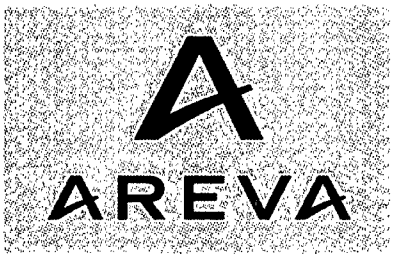

October 3, 2008
REL:08:038

U.S. Nuclear Regulatory Commission
Director, Office of Nuclear Material Safety and Safeguards
ATTN: Document Control Desk
Washington, DC 20555-0001

Gentlemen:

**Subject:** **Request for Additional Information (RAI) Responses Pertaining to Nuclear Criticality Safety and Management Measures (Chapters 5 and 11, respectively, of License No. SNM-1227 Renewal Application)**

Ref.: 1. Letter, P. J. Habighorst, "Request for Additional Information Regarding the Safety Evaluation Report for AREVA NP Inc. Richland Fuel Fabrication Facility License Renewal; License No. SNM-1227, Docket No. 70-1257 (TAC L31975)," July 31, 2008.

Ref.: 2. Letter, R. E. Link to USNRC Document Control Desk, "Submittal of License Renewal Application and Environmental Report for AREVA NP Inc. Richland Fuel Fabrication Facility; License No. SNM-1227, Docket No. 70-1257," October 24, 2006.

Ref.: 3. Letter, R. E. Link to USNRC Document Control Desk, "RAI Request dated July 31, 2008 (TAC L31975)," August 21, 2008

Via Ref. 1, the NRC conveyed RAIs pertaining to a number of chapters in AREVA NP's pending license renewal application for License No. SNM-1227, submitted to the NRC via Ref. 2. Via Ref. 3, AREVA requested that the due date for submitting all the RAIs be extended to October 3, 2008; however, the NRC has since indicated that they would be receptive to AREVA's submittal of RAI responses prior to that date on a chapter-by-chapter basis as they are completed. Accordingly, please find attached AREVA's responses to RAIs pertaining to Chapter 5, *Nuclear Criticality Safety*, and Chapter 11, *Management Measures*, of the Richland license renewal application.

With respect to Chapter 5, responses are being provided for 39 of the 42 RAIs. As discussed in our most recent (September 25, 2008) conference call relative to the Criticality Safety RAIs, additional time will be needed to complete our responses to RAI Nos. 4, 31, and 32. Accordingly, we are requesting that the due date for submittal of these three responses be extended to October 31, 2008.

Responses to the RAIs for Chapter 11 are as discussed in our conference call of October 1, 2008. As part of that call, AREVA also responded to the NRC's questions relative to the coverage of the site's licensed activities by procedures. AREVA affirmed its commitment to conduct activities involving licensed SNM and/or IROFS in accordance with approved procedures. This commitment,

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along with additional commitments relative to procedures development and implementation, are set forth in Section 11.4 of the license application.

Also as part of the October 1, 2008 conference call, AREVA raised the issue of new commitments made in the license application that will require time to fully phase in once approval of the license is received. An additional concern is the question of the applicability of new requirements retroactively versus going forward. These issues are most apparent relative to certain criticality safety program commitments, but could potentially apply to any technical safety area within the license. AREVA will require additional discussion/clarification for these issues.

If you have any questions, please contact me on 509-375-8409.

Very truly yours,

Robert E. Link, Manager
Environmental, Health, Safety & Licensing

REL:jrs

Enclosures

cc: Rafael L. Rodriguez
U.S. Nuclear Regulatory Commission
Fuel Manufacturing Branch, Mail Stop EBB-2-C-40
Division of Fuel Cycle Safety and Safeguards
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555-0001

## RAI RESPONSES – AREVA NP RICHLAND (SNM-1227), October 3, 2008

### Chapter 5: Nuclear Criticality Safety

1. Revise Chapter 3 of the license application to include a commitment to follow the Integrated Safety Analysis (ISA) methodology that was reviewed and approved by the NRC by letter dated October 25, 2007. This should include the consequence, likelihood, and overall risk determinations and the definitions of "unlikely", "highly unlikely", and "credible". This information is necessary to determine compliance with the requirements in 10 CFR 70.62(a).

   **AREVA Response:**

   AREVA will change the first sentence of 3.1 to read "AREVA NP Inc. (AREVA NP) maintains an ISA Program as described in the ISA Summary approved by the NRC by letter dated October 25, 2007 or as subsequently approved."

2. Commit to maintain an ISA for all facilities located at the Richland site at which licensed material is transported, stored, or processed, as well as all other facilities or operations that might present a significant hazard to the facilities at which special nuclear material (SNM) is located. Section 3.1 states that the ISA program is maintained only for those areas that involve, or could impact, the safe handling of SNM in quantities greater than 1400 g U-235. The revision should indicate that the ISA applies to all quantities of SNM. This information is necessary to determine compliance with the requirements in 10 CFR 70.60 and 70.62(c).

   **AREVA Response:**

   AREVA will change the first sentence of Section 3.1 to read as follows:

   "AREVA NP Inc. (AREVA NP) maintains an ISA program for areas of the Richland Horn Rapids Road (HRR) facility that involve, or could impact the safe handling of, SNM as described in the ISA Summary approved by the NRC by letter dated October 25, 2007 or as subsequently approved."

3. Revise Section 5.1 of the license application to indicate that the nuclear criticality safety (NCS) program applies to all SNM activities without exception. Section 5.1 states that the NCS program applies to SNM activities at the Richland site, except where:

   i. SNM quantity is less than or equal to 1400 g $^{235}U$; or

   ii. The areal density is less than or equal to 45% of a critical areal density and double batching the material is not credible; or

   iii. The fissile concentration or density does not exceed the amount listed in 49 CFR 173.453; or

   iv. SNM is contained within NRC/DOT-approved shipping packages, arranged in array(s), with a total Criticality Safety Index of less than 100 and spaced at least 12 feet from other SNM-bearing packages or material.

This information is necessary to determine compliance with the requirements in 10 CFR 70.62(a)

**AREVA Response:**

AREVA has modified the first paragraph of Section 5.1 of the application as follows:

"AREVA NP Inc. (AREVA NP) maintains a nuclear criticality safety program that applies to special nuclear material (SNM) activities at the Richland Horn Rapids Road site."

4. Commit to the ANSI/ANS-8 NCS standards as endorsed by the NRC in RG 3.71, Revision 1, which are applicable to activities at AREVA. Alternatively, justify how the commitments in the license application meet the intent of the standard. The specific version of each standard (e.g., ANSI/ANS-8.1-1998) must be indicated as part of the commitment. The following standards should be addressed as part of your response:

   i. ANSI/ANS-8.1-1998. License application only commits to parts of the 1983 version of the standard.

   ii. ANSI/ANS-8.3-1997. License application commits to the1986 version of the standard.

   iii. ANSI/ANS-8.7-1998. License application does not mention standard.

   iv. ANSI/ANS-8.14-2004. License application does not mention standard. It is not clear if neutron absorber additives would include the use of soluble neutron absorbers.

   v. ANSI/ANS-8.17-2004. License application does not mention standard.

   vi. ANSI/ANS-8.19-2005. License application does not mention standard.

   vii. ANSI/ANS-8.20-1991. License application does not mention standard.

   viii. ANSI/ANS-8.21-1995. License application does not mention standard.

   ix. ANSI/ANS-8.23-1997. License application does not mention standard.

   Revise the license application to specify the version of the ANSI/ANS standards that are being committed to, including the following instances:

   i. Section 5.3.2 reference to ANSI/ANS-8.1 is not dated.

   ii. Section 5.4, third bullet, refers generically to ANSI/ANS standards.

   iii. Section 5.4.2.6, item #2, refers generically to ANSI standards.

   iv. Section 5.4.2.14 reference to ANSI/ANS-8.5 is not dated.

