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SUBJECT: WESTINGHOUSE SNM-1107LICENSE RENEWAL REQUEST FOR ADDITIONAL INFORMATION RESPONSES (TAC 31911)

The following enclosure is being provided by Westinghouse Electric Company (WEC) in response to the NRC License Renewal Application Request for Additional Information dated April 14, 2006.

After you have reviewed the responses, WEC looks forward to discussing any additional questions or concerns with you over the phone or at the CFFF. Based on these discussions, a mutually agreed to schedule will be determined for submittal of the revised license application incorporating the appropriate revisions.

Sincerely,

Nancy Blair Parr

Nancy Blair Parr
Licensing Manager

Enclosure 1: Response to License Renewal Application RAI Questions

cc: U. S. Nuclear Regulatory Commission
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Responses to License Renewal Application RAI Questions

Chapter 1: General Information

1-1. 10CFR 70.22 (a) (4) requires that the license application contains the following information: *the name, amount, and specifications (including the chemical and physical form and, where applicable, isotopic content) of the special nuclear material the applicant proposes to use or produce.*

This regulatory required information is contained in Section 1.1.4 of the license application. More detailed information regarding quantities of SNM in specific WEC processes and the types, amounts and discharge points of waste material discharged to the environment is appropriately contained in the Integrated Safety Analysis (ISA). WEC believes that the license application meets the requirements of the regulation.

1-2. The CFFF does not currently have significant quantities of moderators or reflectors made of graphite, heavy water or beryllium. The current wording contained within the license application, Section 6.1.8, 2nd paragraph, 1st sentence, mandates compliance with 10CFR70.24 for CAAS installation. Evaluation of the introduction of moderators or reflectors of concern, should that be required in the future, would be performed in accordance with the configuration control process, including any required CSEs. The CSEs determine CAAS location compliance with 10CFR70.24 detector placement.

WEC believes this commitment is already included in the text of Chapter 6 and that it would be redundant to locate it within the general information contained in Chapter 1 of the license application.

1-3. WEC will revise the definition of IROFS in Section 1.1.6.20 to the following:

Items Relied On For Safety (IROFS): A subset of Safety Significant Controls (SSCs), disclosed by the Integrated Safety Analysis. IROFS mean structures, systems, equipment, components, and activities of personnel that are relied on to prevent potential accidents at a facility that could exceed the performance requirements in § 70.61 or to mitigate their potential consequences.

Chapter 2: Management Organization

2-1. 10CFR 70.22 (a) (8) requires that the license application contains the following information: *proposed procedures to protect health and minimize danger to life or property (such as procedures to avoid accidental criticality, procedures for personnel monitoring and waste disposal, post-criticality accident emergency procedures, etc.).*

This regulatory required information is contained in Section 2.1.1.3 (b) of the license application. Specifically, it states: "The Manufacturing component conducts operations and maintenance activities required for the production of nuclear fuel. The Engineering Component provides technical support and design service related to processes and

facilities used by the Manufacturing Component and others. WEC will add the following sentence to this section: "The Engineering Component is responsible for managing the development of design changes to the facility."

In addition, WEC believes that the organization chart provided in Figure 2.2, coupled with the text description of key management and EH&S positions is sufficient to demonstrate the independence of EH&S and Quality Assurance functions from manufacturing operations and to assure safety. Also, the management organizational change control process described in Section 2.1.1.4 of the license application provides assurance that organizational changes do not adversely impact safety or regulatory compliance.

Finally, detailed organization charts are maintained at the CFFF, and are always available upon request.

2-2. The following text will be added to the end of the first paragraph of Section 2.1.1.3:

"The lines of communication and authority among the Engineering, Manufacturing and EH&S components are formally described in written position descriptions and department charters at the CFFF."

In addition, the first paragraph of Section 2.1.1.2 states the following: "Position descriptions are reviewed and approved by two higher levels of management. These reviews determine that all key functions are covered, inter-relationships are clear, and conflicts are eliminated."

Chapter 3: Conduct of Operations

3-1. WEC will revise the last sentence of the Section 3.0 introductory paragraph to state the following: "In particular, these management measures are applied to Safety Significant Controls (SSCs) to provide reasonable assurance that items relied on for safety are designed, implemented, and maintained, as necessary, to ensure they are available and reliable to perform their intended functions when needed."

Based on the definition in Section 1.1.6, IROFS are defined as a subset of Safety Significant Controls (SSCs). Therefore, WEC is conservatively applying management measures to beyond the minimum set of controls necessary for compliance with the performance requirements.

