluation that will move the risk into the acceptable risk area (Risk Zone 3).

Based upon the analysis conducted within the CSEs, the risk zone for the identified sequences would be compared against the following table 7.4 reproduced below. Based on the High Consequence affiliated with a Criticality Accident, and the incredibility of such an accident for the analyzed system, the risk would be acceptable and no IROFS would therefore be required.

Table 7.4 Risk Analysis Table

Overall Likelihood of Accident

Severity of Consequences		Highly Unlikely	Unlikely		Not Unlikely		
		-4	-3	-2	-1	0	1
High	6						
	5						
Intermediate	4						
	3						
Low	2	BELOW SEVERITY THRESHOLD					
	1						
	0						

= Risk Zone 1 (Does not meet performance criteria; unacceptable risk for continued operation)

= Risk Zone 2 (Meets performance criteria but unacceptable risk for long-term operation)

= Risk Zone 3 (Meets performance criteria; acceptable risk)

A.4 Conclusion

WEC believes that our interpretation of the regulations is correct, and is also consistent with other fuel cycle facilities subject to 10 CFR Part 70 requirements. WEC also believes the analysis contained within the CSEs is consistent and compliant with the SNM-1107 License Application and ISA Handbook requirements. However, WEC is aware of the differing of opinion with the NRC on this overriding issue of the treatment of passive design features. That is why WEC is committed to working with NRC to resolve this issue, ideally through the proposed NEI/NRC working group.

For purposes of the specific examples, noted:

A. CSE-3-G, "UF6 Cylinder Vaporizer and Condensate System Upsets," Rev. 0, dismissed criticality in the vaporizer trench as incredible based on dimensions of the trench and a volume limiter in the trench sump.

B. CSE-03-M, "Conversion Quarantine Tank System," Rev. 3, dismissed criticality in the non-favorable geometry Q-Tanks based on the presence of Raschig rings.

C. CSE-03-E, "CSE for the CFFF Decanter (De-Watering Decanter D-x07, Decanter Solids Discharge Receiver Tank V-x19, Intermediate Liquid Discharge Receiver Tank V-x12)," Rev. 1, dismissed criticality in the nitrogen system based, in part, on the presence of two valves on the nitrogen supply line.

WEC will institute the corrective actions listed below to restore compliance:

1) The dimensions of the trench and a volume limiter in the trench sump and affiliated configuration management program will be designated IROFS for purposes of compliance with the CSE and current NRC interpretation of the ISA Handbook.
2) The Raschig rings and affiliated testing and configuration management will be designated IROFS for purposes of compliance with the CSE and current NRC interpretation of the ISA Handbook.
3) The two valves on the nitrogen supply line and affiliated configuration management program will be designated IROFS for purposes of compliance with the CSE and current NRC interpretation of the ISA Handbook.

WEC will update the onsite documentation (i.e., sketches, procedures) within 30 days of the issue of this letter to reflect the IROFS designations listed above thus bringing the facility into compliance.

WEC will update the ISA summaries during the annual update submittal to reflect the IROFS listed above. By regulation this will be completed by January 30, 2010

WEC will clarify the ISA Handbook through revision and revision of the NCS Manual (if needed) to better define the classification of passive design features used in incredibility arguments. This action will be taken after the results of the NRC/NEI working group meeting(s) and clarified after the final outcome of those discussions.