   This information is necessary to determine compliance with the requirements in 10 CFR 70.22(a)(8).

   **AREVA Response:**

   Response to be provided on or before October 31, 2008.

5. Revise the license application to include a definition of credible. The term credible is used repeatedly in Chapter 5 of the license application and in 10 CFR 70.61.

**AREVA Response:**

This definition is included in the NRC-approved ISA Summary. 10CFR 70.65 (b) states that the ISA summary shall not be incorporated into the license. In 70.65 (b) (9), it states that the ISA summary must contain "a description of the definitions of unlikely, highly unlikely, and credible as used in the evaluations in the integrated safety analysis. Repeating this definition in the license application is unnecessary and the regulation supports this information residing in the ISA summary.

6. Revise the description of the double contingency principle in Section 5.1 of the license application so that it is clearly consistent with the commitment to the double contingency principle in Section 5.3.2.

Section 5.1 states: "Where practicable, process designs will incorporate sufficient factors of safety to require at least two unlikely, independent, and concurrent changes in process conditions before a criticality accident is possible."

Section 5.3.2 states: "Process designs shall incorporate sufficient factors of safety during normal and credible abnormal conditions to require at least two unlikely, independent, and concurrent changes in process conditions before a criticality accident is possible."

This information is necessary to determine compliance with the requirements in 10 CFR 70.61(d).

**AREVA Response:**

AREVA will change the wording in section 5.3.2 to be consistent with Section 5.1. NUREG 1520 5.4.3.4.4 (7) states that the acceptance criteria listed in this section are met if, "The applicant commits to implement an NCS program that ensures double contingency protection, when practicable." The revised wording in Section 5.3.2 is as follows:"

"To ensure accidental nuclear criticality is highly unlikely, the double contingency principle as defined in the American National Standard ANSI/ANS-8.1 shall be followed in establishing nuclear criticality safety for equipment, systems and operations. Where practicable, process designs shall incorporate sufficient factors of safety during normal and credible abnormal conditions to require at least two unlikely, independent, and concurrent changes in process conditions before a criticality accident is possible."

7. Section 5.3.1 of the license application states: "Processes are examined in the "as-built" condition to validate the safety design and to verify the installation." Revise this section to indicate the function or manager responsible for ensuring this activity has been performed.

This information is necessary to determine compliance with the requirements in 10 CFR 70.22(a)(6).

**AREVA Response:**

AREVA will modify the last sentence of the first paragraph in Section 5.3.1 to read as follows:

"Processes are examined in the "as-built" condition by qualified personnel as specified by procedure to validate the safety design and to verify the installation."

8. Revise Section 5.3.2 to clarify whether or not the double contingency principle will be used to meet the criticality related requirements of 10 CFR 70.61(b), and if controls established for double contingency will be declared as items relied on for safety (IROFS). Section 5.3.2 states that the double contingency principle shall be followed to ensure that an accidental nuclear criticality is highly unlikely.

**AREVA Response:**

AREVA has committed to implement the double contingency principle and to meet the requirements of 10CFR 70.61(b). However, this does not necessarily mean that all controls required to implement the double contingency principle will be listed as IROFS. To eliminate any confusion in this regard, the first paragraph of Section 5.3.2 will be modified as follows:

"The double contingency principle as defined in the American National Standard ANSI/ANS-8.1-1998 shall be followed in establishing nuclear criticality safety for equipment, systems and operations. Where practicable, process designs shall incorporate sufficient factors of safety during normal and credible abnormal conditions to require at least two unlikely, independent, and concurrent changes in process conditions before a criticality accident is possible. Additionally, accidental nuclear criticality will be demonstrated to be at least highly unlikely."

9. Commit to consider heterogeneous effects on parameters when performing Nuclear Criticality Safety Analyses (NCSAs). This information is necessary to determine compliance with the requirements in 10 CFR 70.61(d).

**AREVA Response:**

AREVA believes that this is already covered by the current commitment in 5.4.2.2. Nevertheless, AREVA will modify this section as follows:

"When establishing limits on controlled parameters for credible abnormal conditions, conditions that are not controlled or limited shall be considered to be in the optimum credible condition for causing criticality. These parameters include heterogeneity. Less than optimum conditions can be used when historical data and/or sound engineering determinations can be applied to justify a less reactive condition. Data may be obtained by controlled experimentation.

"When less than the optimum credible conditions for causing criticality are used, the justification for such use shall be documented in a peer-reviewed and approved safety analysis."

10. Revise the license application to indicate that activities with SNM will not be conducted until the appropriate NCSAs are completed and approved. Section 5.3.4 states that: "operations or processes where the NCS program applies shall be determined by a documented and peer reviewed NCSA to be adequately subcritical." The license application does not indicate if the NCSA needs to be completed or be approved by the NRC prior to the start of activities using SNM.

    This information is necessary to determine compliance with the requirements in 10 CFR 70.61(d).

    **AREVA Response:**

    It has always been AREVA's practice and expectation that activities with SNM will not be conducted until the appropriate NCSAs and associated implementing documentation are completed and approved as required. AREVA will make the following clarification to the first paragraph of Section 5.3.4.

    "Operations or processes where the NCS program applies shall be determined by a documented peer reviewed and approved NCSA to be adequately subcritical prior to the start of activities with SNM." Both normal and credible abnormal conditions shall be evaluated and accidental nuclear criticality shall be demonstrated to be at least highly unlikely."

11. Commit to establish Nuclear Criticality Safety Specifications (NCSSs) based on current NCSAs. Commit to implement NCS limits and controls based on current NCSAs and NCSSs. Section 5.3.5 in the license application states that NCSSs describe the NCS requirements implemented by user organizations, and are prepared based on the limits established in NCSAs, and they can be a section of an NCSA or a separate document. However, the license application does not indicate that NCSSs shall be based upon current NCSAs, and that the limits and controls will be implemented based on current NCSAs and NCSSs. This information is necessary to determine compliance with the requirements in 10 CFR 70.61(d).

    **AREVA Response:**

    Approved and applicable NCSAs are the safety basis for NCSSs. AREVA will clarify the NCSSs, when based on NCSAs, are only based on approved and applicable NCSAs. It should be noted that some NCSSs implement end user requirements that are not based on a safety analysis. For example, the requirements for marking storage array boundaries and moderator control areas, and plant wide criticality safety guide rules such as "never operate on guesswork or 'hunches' and If any unusual conditions occur; stop work at once and notify supervision" are implemented via NCSSs but are not based on a safety analysis. The clarified section 5.3.5 is as follows:

    "NCSSs established to document controls for SNM processing systems and storage areas shall be prepared based on limits established in approved and applicable nuclear criticality safety analyses. The NCSSs may be a section of the NCSA or a separate document. NCSSs shall contain, as appropriate, the following information: work location(s), equipment covered, SNM type allowed in the process or storage area, and the associated NCS limits and controls."

12. Commit to have NCS staff conduct and document (e.g., using checklists, log sheets, etc.) surveillance inspections (i.e., walkthroughs) to determine that activities involving SNM are being conducted in accordance with the established NCS limits and controls. These inspections should be conducted on a weekly basis such that all SNM activities are inspected at least every two weeks, unless an alternative schedule is justified and described in the license application. The current license application does not describe NCS surveillance inspections.

    This information is necessary to determine compliance with the requirements in 10 CFR 70.62(d). Additionally, Section 5.4.3.3(3)(b) of NUREG-1520, "Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility," requests that applicants commit to conduct and document weekly NCS walkthroughs of all operating SNM process areas, unless an alternative NCS walkthrough schedule can be justified.

