AREVA

October 30, 2008
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U.S. Nuclear Regulatory Commission
Director, Office of Nuclear Material
Safety and Safeguards
Attn: Document Control Desk
Washington, D.C. 20555-0001

Gentlemen:

Subject: Response to Request for Additional Information (RAI) Item No. 4 Pertaining to Criticality Safety (Chapter 5 of License No. SNM-1227 Renewal Application)

Ref.: 1. Letter, P.J. Habighorst to R.E. Link, "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.

Via Reference 1, the NRC conveyed RAIs pertaining to a number of chapters in AREVA NP's pending license renewal application for License No. SNM-1227. Included were 42 individual RAIs for criticality safety, 41 of which have been answered via previous submittals to the NRC. Attached please find AREVA's response to the one remaining RAI - Item No. 4 regarding application of ANSI/ANS-8 NCS standards. AREVA's response is consistent with our discussions in a conference call with the NRC on this RAI conducted on October 29, 2008. It should be noted that this completes AREVA's responses to all the RAIs conveyed via Reference 1.

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

Very truly yours,

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

cc: Rafael L. Rodriguez
U.S. Nuclear Regulatory Commission
Fuel Manufacturing Branch, Mail Stop EBB-2-C-40
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RAI RESPONSES – AREVA NP RICHLAND (SNM-1227), October 29, 2008

Chapter 5: Nuclear Criticality Safety

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:

Relative to referencing the version of the ANSI/ANS series 8 standards in the license renewal application, all such references to specific ANSI/ANS standards will have the version of the standard indicated. Relative to sub-items ii and iii in the second list of

sub-items listed above, the generic references to ANSI standards will be clarified by changing to "ANSI/ANS series 8 standards"

The ANSI/ANS standards listed provide excellent information regarding NCS at facilities that process and store SNM. However, some items listed in these standards are overly prescriptive and simply provide guidance on how to ensure that accidental nuclear criticality be highly unlikely and doubly contingent (the performance criteria in 10CFR70.61). AREVA's assessment of the ANSI/ANS Standards listed above follows:

ANSI/ANS-8.1-1998. AREVA commits to meet the intent of this standard on a performance basis as it is applicable to the Richland facility operation.

ANSI/ANS-8.3-1997. License application commits to the1986 version of the standard. The AREVA CAAS was demonstrated to comply with the 1986 version of this standard in 1992. Given the vintage of the AREVA CAAS, this is an appropriate version of the standard.

ANSI/ANS-8.7-1998 is for the storage of fissile material. AREVA commitments to meet the intent of this standard on a performance basis where it is applicable to the AREVA Richland facility except for section 4.2.9 (see the discussion on ANSI/ANS 8.3).

A summary of pertinent sections in the license renewal application that serve to meet the intent of this standard as it is applicable to the Richland facility operations is listed in the following table.

Reference/Requirement	License Application Implementation	Comments
4.1.2 Methods of control ...shall be described in written procedures	5.3.7	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application.
Persons...shall be familiar with these procedures	5.3.7	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application.
Limits for storage shall be posted	5.3.6	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application.
4.1.3 Management shall provide for inspections to verify compliance	Chapter 11	This is covered in the management measures discussion in Chapter 11 of the license application.
4.1.4 Access to storage areas shall be controlled.	FNMC Plan	The AREVA FNMC Plan is approved by U.S. NRC. This plan requires access to storage areas to be controlled.
4.2 Technical Practices	5.4	
4.2.1 Limits shall be based on experimental data or on the results of calculations made through the use of validated computational techniques.	5.4.1	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application.
4.2.2 Storage facilities and structures shall be designed and fabricated...in accordance with good engineering practices	5.3.1; 5.3.4	This general practice is covered by regulation and AREVA's commitment to double contingency and assurance that all credible nuclear criticality safety accident scenarios are rendered "highly unlikely" due to IROFS.
4.2.3	---	No shall's in this section
4.2.4 FM shall be stored in such a way that accidental criticality from fire, flood, earthquake or other natural calamities is not a concern.	5.3.4	AREVA meets the intent of this standard through AREVA's commitment to double contingency and assurance that all credible nuclear criticality safety accident scenarios are rendered "highly unlikely" due to IROFS.