3-2. WEC will add a new section to the license application as follows:

"Section 3.7.3, 10CFR Part 21 Compliance - CFFF company policy and procedures require identification and evaluation of all potential substantial safety hazards and conditions adverse to safety within the scope of 10CFR21. Substantial safety hazards and

conditions adverse to safety must be promptly reported to WEC Management and the NRC as appropriate as per these procedures."

3-3. WEC will revise Section 3.1 to remove the following from the first sentence: "in order to reliably predict performance under normal operating conditions and potential process upsets." This change was agreed to during the onsite visit by the license review team.

WEC will further revise Section 3.1.1, second sentence, to read as follows: "These procedures define the review and approval process for assuring that new or modified structures, systems and components comply with applicable regulatory requirements."

WEC will also revise Section 3.1.1.1 as follows:

"3.1.1.1 Procedures are in place for use by the Engineering Component that detail the CFFF configuration control process. These procedures include instructions on the following:

(a) To specify the process for implementation of proposed changes to all plant manufacturing and inspection systems, facilities and utilities;

(b) To provide a description of the modification, including how it is expected to operate during normal conditions and during potential process upset conditions;

(c) To provide for the determination of the applicable codes, standards and specifications;

(d) To identify documentation requirements for maintaining records of current plant conditions, and

(e) To define the review and approval processes necessary to ensure that specification requirements for manufacturing and inspection functions in a manner that:

- Is safe;
- Complies with applicable requirements, and
- Appropriately incorporates As Low As Reasonably Achievable (ALARA) considerations."

An integral part of the configuration control process includes the analysis required and reviews conducted in order to ensure the safety basis of the facility is kept current, and that when required, NRC pre-approval is obtained. The CM program implementation described in Section 3.1.2 and specifically 3.1.2.2 (d) includes necessary review and application of updated PHAs, (e.g., HAZOPS), CSEs, FHAs, or environmental analysis. The various safety disciplines review and document the need for new / updated analysis or design requirements. These reviews are performed in accordance with detailed review instructions or checklists for the configuration change, and are an integral part of the

supporting information mandated in Section 3.1.2.3 to be filed with the applicable baseline ISA. A further level of detail, and direction on use of these checklists and procedures, is more appropriately contained within facility administrative policies and procedures based on a risk informed graded approach. The requirements submitted in the license application address the need for a formal program structure for activities involving storage, handling, processing, inspection and/or other activities involving nuclear materials, which encompass the activities cited in the regulation.

3-4. The answer to this question is addressed in response to RAI Question 3.3.

3-5. 10CFR70.62(d) requires that the licensee shall establish management measures to ensure that IROFS are designed, implemented, and maintained, as necessary, to ensure they are available and reliable to perform their function when needed. In Section 3.2 of the license application, the CFFFF believes that appropriate commitments have been made to develop, maintain and follow a maintenance program in accordance with written, approved procedures to ensure that IROFS are properly installed, tested, modified and maintained. In general, the level of detail requested by this RAI Question is more appropriately contained within facility administrative procedures based on a risk informed graded approach.

(a) The maintenance surveillance function is described in detail within facility administrative procedures. Surveillance functions and frequencies for IROFS are also documented in the ISA and ISA Summary. An example table is provided in the license application as Figure 3.1, showing how the periodic maintenance/calibration/inspection, functional test and post repair/replace test requirements (i.e, surveillance activities) are documented at the CFFF. The frequency of the surveillance function varies based on equipment type, manufacturing recommendations, engineering judgment, past performance, etc. The minimum requirements for surveillance frequencies based on control type are detailed in on-site procedure RA-108, Safety Significant Controls.

Performance trends and corrective action, as necessary, are described in Sections 3.7 and 3.8 of the license application and in response to RAI Questions 3-18. The commitment to maintain records for failures of IROFS per 10CFR70.62(a)(3) is discussed in RAI Question 3-19.

In addition, Procedure RA-108 also appropriately contains requirements for surveillance tests that can only be performed when the IROFS are out of service. Specifically, "Components associated with Safety-Significant Controls shall not be disconnected or removed from service, while the process continues to operate during calibration or interlock verification, unless authorized in a written procedure specifically approved in advance by EH&S." Also, "Whenever components associated with Safety-Significant Controls are observed to be defective, the controlled operations shall be terminated until appropriate controls,

approved by EH&S, can be temporarily instituted while the defective component is being replaced."