    **AREVA Response:**

    AREVA believes that a weekly walk through of all areas where SNM is being processed or stored is not needed to comply with 70.62(d). This appears to be a departure from risk-informed, performance-based licensing. AREVA believes that a better safety culture is ensured by conducting such walkthroughs, surveillances and audits based on plant activity levels and safety performance. Details such as the frequency of staff walkthroughs should not be license commitments but rather should be implemented in sub-tier documents. The audit and inspection commitments for NCS as well as other safety disciplines are provided in Chapter 11. Additionally, Section 5.3.10 will be modified to address periodic walkthroughs. The revised text is as follows:

    "In addition to audits and assessments, the NCS staff conducts walkthroughs of the various process areas. These walkthroughs are conducted per approved procedures and consistent with these procedures, the frequency of the walkthroughs is based on plant activity levels and safety performance."

13. Section 5.1 of the license application states:

    "The objective of the NCS program is preventing an inadvertent nuclear criticality by: (1) Ensuring that sufficient IROFS are in place to render accidental nuclear criticality highly unlikely; and (2) Establishing and maintaining limits and controls on IROFS to ensure that accidental nuclear criticality remains highly unlikely."

    Revise Section 5.1 to also state that sufficient IROFS, including limits and controls, will be in place to ensure that all processes remain subcritical under normal and credible abnormal conditions.

    This information is necessary to determine compliance with the requirements in 10 CFR 70.61(d) and 70.61(e).

    **AREVA Response:**

    70.61(b) states that "The risk of each credible high consequence event must be limited. Engineered controls, administrative controls, or both shall be applied to the extent needed to reduce the likelihood of occurrence...so that upon implementation of such controls, the event is highly unlikely." The objectives of the AREVA NCS program are consistent with this requirement. To make it clear that all bounding credible nuclear criticality accident sequences have been evaluated and sufficient margins of subcriticality will be maintained,

the second and third bullets under the objectives of the NCS program in section 5.1 will be modified as follows:

- "Ensuring that sufficient IROFS, including limits and controls, are in place to render all credible nuclear criticality accident sequences at least highly unlikely."
- "Establishing and maintaining NCS safety parameters and procedures to ensure approved margins of subcriticality."

14. Commit to demonstrate, within the NCSAs, that those criticality safety controls designated as IROFS are sufficient to ensure that each process will remain subcritical under all normal and credible abnormal conditions regardless of any other controls which may be implemented. Section 5.3.4 of the license application states:

    "The NCSA includes consideration of the potential accident scenarios or initiating events that the system may be subject to and the potential consequences associated with such conditions, and establishes the needed limits, controls, and management measures to ensure that an accidental nuclear criticality is highly unlikely."

    However, it is unclear if the NCSA will demonstrate that the designated IROFS will be sufficient to ensure that each process will be subcritical under normal and credible abnormal conditions. This information is necessary to determine compliance with the requirements in 10 CFR 70.61(d) and 70.61(e).

    **AREVA Response:**

    This is essentially the same question as 13 except that it requests that such determinations be documented in the NCSA. Although the current AREVA practice is to place such information in NCSAs, AREVA's position on documenting safety analyses is that such documentation must exist in the suite of safety analyses that constitute the ISA. Whether that documentation exists in the NCSA or other ISA-related safety analysis should not be dictated as a license commitment. The performance-based need is that the documentation, including required peer reviews and document control practices, be maintained by the licensee. It should make no difference if the NCSA is a comprehensive standalone safety analysis or if it is a series of calculations and sensitivity studies that documents the neutron physics of a system and where the limits and controls are established and documented in a consolidated ISA document.

15. Commit to establish NCS limits and controls on parameters only as specified in the license application. Section 5.4.2 states that the controlled parameters described in Sections 5.4.2.2 through 5.4.2.15 are those that are typically used to control the effective neutron multiplication factor to acceptable values. This information is necessary to determine compliance with the requirements in 10 CFR 70.22(a)(8).

    **AREVA Response:**

    AREVA will remove the word "typically" from the referenced text.

16. Commit to document, in the NCSA, the justification for using less than optimal conditions for parameters that are not controlled. Section 5.4.2.2 of the license application states that less than optimal conditions can be used for uncontrolled parameters when ".....historical data and/or sound engineering determinations can be applied to justify a lesser reactive condition." This information is necessary to determine compliance with the requirements in 10 CFR 70.61(d).

**AREVA Response:**

Although the current AREVA practice is to document such information in the NCSA, AREVA's position on documenting safety analyses is that such documentation must exist in the suite of safety analyses that constitute the ISA. Whether that documentation exists in the NCSA or other ISA-related safety analysis should not be dictated as a license commitment. The performance-based need is that the documentation, including required peer reviews and document control practices, be maintained by the licensee. Section 5.4.2.2 will be revised to include the following:

"When less than the optimum credible conditions for causing criticality are used, the justification for such use shall be documented in a peer-reviewed and approved safety analysis."

17. Revise Section 5.4.2.2 of the license application to indicate how limits are established on controlled parameters for normal conditions. Section 5.4.2.2 only describes how limits on controlled parameters are established for credible abnormal conditions.

    This information is necessary to determine compliance with the requirements in 10 CFR 70.61(d).

    **AREVA Response:**

    For NCS purposes, "normal conditions" are assumed to be normal operations and anticipated off-normal, but likely, process conditions. NCS evaluates keff for these normal and anticipated off-normal conditions to ensure an acceptable keff (0.95) The required limits and controls on controlled parameters specified in NCSSs are established to ensure adequate subcriticality (keff $\leq$ 0.97 if adequately supported by sensitivity studies) for the remaining abnormal conditions such that accidental nuclear criticality is at least highly unlikely..

18. Revise Section 5.4.2.3 of the license application to include a definition of the "minimum critical mass" as used in this section. Section 5.4.2.3 states that workstations controlled only by fissile material mass shall be limited to no more that 0.45 of the minimal critical mass of the material in process."

    This information is necessary to determine compliance with the requirements in 10 CFR 70.61(d).

    **AREVA Response:**

    AREVA believes that the term "minimum critical mass" is sufficiently clear. However, to ensure that it is unambiguous, AREVA will include the words "assuming spherical geometry" in Section 5.4.2.3. The revised text follows:

    1. "The work station shall be limited to no more than 0.45 of the minimum critical mass, assuming spherical geometry, of the material in process;"

19. Section 5.4.2.3 of the license application states that: "Alternate mass controls may be used for operations where equipment/container geometry in reality constitutes a multi-parameter control." Revise the license application to indicate the alternate mass controls that may be used. This information is necessary to determine compliance with the requirements in 10 CFR 70.61(d).

**AREVA Response:**

AREVA will revise the discussion on mass controls to make it clear that mass controls may be used on their own and in combination with other parameters and eliminate the use of the phrase "alternate controls". The revised text follows:

"Mass limits on fissile material may be used for criticality control on their own or in combination with other controlled parameters."

The final sentence in Section 5.4.2.3 will be deleted.

20. Section 5.4.2.4 states that: "The calculation of areal density shall assume that the maximum credible mass is present and is distributed over the minimum credible area." Provide two examples to illustrate how this is done in practice.

    This information is necessary to determine compliance with the requirements in 10 CFR 70.61(d).

    **AREVA Response:**

    For the case of uniform precipitation in a large tank, the maximum credible mass that could be in the vessel is projected over the smallest area of a surface of the vessel. For example, if a tank has the shape of a truncated cone, then the minimum credible area would be the area of the minor base of the cone.

    For the case of localized precipitation, the minimum critical area on a flat bottom tank would be further reduced to the minimum area of the "hemispherical blob" containing the precipitated solids if it could not be shown that the end result or worst case intermediate condition was bounded by the uniform precipitation model.

21. Justify the safety factors in Tables 5-1 and 5-2 for the infinite slab, and the safety factor in Table 5-2 for the spherical volume. The safety margin for these cases is less than what is listed in the current license application.