Reference/Requirement	License Application Implementation	Comments
4.2.5 Where the presence of significant combustible materials is unavoidable, ...a fire protection system shall be installed.	5.3.4	AREVA meets the intent of this standard through AREVA's commitment to double contingency and assurance that all credible nuclear criticality safety accident scenarios are rendered "highly unlikely" due to IROFS.
4.2.6 Shelving shall be sturdy and noncombustible	5.3.4	AREVA meets the intent of this standard through AREVA's commitment to double contingency and assurance that all credible nuclear criticality safety accident scenarios are rendered "highly unlikely" due to IROFS.
4.2.7 Containers of FM in areas with sprinkler systems shall be designed to prevent accumulation of water.	5.3.4	AREVA meets the intent of this standard through AREVA's commitment to double contingency and assurance that all credible nuclear criticality safety accident scenarios are rendered "highly unlikely" due to IROFS.
4.2.8 In storage areas equipped with sprinklers...consideration shall be given to the possibility of criticality occurring in an accumulation of runoff water from the sprinkler system.	5.3.4	Actual practice in evaluation of abnormal conditions although not specifically specified
4.2.9 A CAAS shall be provided in accordance with ANSI/ANS-8.3-1997	5.5	AREVA meets the intent of this standard through AREVA's commitment to the 1986 version of this standard as discussed in the discussion of ANSI/ANS 8.3 above.
4.2.10 Good housekeeping shall be incorporated as an important part of the NCS practices.	----	AREVA meets the intent of this standard through AREVA's commitment to double contingency and assurance that all credible nuclear criticality safety accident scenarios are rendered "highly unlikely" due to IROFS. Good housekeeping and vigilance to changes in operating conditions are essential elements of this commitment.
5 Parameters, Limits and Conditions.	---	The mass limits provided in this standard are not currently used in any of the AREVA Richland NCSAs. As such sections 5 and 6 do not apply.
6. Other Applications	---	

ANSI/ANS-8.14-2004. AREVA does not currently use soluble neutron absorbers. If a future need exists for soluble absorbers, their use will be in compliance with this standard. A commitment to meet this standard has been added to section 5.4.2.14.

ANSI/ANS-8.17-2004 is for the handling, storage and, transport of LWR Fuel Outside of Reactors. The AREVA license renewal application meets the intent of this standard as shown in the following table:

Reference/Requirement	License Application Implementation	Comments
4.1	---	No shall's in this section
4.2 Methods used to calculate keff shall be validated in accordance with ANSI/ANS 8.1	5.4	See commitment to ANSI/ANS 8.1 above.
4.3 points to 8.3 for CAAS	---	No shall's in this section
4.4 prior to use...a NCSE shall be performed....	5.3.1; 5.3.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application.
4.5 NCSE shall determine and explicitly identify the controlled parameters and their associated design and operating limits....	5.3.4; 5.3.5	

Reference/Requirement	License Application Implementation	Comments
The effect of changes in these parameters or in the conditions to which they apply shall be documented.	5.3.4	
4.6 The NCSE shall be documented with sufficient detail, clarity, and lack of ambiguity to allow independent review and confirmation of results	5.3.4	
4.7 Prior to commencing an operation, there shall be an independent assessment that confirms the adequacy of the evaluation required by 4.4	5.3.4	
4.8 Prior to commencing operation, the operating organization shall verify that the configuration and conditions at the time of operation conform with the design and operating limits specified in 4.5.	5.3.1;	
4.9...when reliance on neutron-absorbing materials, control shall be exercised to ensure their continued presence...	5.4.2.14	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application.
4.10 In performing NCSEs, the fuel characteristics...that affect reactivity shall be chosen from the range of credible values that maximize keff.	5.4.2.2	
Credit for fuel burn up...shall consider the axial distribution of burnup in the fuel unit.	---	Operations at AREVA's Richland facility do not involve fuel that has been irradiated. This item is not applicable.
4.11 fuel unit should be handled ...two unlikely, independent,...	5.1	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application and the commitment to double contingency that was made above.
5 Criteria to establish subcriticality	5.4.2.1	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application.
5.1 keff shall be less than or equal to an established allowable multiplication factor.	5.4.2.1	

ANSI/ANS-8.19-2005. This standard covers the administrative practices of NCS. The substance of each item in this standard is met by the AREVA Management Measure program and the descriptions of organizational authorities and responsibilities contained in chapters 2 and 5 of the license renewal application.

Reference/Requirement	License Application Implementation	Comments
4 Management Responsibilities		
4.1 Management shall accept overall responsibility for safe operations.	2.1; 2.2	A given expectation
4.2 Management shall formulate a NCS policy and make it known to all employees in operations with FM.	5.1	Although, the License renewal application does not specifically require this policy to be made known to all FM handlers, the policy is generally covered in training. The intent of this requirement is met through AREVA's commitments listed in the referenced sections of the license renewal application.