Finally, the introductory paragraph of Section 3.2 of the license application will be revised to include: "Included in these maintenance program procedures are the requirements for maintaining maintenance records showing the current calibration and testing schedule, acceptance criteria and the test results for IROFS."

(b) Procedure RA-108 states that "whenever components associated with Safety-Significant Controls are observed to be defective, the controlled operations shall be terminated until appropriate controls, approved by EH&S, can be temporarily instituted while the defective component is being replaced." This type of corrective maintenance must be immediately reported to EH&S and the Area Engineer per the "Redbook" process detailed in Section 3.7 of the license application.

Maintenance program procedure MCP-108-103, Work Order Handling, specifies the types of maintenance functions performed at the CFFF such as emergency breakdown, responsive, planned, predictive, redbook/unusual occurrence, safety-significant, fire safety, and others. The first paragraph of Section 3.2.1 of the license application will be revised to add the following sentence: "Written procedures are established to ensure that IROFS are properly installed, tested, modified, maintained, and corrected, when necessary, to ensure their availability and reliability."

(c) This question has been incorporated into the response to RAI Question 3-5 (a).

(d) The methods used to perform functional testing of IROFS are varied, and this level of detail is appropriately described in written CFFF procedures. As described in Sections 3.2 and 3.3.1 of the license application, the ISA will serve as a reference to these detailed maintenance procedures for IROFS. The requirements submitted in the license application address the need for IROFS testing (functional verification) to ensure their availability and reliability and encompass the activities cited in the regulation.

3-6. The authority, responsibility, and accountability of the WEC management structure for activities involving storage, handling, processing, inspection and/or other activities involving nuclear materials, which encompass the activities cited in the regulation, are located in Chapter 2 of the license application. In keeping with a Quality at the Source concept, line management authority, responsibility, and accountability are committed to in Section 2.1.1.3 (b).

To clarify the independence and function of the Regulatory Component Quality Assurance Function, the following will be added in section 2.1.1.3 (c). (This is similar to

the paragraphs in place for the Radiation Protection, Nuclear Criticality Safety, and Occupational Health functions.)

"The Quality Program administered by the Regulatory Component includes, at minimum:

- The development of policies and procedures to ensure the quality of management measures meets regulatory requirements and that regulatory significant engineered and administrative controls and control systems are designed, implemented, and maintained, as necessary, to ensure they are available and reliable to perform their function;
- The scheduling and performance of compliance inspections, program audits and self assessments;
- The application of quality assurance commensurate with the degree of risk posed by activities important to safety, safeguards, and protection of the environment."

3-7. The standards utilized to determine the applicability of the QA program elements are described in the license application under Section 3.3.2. As discussed during the onsite visit of the license review team, the CFFF currently has no systems which are considered High Consequence Systems. The safety systems (IROFS) identified in the ISA submitted in support of the license application are therefore currently addressed by the criteria in Section 3.3.2.2. To commit to a further level of detail, and direction on use of these elements, are more appropriately contained within facility administrative policies and procedures based on a risk informed graded approach. The requirements submitted in the license application address the need for formal program structure for activities involving storage, handling, processing, inspection and/or other activities involving nuclear materials, which encompass the activities cited in the regulation.

To clarify the applicable safety function and the appropriate QA program elements, WEC will revise the license application to revise Section 3.3.2.3 to use Defense in Depth terminology instead of Safety Margin Improvement Systems to avoid conflicts in interpretation. WEC will also revise 3.3.3.2 to remove the use of the term "performance base," as discussed in the site visit, as the implications of that terminology go beyond the facility evaluations for specific equipment operational history and subsequent quality assurance decisions.

3-8. WEC will revise the license application to include the term "procedural inadequacies" along with deficiencies, deviations and defective equipment and services in Section 3.3.3.7 of the license application.

3-9. A commitment within the license application is included to provide written procedures for the operation of IROFS and for management measures supporting the IROFS. IROFS operations and the management measures which support them are included in the commitment contained in the first paragraph of Section 3.4.1 of the license application: "Operations to assure safe, compliant activities involving nuclear material are conducted in accordance with approved procedures." IROFS are a sub-set of Safety Significant

Controls, and the statement "Administrative Safety Significant Controls (SSCs) are detailed in approved procedures" required by the second paragraph of Section 3.4.1 of the license application is also applicable.

3-10. WEC will revise the license application to add Chemical Process Safety and Fire Safety to the list of examples of Category-1 procedures.