    This information is necessary to determine compliance with the requirements in 10 CFR 70.61(d).

    **AREVA Response:**

    For the case with slabs, AREVA will change Table 5-2 to be consistent with the current license which permits 85% of minimum critical slab thickness which also matches the NUREG 1520 guidance.

    In the case for spherical volume, the current AREVA license permits 85% for volumes >5 liters and 75% for volumes less than 5 liters or for heterogeneous systems versus the NUREG 1520 guidance of 75%. AREVA does not possess a critical mass of any material that could be made critical in a volume of less than five liters. Additionally AREVA has used the 85% safety factor for homogeneous spherical volume for over 30 years. For plant uniformity and to minimize fundamental limit changes in a large portion of the plant, AREVA proposes using the homogeneous system safety factor of 85% for heterogeneous units also. There have not been any AREVA nor NRC identified safety issues associated with these safety factors. AREVA believes that this track record is sufficient justification for retaining this safety factor in the proposed license renewal.

22. Revise Section 5.4.2.7 of the license application to describe how density may be controlled. This information is necessary to determine compliance with the requirements in 10 CFR 70.61(d).

**AREVA Response:**

One example of how density is controlled is the process parameters associated with the dry conversion process. Control of process parameters ensures that bulk powder density is less than 4 g/cc. AREVA will revise Section 5.4.2.7 as follows:

"Control of material density may be used to limit the $k_{eff}$ of the unit to meet the guidelines given in Section 5.4.2.1.

When process variables are controlled to limit material density, the process variables will be controlled by IROFS. When density is measured, the measurement shall be made by qualified and controlled methods."

23. The first sentence in Section 5.4.2.9 states that controls are required in order to use a less reactive condition than full water reflection. The second sentence states: "In such cases, the limitations on reflectors that are needed to assure criticality safety shall be controlled or it shall otherwise be shown that exceeding the amount of reflection assumed in establishing $k_{eff}$ limits for credible abnormal conditions is highly unlikely." The second sentence is not entirely clear, but it seems to imply that less than full water reflection is permitted under conditions where controls are not implemented.

Revise Section 5.4.2.9 of the license application to clearly indicate the conditions under which less than full water reflection may be used. Commit to document, in the NCSA, the justification for the chosen reflector conditions when less than full water reflection is used. The minimum reflector conditions that will be used should also be specified in Section 5.4.2.9. Provide justification that this minimum reflector condition accounts for all potential reflectors during normal operations and credible process upsets.

This information is necessary to determine compliance with the requirements in 10 CFR 70.61(d).

**AREVA Response:**

AREVA will revise Section 5.4.2.9 to include a commitment to document in the NCSA/ISA the justification anytime less than full water reflection conditions are used. AREVA will also make it clear that if less than full water reflection is used, controls will be established for all conditions affecting reflection that otherwise could fail to meet the "highly unlikely" performance criteria listed in 70.61(b). The revised wording of the last sentence in Section 5.4.2.9 follows:

"In such cases, the limitations on reflectors that are needed to assure criticality safety shall be controlled such that exceeding the amount of reflection assumed in establishing $k_{eff}$ limits for credible abnormal conditions is highly unlikely."

24. Describe how the concentration of hydrogenous material described in Section 5.4.2.10 of the license application, can be assured to be less than or equal to 50 percent of the critical concentration. Section 5.4.2.10 states that one of the three requirements for establishing a moderator control, where the hydrogenous material within the SNM is limited to a small percentage by weight is that the permitted concentration of the hydrogenous material is less than or equal to 50 percent of the critical concentration.

    This information is necessary to determine compliance with the requirements in 10 CFR 70.61(d).

    **AREVA Response:**

    Two examples of this control at the AREVA Richland facility are used in the moisture content determination of ceramic grade urania powders. These powders typically have low amounts of moisture associated with them. The percent by weight determination is based either on 1) lab analysis (thermo-conductivity, electrolysis, weight loss on heating, and relative humidity in cover gas techniques are currently employed) or 2) by using inline moisture monitoring.

25. Section 5.4.2.11 of the license application states that a concentration limit may be used if, "The concentration limit at worst case credible conditions shall not exceed 50 percent of the minimum critical concentration in the system being evaluated." Revise this section to indicate that this refers to handbook values, and that the "worst case credible conditions" includes the four abnormal conditions listed in Section 5.4.2.11 (a–d).

    This information is necessary to determine compliance with the requirements in 10 CFR 70.61(d).

    **AREVA Response:**

    AREVA will change item 2 of Section 5.4.2.11 to read as follows:

    2. "When using handbook values, the concentration limit at worst case credible conditions, including credible precipitation and other mechanisms of concentrating the SNM, shall not exceed 50 percent of the minimum critical concentration in the system being evaluated."

26. Describe how the uranium concentration limits are maintained (Section 5.4.2.11 of the license application). The description should distinguish between dispersed uranium and dissolved uranium, and include the means by which it is ensured that the localized concentration does not exceed the concentration limits. This information is necessary to determine compliance with the requirements in 10 CFR 70.61(d).

    **AREVA Response:**

    This degree of information is contained in the NCSAs at the facility, which are available for inspection at any time. The NRC has routinely evaluated these controls during its inspection activities.

    Typically controls on process parameters are used to limit the U concentration in solutions when concentration control is employed. Once product is in a quarantine tank, the contents are sampled and confirmed to have acceptable concentrations. The limits are sufficiently low to ensure that subsequent concentration during storage due to evaporation, freezing etc. will remain subcritical.

In the case for dispersed uranium rather than dissolved uranium, this pertains to material in a solid rather than a liquid state. For example, uranium in incinerator ash, contaminated soil, or sand is dispersed rather than dissolved yet concentration control for these materials is equally valid when no credible physical mechanism can concentrate the dispersed uranium.

27. Section 5.4.2.12 of the license application states that systems separated by "A 25 cm thick slab of concrete" may be considered neutronically isolated. Revise the license application to include the minimum concrete density that is acceptable for this condition. Justify the selected concrete density and slab thickness.

**AREVA Response:**

AREVA will revise the second bullet in Section 5.4.2.12 of the license as follows:

- "A 30 cm thick water equivalent slab of concrete"

28. Section 5.4.2.12 states that in-transit unmoderated material, or in-transit moderated material, in nominal 5-gallon or less containers, spaced at least 30 cm away, can be excluded from interaction considerations. Commit to consider the interaction of all in-transit material with other fissile systems in the NCS analyses. Alternatively, commit to reduce the maximum acceptable neutron multiplication factor, for both normal and credible abnormal conditions, by a specified value when in-transit materials are not explicitly considered in an NCSA. Provide justification that this specified value can account for the increased reactivity that may result from in-transit material for both normal and credible abnormal conditions.

This information is necessary to determine compliance with the requirements in 10 CFR 70.61(d).

**AREVA Response:**

AREVA will modify this section and will remove the exemption for consideration of transfer pipes two inches or less in diameter, units of unmoderated material, and moderated material that is in nominal 5-gallon or less containers in-transit at least 30 cm away. The only requested additional exemption is single transfer pipes two inches or less in diameter.

29. Section 5.4.2.12 of the license application states that transfer pipes, two inches or less in diameter, may be excluded from interaction considerations. Revise this exclusion to account for fissile systems and multiple pipes in close proximity. Provide justification for the exclusion of transfer pipes from interaction considerations.

This information is necessary to determine compliance with the requirements in 10 CFR 70.61(d).

**AREVA Response:**

AREVA will modify this section to remove the exemption for consideration of transfer pipes two inches or less in diameter, units of unmoderated material, and moderated material that is in nominal 5-gallon or less containers in-transit at least 30 cm away. The only requested additional exemption is single transfer pipes two inches or less in diameter.