Reference/Requirement	License Application Implementation	Comments
4.3 Management shall assign responsibility and delegate commensurate authority to implement established policy.	5.2	The assignment of responsibility and authority to implement the NCS policy, the intent of this requirement is met through AREVA's commitments listed in the referenced section in the license renewal application.
Each individual, regardless of position, shall be made aware that NCS in his or her work area is his or her responsibility.	---	
4.4 Management shall provide personnel familiar with the physics of nuclear criticality and with the associated safety practices to furnish technical guidance appropriate to the scope of operations.	2.2.5.1; 5.2	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application.
4.5 Management shall establish a training and qualification program for NCS staff.	5.2	Section 5.2 does not specifically address training program, however the intent of this commitment is met by the commitment that the EHS&L manager ensure adequate staff, skilled in the interpretation of data pertinent to NCS and familiar with the operation of the facility.
4.6 Management shall establish a method to monitor the NCS program	Chapter 11	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application.
4.7 Management shall participate periodically in auditing the overall effectiveness of the NCS program.	Chapter 11	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application.
4.8 Management may use...	---	No shall's in this section
4.9 Management shall establish and maintain a configuration management system that identifies and controls changes to facility and process conditions important to NCS.	5.3.1; Chapter 11	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application.
5. Supervisory Responsibility		
5.1 Each supervisor shall accept responsibility for the safety of operations under his or her control.	2.2.3; 2.2.4	Although, the License renewal application does not specifically require this of each supervisor, section 2.2.3 of the license renewal application states that the manager through a network of supervisors is responsible for safety in the area. Section 2.2.4 discusses safety by committing to ensure procedural compliance.
5.2 Each supervisor shall be knowledgeable in those aspects of NCS relevant to operations under his or her control.	2.2.4	Supervisors are required to read / acknowledge all NCSS for their area
5.3 Each supervisor shall provide training and shall require that personnel under his or her supervision have an understanding of procedures and safety considerations...	2.2.4; 5.3.1; 11.1.1	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application. Supervisors using assistance from training department ensure that employees are adequately trained and understand safety requirements
Records of training activities shall be maintained.	11	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application. The training records are part of Portfolio, the current learning management system.
5.4 Supervisors shall develop or participate in the development of written procedures...	2.2.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application. This activity is part of the procedure development process.

Reference/Requirement	License Application Implementation	Comments
Maintenance of these procedures to reflect changes in operations shall be a continuing supervisory responsibility.	2.2.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application. This activity is part of the procedure development process.
5.5 Supervisors shall verify compliance with NCSS for new or modified equipment before its use.	2.2.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application. Supervisors participate with NCS and responsible Engineer in verifying compliance with NCS requirements. This is part of the ECN Procedure
5.6 Supervisors shall be responsible for the inspection, testing and maintenance of engineered controls.	2.2.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application. The PM/IRM procedure does not specifically require an operations supervisor be responsible for each maintenance activity. In some cases it is the maintenance supervisor who has this direct responsibility.
5.7 Each supervisor shall require conformance with good safety practices including unambiguous identification of FM and good housekeeping.	2.2.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application.
6 NCS Staff Responsibilities		
6.1 NCS staff shall provide technical guidance for the design of equipment, and processes and for development of operating procedures	5.3.7; 11.1.2; 11.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application.
6.2 the staff shall maintain familiarity with current developments in NCS standards, guides, and codes.	5.2	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application.
6.3 the staff should consult with knowledgeable individuals ...		No shall's in this section.
6.4 the staff shall maintain familiarity with all operations within the organization requiring NCS controls.	5.2	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application.
6.5 The staff shall assist supervision, on request, in training personnel.	11.3	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application.
6.6 the staff shall conduct or participate in audits...	5.2; 11.5	
6.7 the staff shall examine reports of procedural violations and other deficiencies...	5.3.9	
And shall report findings to management.	5.3.10; 11.5	
7 Operating procedures		
7.1 The purpose of written procedures is to facilitate...		No shall's in this section
7.2 Procedures shall include those controls and limits significant to NCS of the operation.	11.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application.
7.3 Supplementing and revising procedures shall be facilitated.	11.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application. The actual practice of document changes is facilitated by Documentum.
7.4 Active procedures shall be reviewed periodically by supervision.	11.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application. This activity is part of periodic review process; not required by NCS Standards

Reference/Requirement	License Application Implementation	Comments
7.5 New or revised procedures impacting NCS shall be reviewed by NCS staff.	5.3.7	
7.6 Procedures should be supplemented by postings...	5.3.6	No shall's in this section
7.7 Deviations from procedures and unforeseen alterations that affect NCS shall be reported to management, investigated promptly, corrected as appropriate and documented.	5.3.9	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application.
Actions shall be taken to prevent recurrence.	5.3.9 ; 11.6	
7.8 Operations shall be reviewed at least annually	11.5; Table 11-1	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application Audit program requires entire facility be reviewed biennially. Most areas are reviewed more frequently on a risk informed and performance basis.
These reviews shall be conducted, in consultation with operating personnel, by individuals who are knowledgeable in NCS...	11.5	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application This activity is part of the work practice on performing audits.
7.9 For facilities or operations in extended shut down, the extent and frequency of review described in 7.8 shall depend on the post shutdown conditions and shall be documented.	11.5; Table 11-1	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application In actual practice the schedule is created each year with areas in extended shut down in mind.
8 Process evaluations for NCS	---	
8.1 Before the start of a new operation with FM or before an existing operation is changed, it shall be determined that...	5.3.1	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application.
Normal and credible abnormal conditions shall be determined with input from operations and other knowledgeable individuals.	5.1	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application NCS is responsible for this determination. Sub-tier documents discuss the involvement of the team of people used to evaluate credible abnormal conditions.
8.2 NCSEs shall determine and explicitly identify the controlled parameters and associated limits...	5.3.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application.
The effect of changes in these parameters, or the conditions to which they apply shall be understood.	5.3.4	
8.3 The NCSE shall be documented with sufficient detail...	5.3.4	
8.4 Before the start of operation, there shall be an independent review that confirms the adequacy of the NCSE.	5.3.1	
9 Material Control		
9.1 The movement of FM shall be controlled as specified in documented procedures.	5.3.7	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application. "Operations in which nuclear criticality safety is pertinent shall be governed by written procedures."