3-11. The regulatory requirements of 10 CFR 70.22(a)(8) are:
(a) Each application for a license shall contain the following information:
(8) Proposed procedures to protect health and minimize danger to life or property (such as procedures to avoid accidental criticality, procedures for personnel monitoring and waste disposal, post-criticality accident emergency procedures, etc.).

Those activities that encompass protection of health and are necessary to minimize danger to life or property are regulatory significant. The sentences in the second paragraph of Section 3.4.1.2 commit the licensee to prepare, review and approve such procedures, including changes to the procedures. The RAI question suggested wording includes methods available that may or may not apply to each and every new procedure or procedural change. This level of detail, and direction on use of these methods, are more appropriately contained within facility administrative procedures based on a risk informed graded approach. The requirements submitted in the license application address the need for formal preparation, review, approval, and content (including changes) for activities involving storage, handling, processing, inspection and/or other activities involving nuclear materials, which encompass all of the activities cited in the regulation.

The regulatory requirements of 10 CFR 70.62(d) are:
(d) Management measures. Each applicant or licensee shall establish management measures to ensure compliance with the performance requirements of § 70.61. The measures applied to a particular engineered or administrative control or control system may be graded commensurate with the reduction of the risk attributable to that control or control system. The management measures shall ensure that engineered and administrative controls and control systems that are identified as items relied on for safety pursuant to § 70.61(e) of this subpart are designed, implemented, and maintained, as necessary, to ensure they are available and reliable to perform their function when needed, to comply with the performance requirements of § 70.61 of this subpart.

The license application commitment to the management measure for configuration management in Chapter 3, Section 3.1 and the mandatory reviews and approvals for regulatory significant procedures are applicable and utilized to ensure that engineered and administrative controls relied on for safety are available and reliable to perform the intended function. The requirements discussed in response to RAI Question 3.9 clearly identify the need for IROFS procedures and thus subject said procedures to the necessary reviews to ensure they function as needed.

3-12. The license application Chapter 3, Section 3.7.2, Internal Reporting and Unusual Occurrences, and Section 3.8 provide the license structure to ensure that any procedural issues are addressed via the evaluation processes, which utilizes either the Redbook System or a more detailed causal analysis method, which is the industry norm to address significant events. The causal analysis / Redbook process as described would result in procedural changes if that was an appropriate corrective action. Modification of Section 3.4.1.3 as suggested would be redundant and perhaps confusing to the staff, as it would imply procedure changes are required even if the causal analysis did not recommend procedural changes.

For modifications, the configuration and change control requirements, outlined in license application Section 3.4.1.2 and in response to RAI Question 3.11 above, address "changes" to the process resulting from modifications. Section 3.4.1.3 is solely meant to commit to a periodic review of regulatory significant procedures, to ensure they are reviewed and updated for whatever changes (i.e., updated regulations, standards, and management changes) may be needed to maintain them reasonably current. Most operational procedures will undergo this review during the normal execution of daily activities; this requirement ensures seldom used but important procedures are also addressed.

3-13. Temporary procedures are not excluded based on the license application, and are subject to the same preparation, review and approval process which has been committed to in the application. The level of detail and direction on how temporary procedures are specifically processed is more appropriately contained within facility administrative procedures based on a risk informed graded approach.

3-14. The introduction of Section 3.4.2 in the license application specifies that the training and qualification structure is necessary to "enable procedure use and adherence" and that the programs are "performance based." It further commits to the program being structured such that specific training and qualification requirements are met prior to regulatory positions being fully assumed. "Operations to assure safe, compliant activities involving nuclear material are conducted in accordance with approved procedures" is already contained in the first paragraph of Section 3.4.1. As the use of the procedures is mandatory, and the training requirements are performance based, it is not possible to fulfill the training requirements without familiarity and use of the applicable supporting procedures. These requirements are contained within the applicable section of the license application as it is currently structured.

3-15. WEC will revise Section 3.6 of the license application to add the following sentence:

"Compliance inspections, audits, and self assessments are periodically performed on the programs described within Chapter 3 of this license, and the areas of Nuclear Criticality Safety, Chemical Safety, Fire Safety, Emergency Management and Environmental Protection."

3-16. The training attributes described within Section 3.4.2.2 of the license application apply to Regulatory Function Engineers who conduct these inspections. Formal inspections are scheduled and conducted based on a variety of factors, including governing regulations, procedural requirements, operating histories, or management decision. The sharing of inspection results is committed to in the wording of Sections 3.6.2.1 (b) and 3.6.2.2. CAPS (Section 3.8 of the license application) is used as the primary mechanism which provides a structured disciplined approach to detect, correct and prevent recurrence of undesirable issues, including findings from audits and inspections. The level of detail and direction on conduct and distribution of information is contained within facility administrative procedures and the EH&S Quality Program/Policy Manual which was discussed during the review team visit. This is appropriate based on a risk informed graded approach.