30. Commit to maintain documented evaluations at the facility that demonstrates that the criticality accident alarm system (CAAS) meets the requirements of 10 CFR 70.24. Section 5.5 of the license application states that the CAAS will meet the requirements of 10 CFR 70.24(a)(1), but does not indicate that will be demonstrated in documented evaluations.

**AREVA Response:**

Having the means to demonstrate compliance with a license commitment is inherent with the commitment. To reaffirm this commitment, AREVA has added the following sentence to the end of the first paragraph of Section 5.5:

"Documentation of this capability shall be maintained by AREVA."

31. Section 5.5 of the license application states the following:

"Should the nuclear criticality accident alarm system or a portion of the system be out of service for a period of more than four hours, movement of SNM in the affected area will cease until the alarm system has been restored, or until compensatory monitoring, approved by the nuclear criticality safety component, has been implemented."

"Routine testing, calibration and/or maintenance of the system are permitted with no suspension of SNM movements."

The following items should be addressed regarding these statements:

i. Commit to halt SNM operations or put compensatory measures in place during routine testing, calibration, maintenance, or planned outages of the CAAS, or provide justification for not doing so.

ii. For an unplanned loss of CAAS coverage, explain why SNM operations cannot be halted and why compensatory monitoring cannot be put in place in less than four hours in the event the CAAS is out of service.

iii. Describe the compensatory monitoring or other measures that will be used when the CAAS is not fully operational.

iv. Commit to halt SNM operations in areas where the CAAS is not fully operational for more than a specified number of hours. Justify the number of hours that are specified.

This information is necessary to determine compliance with the requirements in 10 CFR 70.24.

**AREVA Response:**

Response to be provided on or before October 31, 2008.

32. Commit to have a CAAS that is designed to remain operational during credible events (e.g., design-basis earthquake, fires, explosions, or other events described in ISA), or provide and justify an alternative standard for CAAS operability during such events.

This information is necessary to determine compliance with the requirements in 10 CFR 70.24.

**AREVA Response:**

Response to be provided on or before October 31, 2008.

33. Revise Section 5.6 of the license application to indicate that AREVA has authorized its staff to use the listed references. The phrase ".....authorized for use by AREVA NP" is ambiguous as to whether it is the NRC or AREVA NP that has authorized the use of the references. This information is needed to ensure that the listed references are intended for informational purposes and do not require review and approval by NRC, unless explicit commitments are provided in other sections of the license application.

**AREVA Response:**

AREVA will make the clarification that AREVA NP has authorized its staff to use the listed references. The first paragraph of Section 5.6 is as follows:

"AREVA currently authorizes the NCS Staff to use the following sources of criticality data and analytical techniques in performing criticality safety analyses:"

34. With regard to the authorization to possess fuels at reactor sites (Section 1.2.5.5 of the license application), commit to comply with the applicable reactor license, regardless of any exemptions in the AREVA license, and with the commitments made in Chapter 5 regarding NCS.

Reactor licensees have the option of meeting 10 CFR 70.24 or 10 CFR 50.58; the authorization in Section 1.2.5.5 shall be in compliance with the reactor licensee's requirements under these sections. This information is needed to ensure that AREVA's activities at other facilities are being conducted in accordance with the NRC license for that facility.

**AREVA Response:**

Section 1.2.5.5 limits AREVA's authorization to receiving fuel assemblies or fuel rods for the purpose of loading them into shipping containers. This is a very limited authorization.

To clarify the extent of this authorization, the first sentence of section 1.2.5.5 will be revised to state:

"AREVA NP is authorized to possess fuel assemblies or fuel rods at reactor sites, within the license requirements of the reactor site, for the purposes of loading them into shipping containers and delivering them to a carrier for transport. "

It is understood that all of AREVA's licensed activities must be conducted under the provisions of the license that authorizes them. This is not limited to the commitments in Chapter 5.

35. With regard to the use of "peer reviewed handbooks" (Sections 5.4 and 5.4.2.6 of the license application), provide examples of handbooks that are considered acceptable, and provide your acceptance criteria for the use of such handbooks. State how "approved safety factors" will be determined. This information is necessary to determine compliance with the requirements in 10 CFR 70.61(d).

**AREVA Response:**

Examples of peer reviewed handbooks are included in the references listed in Chapter 5 of this application. The "approved" safety factors to be used are those listed in Tables 5.1 and 5.2 of the license renewal application.

36. Provide the validation document listed as Reference 17 (EMF-2670, "PC-SCALE 4.4a Validation," Revision 2) and identify where in this document the nine items mentioned in Section 5.4.1 of the license application are described.

    This information is necessary to determine compliance with the requirements in 10 CFR 70.61(d).

    **AREVA Response:**

    During a telephone call with the NRC on 9/25/2008, the NRC agreed that the validation document listed as Reference 17, EMF-2670, "PC-SCALE 4.4a Validation," has already had extensive NRC review and did not need additional review. However, the NRC expressed concern about significant future revisions to this document. AREVA agreed to notify the NRC of any future significant revisions by letter. This letter will also include a summary of the major changes. The added text to Section 5.4.2.1 is as follows:

    "The current validation document is listed in Reference 17. Whenever AREVA makes significant changes to this document, AREVA will notify the NRC by letter and will include in that letter a description of the changes made."

37. Define the term "safety margin" in the first of nine items in Section 5.4.1 of the license application, and summarize how it may be justified.

    **AREVA Response:**

    This safety margin corresponds to the maximum evaluated neutron multiplication factor discussed in Section 5.4.2.1 (0.05 and 0.03 for normal and abnormal conditions respectively). These safety margins have been employed at the AREVA Richland Facility, with the NRC's approval, for over 30 years.

38. Define the term "boundaries" in the sixth of nine items in Section 5.4.1 of the license application. The meaning of the term "boundaries that could limit the appropriate use of the methodology" is unclear.

    **AREVA Response:**

    In this context, "boundaries" means the extent to which the methodology could be used, i.e., area of applicability.

39. Describe what kind of justification may be used to allow extrapolation beyond the code's area of applicability (seventh of the nine items in Section 5.4.1 of the license application). Add a commitment that any extension will be made by making use of trends in the bias.

    This information is necessary to determine compliance with the requirements in 10 CFR 70.61(d). Additionally, NUREG-1520, Section 5.4.3.4.1(6)(3) reiterates statements from ANSI/ANS-8.1-1998 to the effect that extending the area of applicability should be based on trends in the bias. The information is needed to ensure subcriticality when it is necessary to extend the area of applicability outside the bounds covered by benchmark experiments.

**AREVA Response:**

Any justification for extending the area of applicability will be based on sound statistical methods and will be documented in the individual NCSA or the referenced validation report. These methods will include trending of the bias. Item 7 of Section 5.4.1 has been revised to include this commitment.

40. Provide a summary of the validated area(s) of applicability (Section 5.4 of the license application). This information is necessary to determine compliance with the requirements in 10 CFR 70.61(d). Additionally, NUREG-1520, Section 5.4.3.4.1(7)(b) states that the area of applicability of the code should be described. This information is needed to ensure that calculation methods are only used within valid bounds.

**AREVA Response:**

Code validation at AREVA includes four broad classes of material. These are:

Well moderated homogeneous materials (combines UO2F2 and UNH classes)

Low moisture content, low density uranium oxide powder

$UO_2$ fuel rods without $Gd_2O_3$ (combines full density water moderated and low density moderated classes).

$UO_2$ fuel rods with some $UO_2$-$Gd_2O_3$ fuel rods with full density water moderator.

41. Section 5.4.2.1 of the license application states:

"The maximum evaluated neutron multiplication factor at normal and credible abnormal conditions shall not exceed k95/95 = 0.95 for normal conditions or 0.97 for credible abnormal conditions, if justified by a sensitivity analysis."