Reference/Requirement	License Application Implementation	Comments
9.2 Appropriate material labeling and area posting shall be maintained...	5.3.6;	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application. Labeling not specifically listed in license renewal application. However we have a Plant Wide Criticality Safety Specification (a sub tier document) that implements the requirement for material to be labeled
9.3 If reliance for NCS control is placed on neutron absorber materials,...procedural control shall be exercised to maintain their continued presence with the intended distribution...	5.4.2.14	This requirement to be continuously present and available to perform the required function is not specific to absorbers—but general design requirement for all engineered controls AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application. .
9.4 Access to areas where FM is handled, process, or stored shall be controlled.	NRC Approved FNMC plan	General requirement in the FNMC plan to keep SNM controlled/locked up.
9.5 Controls on FM parameters... shall be maintained...	5..3.7	
9.6 additional consideration should...	---	No shall's in this section
10 Planned response to Nuclear criticality accidents—references 8.3 and 8.23	5.3.11	See discussion on ANSI/ANS 8.3 and 8.23

ANSI/ANS-8.20-1991. This standard covers NCS training. The intent of this standard is to ensure that an effective training program is established and that an adequately trained work force is provided. This intent is met by the AREVA Management Measures program and the commitments to minimum qualifications of personnel and to training as described in chapters 2, 5 and 11 of the license renewal application.

A detailed compliance check with the intent of this standard is provided in the following table and includes references to sub-tier documents that implement the requirements of this standard.

Reference/ Requirement	License Application Implementation	Subtier Nuclear Criticality Safety Standards	Comments
5 Program Responsibilities		E04-05-01, 8.2	
5.1 Management shall establish a NCS training program...	2.2.5.1	E04-05-01, 8.0	NCS Std establishes training in the big picture sense.
5.2 Supervision shall ensure that their staffs are ...trained.	11	---	Supervisory assignment of learning plan elements and ongoing monitoring of training status.
5.3 NCS staff shall participate in the development of the training program...	---	E04-05-01, 8.2	Training and NCS worked closely together on the initial and refresher courses
6 Program structure	---	---	
6.1 Training requirements shall be determined and documented.	---	E04-05-01, 8.3	

Reference/ Requirement	License Application Implementation	Subtier Nuclear Criticality Safety Standards	Comments
6.2 Refresher training requirements shall be determined and documented	---	E04-05-01, 8.3.3	
6.3 learning objectives should be made available to participants…	---	---	No shall's in this section; Objectives are given at the start and end of the initial course
7 Program content	---	---	
7.1.1-7.1.2.2	---	E04-05-01, 8.3.2	No shall's in this section
7.1.3 Health effects of criticality accidents shall be discussed.	---	E04-05-01, 8.3.1	Discussed in presentation of basic NCS training.
7.2-7.2.4 neutron behavior	---	E04-05-01, 8.3.2	No shall's in this section
7.3 Criticality Accident History	---	E04-05-01, 8.3.2	No shall's in this section; 2 examples are reviewed in initial and several more are reviewed in the annual refresher
7.4 Responses to Criticality Alarm Signals	---	E04-05-01, 8.3.1	This is presented several times • Instructions are given on the site access video which everyone has to view once per year (contractors, visitors) • Initial training • Refresher training
7.4.1 Training shall be provided in the recognition and response to criticality accident alarms	---	E04-05-01, 8.3.1	See response to 7.4
7.4.2 An example of the reduction in the received dose as a function of distance, time, and shielding shall be given emphasis…	---	---	Covered in initial & refresher – examples are given of the inverse square law. Time, distance, and shielding is covered in radiological safety training.
7.5 Controlled parameters	---	E04-05-01, 8.3.1	Each of the factors listed in 7.5.1 are reviewed and discussed. Examples are given and during initial NCS training; during the tour, physical examples are shown. Controlled parameters are also covered in the NCS refresher training
7.5.1 The effects and application of the following factors shall be explained and illustrated:	---	E04-05-01, 8.3.1	See response to 7.5
7.5.2 single parameter limits appropriate to the facility shall be discussed.	---	---	Where single parameter control is used, the workstation specific NCS training discusses the use of a single parameter and the controls used to ensure that this parameter is maintained within allowed ranges. For example in moderator controlled powder prep equipment, UF6 Cylinder storage and liquid in 55-gallon concentration controlled drums.
7.5.3 The concept of nuclear criticality shall be illustrated by examples…	---	---	Covered in initial and refresher