3-17. There is a commitment in Section 3.6.2.2 of the license application to utilize "appropriately qualified and certified individuals" for performance of program audits. The training attributes described within Section 3.4.2.2 apply to Regulatory Function Engineers who conduct these audits. The level of detail and direction on audit qualification and training is contained within facility administrative procedures, and the EH&S Quality Program/Policy Manual which was discussed during the review team visit. This is appropriate based on a risk informed graded approach.

3-18. The following statement will be added to the end of Section 3.7.1.2 of the license application: "Redbook items and associated causes are periodically trended and summarized by the EH&S Regulatory Component to identify repetitive failures and generic issues. If needed, additional evaluation or corrective actions may be initiated as a result of this trend analysis. Specifically, the performance of safety significant controls will be reviewed, and unacceptable performance deficiencies will be corrected. If necessary, updates to the Integrated Safety Analysis and Summary documents will be performed to correct underestimated performance."

3-19. The commitment to maintain the records requirements of 70.62(a)(3) is contained in Section 3.9.2.1 of the license application. Reference to the general "revised 10CFR70 regulation" will be replaced with the specific NRC regulation reference 70.62(a)(3) to clarify the commitment to maintain these records.

3-20. The following information is provided to clarify the reporting requirement Section 3.7.2.3 of the license application:

(a) WEC interpreted the Appendix A requirement to be consistent to with the performance criteria for high consequence events listed in 10CFR70.61(b)(3), which specifies an intake of 30 mg or greater of uranium in soluble form by any individual located outside the controlled area. We would like to discuss with you the reason for this inconsistency in the regulation. If necessary, WEC can take out the text limiting this notification to an intake by a member of the offsite public.

(b) A sentence will be added to the second paragraph of Section 3.7.2.3 as follows: "If the Emergency Coordinator cannot ascertain whether 1- or 4- hour notification criteria apply, the occurrence will be treated as a 1-hour reportable event until confirmation of the proper event classification is obtained."

(c) This Section 3.7.2.3 notification criterion will be modified to add the text "and the quantity of material involved is greater than five times the lowest annual limit on intake (ALI) specified in Appendix B of 10CFR Part 20 for the material."

(d) There was no part (d) for this RAI question.

(e) This license application Section 3.7.2.3 written report criterion will be modified to the following: "(c) the name of the manufacturer and model number (if applicable) of any safety-significant equipment that failed or malfunctioned."

(f) Under the 24-Hour Notifications Section 3.7.2.3(c), bullets 7, 8 and 10 will be reworded as follows to clarify the requirements:

- "An unusual occurrence that results in the facility being in a state that was not analyzed, or is different from occurrences analyzed in the ISA, and which results in failure to meet the performance requirements of 10CFR70.61."
- "Loss or degradation of IROFS that result in failure to meet the performance requirements of 10CFR70.61."
- "An occurrence that was considered in the ISA but was dismissed due to its likelihood; or was categorized as unlikely and whose unmitigated consequences would have exceeded the high consequence performance criteria of 70.61(b) had the IROFS not performed their intended safety function."

3-21. The first sentence of the introductory paragraph of Section 3.8 will be revised as follows: "The CFFF maintains a Corrective Action Process that provides a structured, disciplined approach to identify, control, detect, document, evaluate, notify, disposition, correct, and prevent recurrence of undesirable issues and safety significant non-conforming hardware items."

3-22. The first paragraph of Section 3.9.1.1 in the license application will be modified to add the following statement after the first sentence: "Required ISA records, such as process safety information, integrated safety anlysis documentation, and management measures documentation are included in the Records Program."

3-23. 10CFR70.72(f) states the following: *The licensee shall maintain records of changes to its facility carried out under this section. These records must include a written evaluation that provides the bases for the determination that the changes do not require prior Commission approval under paragraph (c) or (d) of this section. These records must be maintained until termination of the license.*

In accordance with the requirements of 10 CFR 70.72(f), the detailed commitments for maintaining these records are appropriately contained in CFFF procedures. In the license application, the commitment is addressed by the addition of "management measures documentation" provided in the response to RAI Question 3-22.