With regard to this commitment, answer the following questions:

i. Does the requirement to perform a sensitivity analysis apply only to credible abnormal conditions, or to both normal and credible abnormal conditions?

ii. Provide illustrative examples of such a sensitivity analysis. Explain how they justify the use of the stated k95/95 limits.

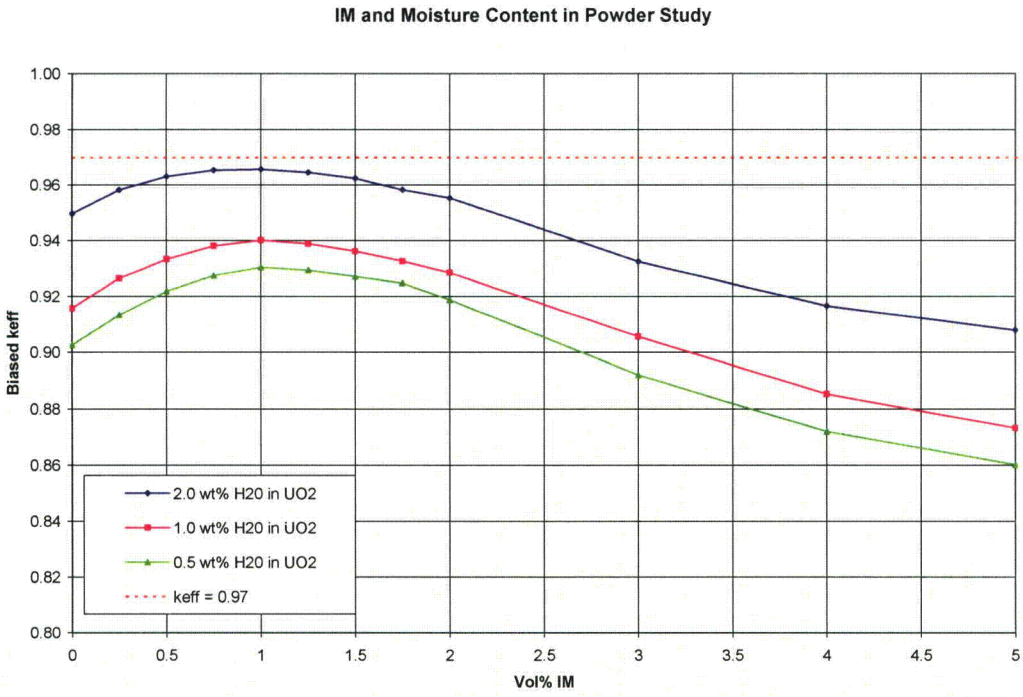
This information is necessary to determine compliance with the requirements in 10 CFR 70.61(d).

**AREVA Response:**

When the AREVA NCS staff performs NCSAs, sensitivity studies for both normal and abnormal conditions are part of the work activity. The commitment to only use a $k_{eff}$ of 0.97 for abnormal conditions when justified by a sensitivity analysis is provided because there are some circumstances when a $k_{eff}$ of 0.97 may not be appropriate.

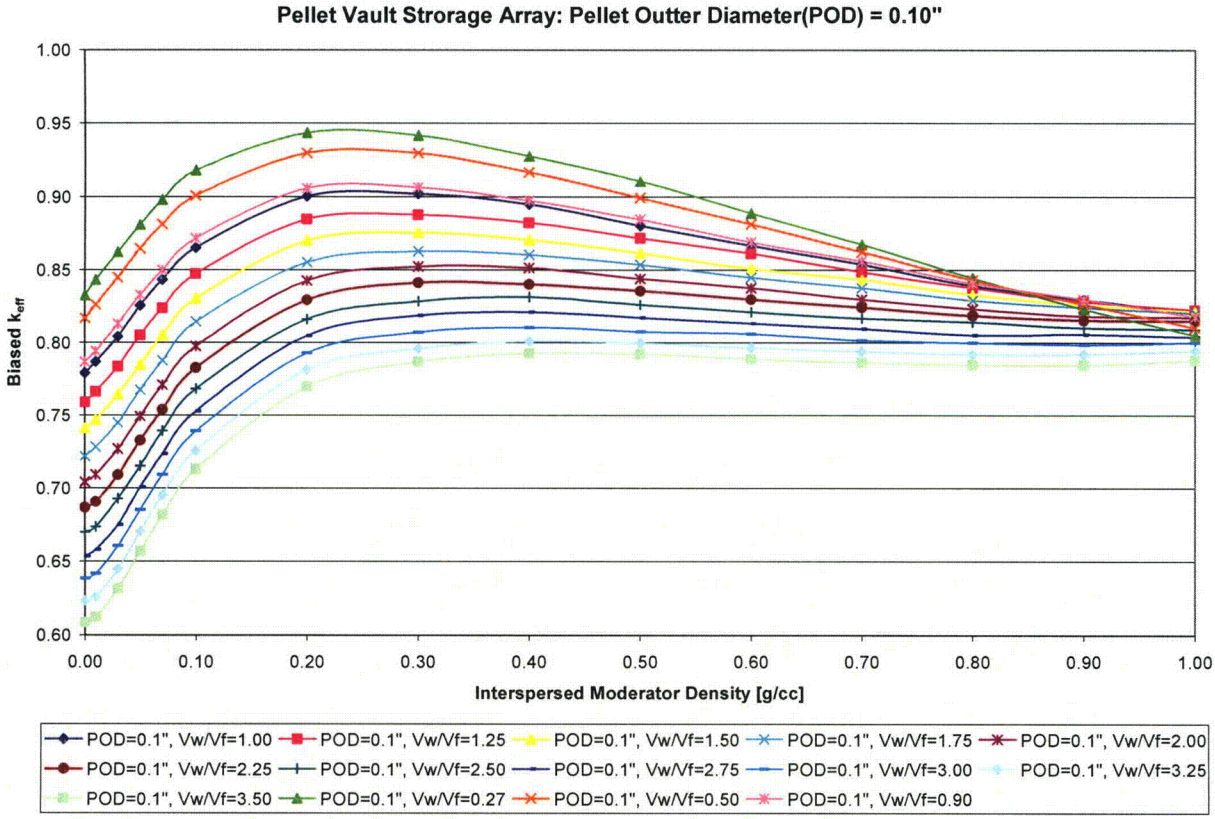
Two examples are provided that show sensitivity studies supporting the 0.97 and 0.95 limits. The first example deals with dry powder storage in the BLEU powder storage area. The NCS limit on powder moisture content is 0.5 wt% moisture in the powder. The point that the moisture control IROFS would be declared as failed is if the moisture content exceeds 2

wt%. The following graph shows the significant margin in $k_{eff}$ between these two concentrations and the gradual change in $k_{eff}$ over the full range of moderator interspersed between the drums of powder.