Reference/ Requirement	License Application Implementation	Subtier Nuclear Criticality Safety Standards	Comments
7.5.4 the concept of contingencies for checking the validity of criticality safety limits shall be discussed.	---	---	This is covered at the workstation specific training as appropriate to that work station –e.g. A function of the Criticality Control Key Custodian (CCKC) qualification process.
7.6 Policy and Procedures	---		
7.6.1 Management's NCS policy shall be described.	---	E04-05-01, 2.0	The flow down of procedures is discussed in initial and refresher training. We discuss NCSA flows to NCSSs, which flow down to SOPs / SWIS, NCSPs, PMs, etc. This in turn leads into configuration management and the ECN process.
7.6.2 facility policy on the use of check lists, sign-off sheets, and documentation in the execution of procedures pertinent to NCS shall be explained	---	E04-05-01, 3.5	These are covered at the workstation specific training as appropriate to that work station.
7.6.3 Relevant procedures that pertain to NCS shall be discussed.	---	E04-05-01, 8.3.2	Initial and refresher review NCSPs, SOP etc During initial – NCSPs are handed out for each individual to read and discuss the meaning of the posting, this is where we also cover the symbols we use (less than or equal to etc.)
Emphasis shall be given to NCS limits, controls, and emergency procedures	---	E04-05-01, 8.3.2;8.3.1	
7.6.4 The policy that relates to situations not covered by procedures and to situations in which the safety of the operation is in question shall be discussed.	---	---	Currently this is discussed as a talking point in initial training. NCS refresher covers this when discussing Work Sequence Plans The safety culture is stressed – if you are unsure, stop and contact your supervisor.
7.6.5 Employees shall be informed of their right to question any operations that they believe may not be safe.	---	---	This is covered in several places • Human performance - STAR / Questioning attitude • NCS initial and refresher discusses what to do if a procedure does not adequately cover the work in progress • NCS initial and refresher review the 10 NCS guide rules
8 Evaluation	---	---	
8.1 The NCS training program of an organization shall be evaluated periodically.	---	E04-05-01, 8.2; 9.2.2	There is a team consisting of Training, NCS, Manufacturing Manager and PC managers to review the standards set fourth in E04-05-01
The evaluation process and the evaluation shall be documented	---	E04-05-01, 8.2; 9.2.2	

Reference/ Requirement	License Application Implementation	Subtier Nuclear Criticality Safety Standards	Comments
8.2 Satisfactory completion of training shall be based on predetermined performance criteria.	---	---	Initial has a pre & post exam Refresher NCS training has an exam that a passing grade must be achieved before credit is given. Part of this is the workstation qualification process
8.3 The employee's training record shall be documented and retained for a minimum of four years or longer as required by management.	---	E04-05-01, 8.2	All training is recorded in the Plant Learning Management System.

ANSI/ANS-8.21-1995. This standard covers the use of fixed neutron absorbers. AREVA meets the intent of the key requirements of this standard which are: the assurance that the absorbers have been carefully evaluated in the safety analysis, that the material used is consistent with the assumptions of the analysis, that the absorbers are correctly installed, and that they will remain effective during use when considering the operating environment and credible abnormal conditions that could have a negative impact on the effectiveness of the absorbers. A detailed compliance check with the requirements of this standard and how they are met in the current license renewal applications is listed in the following table.

Reference/Requirement	License Application Implementation	Comments
4. General considerations		This ANSI/ANS Standard covers the design, safety evaluation and verification process used to assure that neutron absorbers are correctly installed, have appropriate management measures in place to ensure their continued availability and reliability during service life. Each of the following items list specific considerations for accomplishing these goals. The AREVA MM program and basic NCSA verification and review steps accomplish these issues.
Verification of the absorbers and their effectiveness to capture neutrons shall be required before materials are used.	5.3.1;	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application.
After the installations there shall be verification to ensure that the neutron absorber system is in place as intended.	5.4.2.14	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application. Included in NCS / NCSS documentation
The extent and frequency of verification shall be dictated by the impact of the environment in which the absorbers are placed.	5.4.2.14	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. This is a generic consideration for all engineered controls not specific to neutron absorbers.
5 A quality assurance program that meets ... NQA-1 -1989 or equivalent shall be established to implement the activities specified in this standard.	11.8	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. A specific commitment to NQA-1 is not made, however this section is adequate to meet the intent of this requirement.

Reference/Requirement	License Application Implementation	Comments
5.1.1 fixed neutron absorbers shall be designed to maintain their required geometrical relationships with FM during the intended operating life.	5.1; 5.3.1; 5.3.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. This is a generic consideration for all engineered controls, not specific to neutron absorbers.
5.1.1.1 a means for verification shall be provided to determine that the design, safety, and operating requirements are met...	5.3.1 requires verification be performed.	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. This is a generic consideration for all engineered controls, not specific to neutron absorbers.
Requirements for in-service verification shall be considered during the design of the neutron absorber system	11.1.2	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. This is a generic consideration of all for all engineered control designs, not specific to neutron absorbers.
5.1.1.2 the design shall include assessment of the operating environment.	5.1; 5.3.1; 5.3.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. Not specifically required for neutron absorbers in the license application. This is a generic consideration for all engineered controls, not specific to neutron absorbers.
Degradation...shall be protected against or allowed for in the design process.	5.3.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. Not specifically required for neutron absorbers in the license application. This is a generic consideration for all engineered controls, not specific to neutron absorbers.
5.1.1.2.1 the fixed neutron absorber shall be designed to maintain its designed capability during its intended operating life, including all credible conditions of neutron moderations and reflection.	5.3.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. Not specifically required in License application. This is a generic consideration for all engineered controls, not specific to neutron absorbers.
5.1.1.2.2 Radiation effects on the neutron absorber system over its expected life... shall be evaluated.	5.3.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. Not specifically required for neutron absorbers in the license application. This is a generic consideration not specific to neutron absorbers.
5.1.1.3 The design shall make allowances for process material variations, manufacturing tolerances....	5.3.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. Not specifically required in License application. This is a generic consideration not specific to neutron absorbers.
5.1.2 The neutron absorber system shall be designed such that the NCS function is not compromised for credible operating conditions and natural phenomena events...	5.3.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. Not specifically required for neutron absorbers in the license application. This is a generic consideration not specific to neutron absorbers.
5.1.3 The neutron absorber system shall be designed to prevent inadvertent removal, displacement, or alteration...	5.3.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. Not specifically required for neutron absorbers in the license application. This is a generic consideration not specific to neutron absorbers.

Reference/Requirement	License Application Implementation	Comments
5.1.4 The design of equipment...shall incorporate human factors engineering practices for installation, operation, and maintenance of fixed neutron absorbers.	5.3.3	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. The preference of controls incorporates the most significant human factors engineering principles—using passive controls where possible, followed by active engineered controls and .then administrative controls.
5.1.5 The requirements of operations, accountability, and other safety disciplines shall be considered...	---	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. Not specifically required for neutron absorbers in the license application. This is a generic ISA consideration not specific to neutron absorbers.
5.2 Safety Evaluations		
5.2.1 refers to 8.1	5.1;; 5.3.1	
5.2.1.1 Potential for degradation...shall be assessed.	5.3.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. Not specifically required for neutron absorbers in the license application. This is a generic consideration not specific to neutron absorbers.
5.2.1.2 The impact of adverse...conditions such as ... shall be evaluated.	5.3.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. Not specifically required for neutron absorbers in the license application. This is a generic consideration for all engineered controls, not specific to neutron absorbers.
5.2.1.3 any event...outside the design envelope shall require reassessment of the system prior to restart of operations.	5.3.9; 11.6	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application.
5.2.2 Safety analyses shall be based on results obtained from validated calculational methods or results obtained from experiments..	5.1; 5.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced sections of the license renewal application.
Calculational methods shall be validated per ANSI/ANS- 8.1	5.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application.
5.2.2.1 the calculational methods shall replicate the effect of neutron flux depressions associated with localized neutron absorbers.	5.4.1	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. Not specifically required in License application but is covered by using a validated methodology.
5.2.2.2 The effect on criticality of inhomogeneity of the fixed neutron absorber shall be assessed.	5.3.1	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. Not specifically required in License application but is covered by considerations of manufacturing tolerances and credible abnormal conditions.
5.2.3 Evaluations shall consider manufacturing tolerances, material substitutions...	5.3.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. Not specifically required for neutron absorbers in the license application. This is a generic consideration for all engineered controls, not specific to neutron absorbers.

Reference/Requirement	License Application Implementation	Comments
5.3 Verification and Inspections		
5.3.1 The inspection and verification plan for fixed neutron absorber systems shall conform to the facility QA requirements.	11.1	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. Not specifically required for neutron absorbers in the license application. This is a generic consideration for all engineered controls, not specific to neutron absorbers.
Any actions as a result of the plan shall not compromise the NCS of the operating system.	5.3.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. Not specifically required for neutron absorbers in the license application. This is a generic consideration for all engineered controls, not specific to neutron absorbers
The inspection and verification shall be documented,	5.3.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. Not specifically required for neutron absorbers in the license application. This is a generic consideration for all engineered controls, not specific to neutron absorbers
Records shall be maintained for the operating life of the facility...	11.7	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. Not specifically required for neutron absorbers in the license application. This is a generic consideration for all engineered controls, not specific to neutron absorbers
5.3.1.1 The required frequency of inspection and the extent of in-service inspection shall be determined.	5.3.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. Not specifically required for neutron absorbers in the license application. This is a generic consideration for all engineered controls, not specific to neutron absorbers
Factors that shall be considered include the safety analysis, environment, and material properties.	5.3.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. Not specifically required for neutron absorbers in the license application. This is a generic consideration for all engineered controls, not specific to neutron absorbers
5.3.1.2 If required, the in service verification methods used to ...may include	---	No shall's in this section
5.3.1.3 Testing methods used shall be calibrated to material standards traceable to NIST	11.8	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. Not specifically required for neutron absorbers in the license application. This is a generic consideration for all engineered controls, not specific to neutron absorbers.
5.3.2.1 Fixed neutron absorber material verification shall be obtained before use.	5.3.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. Not specifically required for neutron absorbers in the license application. Verification of component and materials is a generic consideration not specific to neutron absorbers