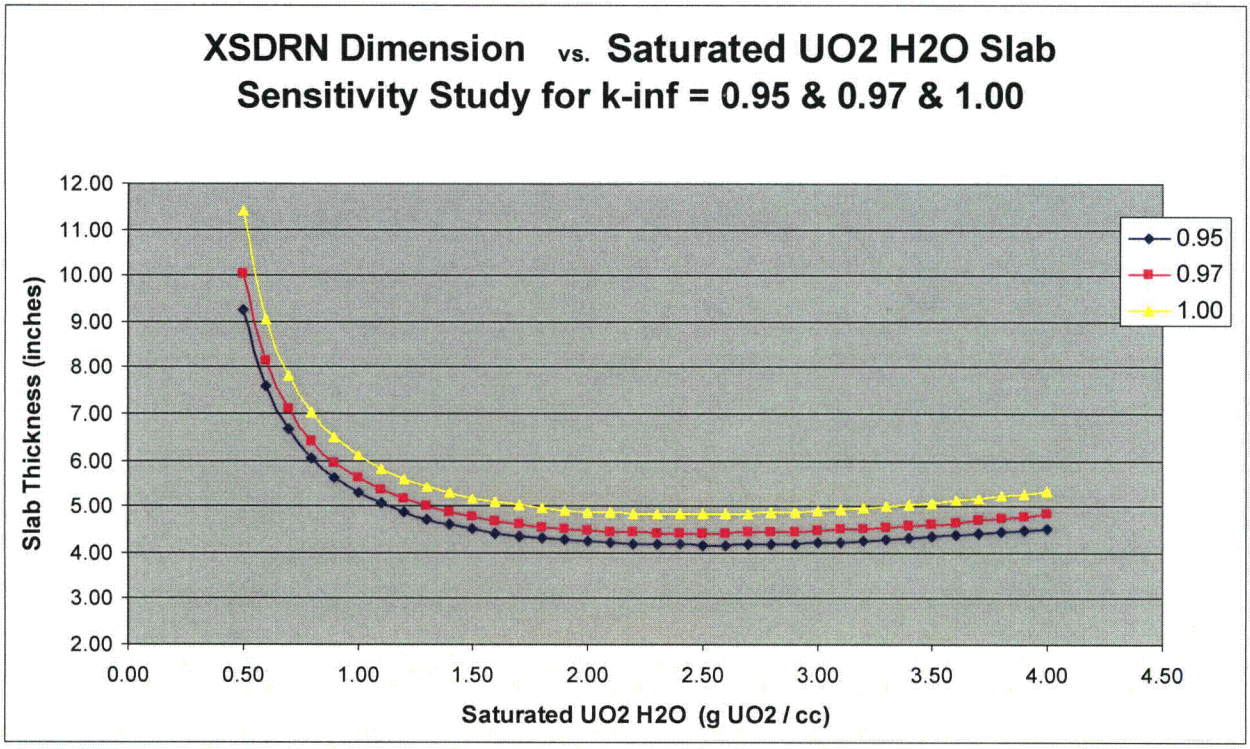



The above figure shows the Drum Storage Racks; Base Case; 4 g/cm$^3$ $UO_2$ with 0.5, (limit of moisture content specified in the NCSS) 1.0, and 2.0 wt% $H_2O$; IM Varied between Dry and Fully Flooded

The second example shows the sensitivity of the pitch and moderator content for a given pellet diameter stored in an array of pellet vaults. This graph readily shows that for the analyzed size of pellet combined with any amount of interspersed moderator and any pellet pitch, $k_{eff}$ remains acceptable.




The third example shows where a keff of 0.97 does not provide enough margin to permit its use. It shows a case for slab tanks containing concentrated U–bearing material that would not support a 0.97 limit. The difference between 0.97 and critical is less than 0.25-inch per side. The potential for bulging beyond what is anticipated under abnormal conditions is too great. (Anticipated amounts of bulging could be exceeded due to unexpectedly high pressurization, thermal expansion of the metal due to fire, welding, chemical reactions in solutions, UOx oxidation, etc.)




To clarify, "if justified by a sensitivity analysis," AREVA will add the following sentence to the application, "The documented justification accompanying this sensitivity analysis shall clearly discuss the sufficiency of the margin of subcriticality in terms of the parameters being controlled."

42. Explain your statement in Section 5.4.2.1 of the license application, which reads: "A conservative bias will not be used unless the reason for the bias is well understood and justified." Describe what type of justification may be used, and provide illustrative examples, if they exist.

**AREVA Response:**

To date, AREVA has not credited a conservative bias. If such a need were to arise, the justification of using the conservative bias would be included in either the NCSA or the validation document. Such a justification would have to include a sound understanding of the cause of the bias. Both NCSAs and code validation documents receive a peer review by a competent criticality safety engineer.

## RAI RESPONSES - AREVA NP RICHLAND (SNM-1227), October 3, 2008

### Chapter 11: Management Measures

1. Section 11.2.2 describes the preventive maintenance program for the facility. However, this section does not discuss what methodology will be used to establish the frequencies of safety-related instrument repetitive maintenance or preventive maintenance. Describe what methodology is going to be used to establish such frequencies. This information is necessary to determine compliance with the requirements in 10 CFR 70.62(d).

   **AREVA Response:**

   The AREVA preventive maintenance (PM) program, which includes the instrument repetitive maintenance (IRM) program, is described in MCP-30383 and is available at the site for review. Relative to repetitive/preventive maintenance, the initial PM and IRM content, including frequency, is created from the manufacturer's recommendations and/or from past plant history of similar equipment.

   The PM/IRM procedure (MCP-30383) also requires the responsible engineer to change the frequency and/or PM/IRM content as dictated by equipment failure experience, new information, and/or increased frequency of out-of-tolerance issues.

   To assist the responsible engineer with this responsibility, the CR system tracks trending issues related to out-of-tolerance conditions and/or equipment failures. The corrective action procedure requires an apparent cause analysis (ACA) to address adverse trending.

2. Section 11.1 of the license application does not provide any information on reconstitution of design bases and requirements for the AREVA facility. Revise the license application to include a discussion on this subject. This discussion should include the following items:

   i. Whether the need for reconstitution was properly investigated;

   ii. A discussion on the approach used to complete reconstitution of design bases and requirements, as necessary; and

   iii. How the new or revised documentation was incorporated into the configuration management system.

   **AREVA Response:**

   AREVA Richland, prior to submitting the ISA Summary which was approved by the NRC October 25, 2007, confirmed that the facility design and construction were as described in the ISA Summary. During the establishment of IROFS, anytime an existing control was designated as an IROFS, it was verified to be able to meet the required functional criteria. Any changes that required updates to facility drawings and safety-related documents and procedures were made and approved according to the protocols described in Sections 11.1 and 11.4 of this application.

3. Section 11.3.1 discusses the plans for recurrent training of personnel working at AREVA. This section excludes recurrent training in several program areas where initial training will be provided to the AREVA staff, such as chemical safety, fire protection, etc. Revise the section on "Recurrent Training" in the license application to reflect consistency with the training information included under "Initial Training."

   This information is necessary to determine compliance with the requirements in 10 CFR 70.22(a)(6).

   **AREVA Response:**

   The recurrent training requirements for employees who work with licensed materials include, as appropriate for their workstations, chemical safety, fire protection, and emergency response.

   To clarify that these aspects of safety training are not excluded, AREVA will make the following changes to the license application:

   > "Recurrent Training
   >
   > Each employee routinely working with licensed materials shall receive periodic refresher training (including an examination) as part of the facility's continuing program in safety awareness. When changes are made relative to safety or emergency response requirements, provisions shall be made to assure that affected employees are appropriately informed and instructed on the change. Recurrent and update training shall be documented and records appropriately maintained."

4. Section 11.5 discusses audits and assessments for the facility. Section 11.5.1 does not specify that audits will be conducted to certain programs such as emergency management, quality assurance, configuration management, maintenance, training and qualification, procedures, incident investigation, and records management. Section 11.5.2 considers emergency preparedness, configuration management and training and qualification in the application of the assessment program, but excludes quality assurance, configuration management, maintenance, training and qualification, procedures, incident investigation, and records management. Revise both sections in the license application to reflect consideration of management measures, as defined in 10 CFR 70.4, to the audit and assessment programs for the AREVA facility.

   This information is necessary to determine compliance with the requirements in 10 CFR 70.62(a).

   **AREVA Response:**

   The first paragraph of Section 11.5.1 will be revised to read:

   "Audits are compliance-based evaluation activities with an objective of verifying the compliance of operations with regulatory requirements and license commitments. The audit program will apply as a minimum to radiation protection, nuclear criticality safety, fire protection, environmental protection, hazardous chemical safety, emergency management, quality assurance, configuration management, maintenance, training and qualification,

procedures, incident investigations, and records management as these subjects relate to maintaining the safety of licensed material operations."