Reference/Requirement	License Application Implementation	Comments
5.3.2.2 The inspection and verification plan shall be verified to conform with design drawings and specifications before installation	5.3.4	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. Not specifically required for neutron absorbers in the license application. This is a generic consideration for all engineered controls, not specific to neutron absorbers
5.3.2.3 Proper installation of neutron absorber system shall be verified prior to use.	5.3.1	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. Not specifically required for neutron absorbers in the license application. This is a generic consideration for all engineered controls, not specific to neutron absorbers
5.3.2.4 The operation of the neutron absorber system and its maintenance shall be verified to conform to the safety evaluation requirements.	5.3.1	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. Not specifically required for neutron absorbers in the license application. This is a generic consideration for all engineered controls, not specific to neutron absorbers
5.3.3 Results of in-service verification shall be evaluated and, if necessary, appropriate corrective actions shall be taken.	5.3.9	AREVA meets the intent of this standard through AREVA's commitments listed in the referenced section of the license renewal application. Not specifically required for neutron absorbers in the license application. This is a generic consideration for all engineered controls, not specific to neutron absorbers

ANSI/ANS-8.23-1997. This standard covers Criticality Accident Emergency Planning and Response. AREVA meets the intent of this standard by implementation of an NRC approved emergency plan which covers NCS as well as other emergencies.

A detailed compliance check with the intent of this standard is provided in the following table to facilitate the NRC's review.

Reference/Requirement	License Application Implementation	Comments
4.1 Management shall ensure that: 1) staff with relevant experience provided. 2) An emergency response plan is established and maintained. 3) Immediate evacuation zones and evacuation routes are established. 4) A personnel assembly station is established... 5) Instrumentation and equipment needed for response... 6) The level of readiness...for response is adequate 7) The capability to perform rad dose assessments... 8) A communication system for central coordination of all site EP actions... 9) NADs (ANSI N13.3-1969 are provided 10) Equipment and procedures are in place to activate the emergency response when needed.		The NRC approves the AREVA Emergency Plan, which covers NCS as well as other emergencies. If the NRC has any concerns regarding emergency response, they should be addressed while the EP is being approved.
4.2 Tech Staff Resp.		
4.2.1 Staff shall: 1) Identify potential crit accident locations. 2) Evaluate and characterize potential crit. accidents...including prediction of doses. 3) Determine the instrumentation and equipment required for ER actions 4) Define the immediate evacuation zone for each crit accident location. 5) Participate in the planning, conduct, and evaluation of drills and exercises.		1) Listed in E08-06 Emergency Assessment Resource Manual (EARM) 2) Bounding conditions listed in EARM 5.1; EP 2.1.1.3 3) EP 6.4 4) EP 2.2.1.3 and Table 3 5) EP 7.3
4.2.2 During an emergency response the tech staff shall: 1) be available to advise and assist the emergency coordinator... 2) Conduct a radiological dose assessment appropriate for a crit accident.		1) PERMT is expected to respond 2) Using EARM 5.1; EP 2.1.1.3; EP 4.3.8, and the Criticality Accident Slide rule, staff can complete a dose assessment. Additional aids are PNADs and quick sort surveys.
5 Emergency Response Planning		
5.1.1 An evaluation shall be conducted and documented to identify potential crit. accident locations.		We assume that this could occur at any processing or storage location.
5.1.2 if the above evaluation indicates accident is credible, evaluation shall describe the bounding accident.		Bounding conditions listed in EARM 5.1; EP 2.1.1.3
5.1.3 An immediate evacuation zone shall be established...		Recommendations are listed in both EARM 5.1; EP 2.1.1.3; EP 2.1.1.3 is conservative and flows down through the PARs in sub-tier procedures.
Emergency response planning shall establish a maximum acceptable value for the absorbed dose at the immediate boundary...		EARM Table 5.2; EP 2.1.1.3