Table 11-1 will be updated to include these additional subject areas.

The sixth paragraph of Section 11.5.2 will be modified as follows:

"The assessment program will be applied at a minimum to the areas of radiation protection, nuclear criticality safety, chemical safety, fire safety, environmental protection, emergency preparedness, configuration management, and training and qualification. Assessments in these areas shall be scheduled such that each area is assessed on at least a triennial basis. The need for assessments of the subject areas of quality assurance, maintenance, procedures, incident investigation, and records management will be determined at the discretion of the manager of the EHS&L function after considering plant activities and the results of periodic audits of these subject areas. Actions to require interim assessments, to require more frequent assessments of any area, or to add other functional safety areas to the assessment program shall also be at the discretion of the manager of the EHS&L function."

5. Section 11.6.2 discusses issue investigation and causal analysis. However, this section does not discuss how the results of an incident investigation and causal analysis are used to eliminate or minimize the root cause from recurring. Describe how such results are used to eliminate or minimize recurrence of an incident. This information is necessary to determine compliance with the requirements in 10 CFR 70.62(a).

   **AREVA Response:**

   Section 11.6.2 did not provide adequate emphasis on the actions that are identified via the incident investigation/causal analysis process. Accordingly, the list of bulleted items describing the scope of the issue evaluation/causal analysis procedure will be supplemented to include the following:

   "requirements for identification of corrective and preventive actions, as appropriate."

   Secondly, the final paragraph will be revised to read:

   "Issue investigations, causal analyses, and identified corrective/preventive actions require review/approval by the EHS&L function. Identified actions are assigned to action owners and tracked through to completion via the formal CAP."

6. Section 11.8 states that: "Quality Assurance (QA) elements are applied to IROFS as management measures to assure that there is reasonable assurance that IROFS are available and able to perform their functions when needed." However, "Other QA elements" applied at the facility are not mentioned or defined in the license application. Since "Other QA elements" are part of the management measures criteria per its definition in 10 CFR 70.4, revise this section to clarify what other QA elements apply.

   This information is necessary to determine compliance with the requirements in 10 CFR 70.62(d).

**AREVA Response:**

AREVA will add the following section as a supplement to Section 11.8.

"Additional quality measures, listed below, may be applied to the site's safety programs or to individual IROFS, as needed, on an individual needs basis.

1. **Organization and Management Responsibility**. Chapter 2 of this license application provides the commitments associated with organizational structure, authority, and accountabilities to assure that they are able to carry out their responsibilities relative to the safety of licensed materials.

2. **QA Program**. AREVA maintains a QA program that meets the requirements of 10CFR50 Appendix B. Aspects of this program may be used for 10CFR70-related activities when deemed appropriate by AREVA.

3. **Design Control**. The design control function is an element of the configuration management program described in Section 11.1 of this chapter. This is detailed in AREVA's Engineering Change procedure which is available at the AREVA Richland site for review.

4. **Procurement Document Control**. The purchasing program has provisions for purchase specifications that define the necessary requirements. These specifications receive the appropriate reviews and approvals. This program provides reasonable assurance of conformance with specified requirements. This is integrated into the Work Order and engineering change procedures to assure appropriate features meet the needs of the IROFS to perform reliably. These procedures are available at the AREVA facility for review.

5. **Instructions, Procedures, and Drawings**. Section 11.4 of this application makes the commitment that all licensed activities will be performed "in accordance with a system of written operating procedures, which may take various forms, e.g. standard operating procedures, standard work instructions, maintenance instructions, etc.

   The procedure development process is described in Section 11.4 of this application. These operating procedures are reviewed and approved by the management of the functional component and by the safety organization as appropriate. Drawings are controlled as part of the CM program as described in Section 11.1.

6. **Document Control**. The document control program is described in Section 11.4 of this application and assures that all new or modified documents receive appropriate review and approval. The procedures and standards associated with Document Control are reviewed and approved by the management of the functional component. This process applies to all licensed activities including the ISA program.

7. **Control of Purchased Material**. The purchasing program has provisions for purchase specifications that define the necessary requirements for controlling purchased material. This program provides reasonable assurance of conformance with specified requirements. This program allows for appropriate receipt inspection, storage, and shelf life requirements for materials.

8. **Identification and Control of Materials and Parts**. The lock and tag procedures associated with the configuration management and safety management programs have provisions for tagging non-conforming IROFS such that they will not be used until such time as they repaired and able to perform the required function.

9. **Control of Special Processes**. Section 11.4 of this application makes the commitment that all licensed activities will be performed "in accordance with a system of written operating procedures." This commitment also applies to special processes. The development of the procedures associated with special processes is described in Section 11.4 of this application. Management is responsible to assure that personnel who perform such activities are suitably qualified. The Work Order and engineering change procedures detail the assessment and application of appropriate codes and standards including special processes such as welding. These in turn require qualified personnel, qualified procedures, and qualified materials.

10. **Inspection**. Acceptance testing is a part of the configuration management program which ensures that IROFS meet requirements prior to initial use. The Preventative Maintenance and Instrument Repetitive Maintenance programs as described in Sections 11.2.2 and 11.2.3 of this application provide assurance that IROFS and other safety-related equipment continue to meet requirements by assuring these inspection activities are scheduled and implemented.

11. **Test Control**. Acceptance testing is a part of the configuration management program which ensures that IROFS meet requirements prior to initial use. The Preventative Maintenance and Instrument Repetitive Maintenance programs as described in Sections 11.2.2 and 11.2.3 of this application provide assurance that IROFS and other safety-related equipment continue to meet requirements by assuring these testing activities are scheduled and implemented. .

12. **Calibration of Equipment**. Equipment calibration is a part of the maintenance program as described in Sections11.2.2 and 11.2.3 of this application. This portion of the program applies equally to newly installed components that require calibration and those that have been installed and require periodic recalibration.

13. **Handling Storage and Shipping**. The spare parts program has provisions to ensure that safety important items can be stored in such a manner as to prevent damage, loss, and deterioration caused by environmental conditions. Testing for potential damage during shipping, handling or storage is completed as part of the post-installation pre-operational testing as described in Item 14 below.

14. **Inspection, Testing and Operating Status**. Acceptance testing is a part of the configuration management program which ensures that IROFS meet requirements prior to initial use. The Preventative Maintenance and Instrument Repetitive Maintenance programs as described in Sections 11.2.2 and 11.2.3 of this application provide assurance that IROFS and other safety-related equipment continue to meet requirements by assuring these activities are scheduled and implemented. The lock and tag procedures associated with the configuration management and safety programs have provisions for tagging non-conforming IROFS and other safety-related equipment identified during testing such that they will not be used until such time as they are repaired and able to perform the required function.

15. **Nonconforming Material**. The lock and tag procedures associated with the configuration management and safety programs have provisions for tagging non-conforming IROFS such that they will not be used until such time as they repaired and able to perform the required function. The Fuel America Corrective action program described in sections 11.6.1 of this application provides the needed assurances that all conditions adverse to safety are promptly identified and that appropriate corrective actions to prevent recurrence are established and implemented.

16. **Corrective Actions**. The Fuel America Corrective Action Program records are permanent company records. These records and those associated with the PM/IRM program are adequate to track the performance reliability of IROFS and ensure a feed-back mechanism to the ISA process should any adjustment need to be made.

17. **QA Records**. QA records, including those associated with the corrective action program, are permanent company records.

18. **Audits and assessments**. Both the QA and EHS&L organizations plan, schedule, and execute assessments and audits to determine the effectiveness of organizations and programs and to inform management of any items needing attention. These commitments are described in Sections 11.5.1 and 11.5.2 of this application. Corrective actions and recommendations derived from audits and assessments are evaluated and tracked to completion via the Fuel America Corrective Action Program described in Section 11.6 of this application."