Reference/Requirement	License Application Implementation	Comments
The basis for the maximum dose shall be documented.		EARM 6.4./1
5.2 Emergency Response Plan		
5.2.1 If a crit accident is credible, an emergency response plan shall be established and maintained.		EP 2.1.1.3, Table 3 and implementing procedures
5.2.2 The emergency response plan shall include guidance to ...		EP 2.1.1.3, Table 3 and implementing procedures
The plan shall address recommended protective actions...		EP 2.1.1.3, Table 3 and implementing procedures
5.2.3 The emergency plan shall identify potential crit accident locations and include appropriate facility descriptions.		We assume that this could occur at any processing or storage location. The more likely locations are listed in the EP and EARM.
5.2.4The emergency response plan shall include provisions for:... 1) Emergency coordinator 2) Activating emergency response. 3) Responding to concurrent emergencies... 4) Identifying exposed personnel and determining doses 5) Providing appropriate medical care for exposed individuals 6) Evaluating the consequences of the accident... 7) Determining when the emergency condition no longer exists. 8) Coordinating with emergency organizations... 9) Assembly and accountability of personnel.		This AREVA EP includes each of these items. We have not documented specific references to each of these items.
5.2.5 The EP may be activated on even a perception that a crit. accident is developing		No shall's in this section
5.3 Equipment		EP 6.0
5.3.1 Appropriate PPE shall be provided for response personnel.		Provided and staged in repositories around the site for easy access.
5.3.2 Appropriate monitoring equipment shall be provided...		EP 6.4.1.4
6 Evacuation		Standard response to crit alarm
6.1 Personnel within the immediate evacuation zone shall evacuate...		Standard response to crit alarm
6.2 Radiation levels shall be monitored in adjacent, occupied areas .		Standard response to crit alarm
6.3 Monitoring at the assembly area shall be performed periodically after the event.		Standard response to crit alarm
6.4 If monitoring indicates a dose rate > 100 mrem/hr... non-emergency response personnel shall be evacuated...		Standard response to crit alarm
6.5 Sufficient exits from the immediate evacuation zone shall be provided.		Part of plant layout
Immediate evacuation for personnel shall take precedence over contamination control or security considerations.		Standard response to crit alarm
6.6 Assembly points shall be clearly identified or posted.		Standard practice
6.7 Evacuation routes should...		No shall's in this section
7 Re-entry, Rescue, and Stabilization; all re-entry activities...shall be coordinated and authorized by the emergency coordinator		Standard response to crit alarm

Reference/Requirement	License Application Implementation	Comments
7.1 Re-entry shall be planned to minimize risk		Standard response to crit alarm
7.1.1 Re-entry during the emergency shall only be made by volunteers.		Standard response to crit alarm
7.1.2 Re-entry should...		No shall's in this section
7.1.3 All re-entry shall be made with continuous monitoring		We rely on the HP/Environmental Safety Liaison's who participate in the Emergency Response Management Organization to ensure this is established prior to reentry.
7.1.4 ...The method for disabling the system shall be carefully planned to minimize hazards to the re-entry team.		Standard response to crit alarm
7.2		---
7.2.1 If personnel need to be rescued, the rescue shall be planned so as to not expose rescuers to life-threatening radiation doses. ...		Standard response to crit alarm
7.2.2 Rescue actions...should...		No shall's in this section
7.3 Stabilization		
7.3.1 The technical staff shall determine if the system is subcritical		Assigned to nuclear safety liaison
Shall advise management of methods to ensure stabilizations...		Assigned to nuclear safety liaison
7.3.2 If use of neutron absorbers is planned...sufficient quantity shall be readily available...		This is not pre-planned. However, we do have sufficient Gd2O3 to utilize in most situations.
Consideration shall be given to material compatibility...		These issues will be considered as recovery actions are developed.
8. Classroom Training, Exercises and Evacuation Drills		
8.1 Training for response shall be developed and provided annually		Part of general NCS trng. Also covered in evacuation drills
Training shall be reviewed annually.		This is considered in our management measures section on audits and assessments
8.1.1 Facility personnel who must respond shall be trained to recognize the alarm...		Part of GET and NCS training
8.1.2 Emergency response personnel shall be trained to specific duties...		Part of our drill and table top exercises and associated training
Training shall include procedures, facility layout, and characteristics of a criticality accident.		EP training includes familiarization of facility layout, location, and content of equipment repositories, and the EP implementing procedures..
8.1.3 Visitors shall be briefed on responsibilities in responding to a criticality accident.		Standard protocol of site access training requirements. Also a card containing this information is generally handed out to visitors.
8.1.4 Training on re-entry procedures and facility hazards shall be provided annually for re-entry teams.		This is a standard part of Plant Emergency Response Team (PERT) training.
8.1.5 Technical staff shall be trained in duties and responsibilities...		
8.2 Exercises-- exercises should be conducted annually		No shall's in this section
8.2.1 Exercises should include realistic...		No shall's in this section
8.2.2 exercises should include a post-exercise...		No shall's in this section
8.2.3 Exercises should be planned and controlled...		No shall's in this section
8.2.4 Emergency response personnel should...		No shall's in this section
8.3 Evacuation Drills.		

Reference/Requirement	License Application Implementation	Comments
Evacuation drills shall be conducted at least annually		Part of our program
Drills shall be pre-announced		All of our drills are pre announced
False alarms shall not be substituted for drills.		We do not substitute false alarms for drills.