Chapter 4: Integrated Safety Analysis

4-1. The first paragraph of Chapter 4 Integrated Safety Analysis (ISA) will be modified to read as follows:

"The Columbia Fuel Fabrication Facility (CFFF) develops and maintains an Integrated Safety Analysis for the site. The ISA is a systematic analysis to identify facility and external hazards and their potential for initiating accident sequences, the potential accident sequences, their likelihood and consequences, and the items relied on for safety."

4-2. The following will be incorporated into Chapter 4 of the License Application:

"The ISA will be of appropriate detail for the complexity of the processes and will identify radiological hazards related to possessing and processing licensed material at the CFFF, chemical hazards of licensed material and hazardous chemicals produced from licensed material. The ISA will include facility hazards that could affect the safety of licensed materials. The ISA will also identify potential accident sequences caused by process upset situations and credible external events.

4-3. This has been addressed by adding the last sentence in the response to RAI Question 4-2 above.

4-3. The following will be incorporated into Chapter 4 of the License Application:

"The CFFF has selected the HAZOP method as the primary tool for conducting process hazard analyses on chemical operations. What-if/checklist analysis, FMEA, Fault Tree/Event Tree, LOPA or other generally recognized PHA methods may also be used, as applicable. When methods other than those identified are used, they will be consistent with NUREG-1513."

4-4. The following will be incorporated into Chapter 4 of the License Application:

"The ISA documents a comprehensive identification of potential accident / event sequences that would result in radiological hazards from possessing and processing licensed material, chemical hazards of licensed material and hazardous chemicals produced from licensed material, including the consequences with expected magnitudes and likelihoods of occurrence."

a) The likelihood acceptance criteria are described in Table 7.4 in the Baseline Integrated Safety Analysis and ISA Summary Handbook. The acceptance criteria are on a sliding scale, the acceptability of the likelihood being related to the associated consequence. To more clearly demonstrate, Table 7.4 is reproduced below and will be incorporated into the license application.

Table 7.4 Risk Analysis Table

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

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

= Risk Zone 2 (Does not meet performance criteria; unacceptable risk for long-term operation)

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

b) Highly unlikely events are those with an index score less than (more negative than) or equal to -4. Unlikely events are those with index scores less than or equal to -2 and greater than -4 (i.e. -4<Score<=-2). Credible events are those with an index score greater than -2. Note: Putting Table 7.4 in the license would answer this question automatically.

c) The criteria for determining the indices for the likelihood of initiating events and IROFS failures are referenced in Table 7.2 (Occurrence Rate Scores for Initiating Events) and Table 7.3 (Failure Probability Scores for Protective Mechanisms) of the Baseline Integrated Safety Analysis and ISA Summary Handbook. These Tables are reproduced below and will be incorporated into the license application.

Table 7.2 Occurrence Rate Scores for Initiating Events

Score[1]	Occurrence Rate	Qualitative Description and/or Example of Prevention Mechanism
1	1/month	Expected to occur regularly during plant lifetime; prevention ineffective
0	1/year	Expected to occur occasionally during plant lifetime; prevention by a trained operator performing a routine task
-1	1/10 years	Expected to occur sometime during plant lifetime; prevention by a trained operator performing a routine task
-2	1/100 years	Not expected, but might occur during plant lifetime; prevention by an inspected passive device, or a functionally tested hardware and/or software system with trained operator backup
-3	1/1,000 years	Not expected to occur during plant lifetime; prevention by an inspected passive device, or a functionally tested hardware and/or software system with trained operator backup
-4	1/10,000 years	Physically possible (credible) but not expected to occur; prevention by two independent, redundant methods or systems each functionally tested (consistent with double contingency protection and control)
-5	—	Not credible (events determined to be *not credible* are those events that are not expected to be possible, based upon generally accepted physical or engineering principles; if an initiating event is determined to be *not credible,* then further analysis of the accident sequence progression is not necessary)

[1]If *detection and correction systems* are in place to detect and correct the failure that results in the initiating event before the accident progresses to the ultimate consequence, then the index score may be lowered by one. This is acceptable since detection and correction will limit the amount of time that the system remains in the failed state. This may be applied only to frequency scores of 1, 0, -1, or -2.

Table 7.3 Failure Probability Scores for Protective Mechanisms

Index Score	Failure Probability	Qualitative Description or Example of Protection Mechanism
0	1	No protection or extremely weak protection
-1	0.1	Protection by a trained operator performing a nonroutine task
-2	0.01	Protection by a trained operator performing a routine task, or a functionally tested active safety device
-3	0.001	Protection by an inspected passive safety device, or a functionally tested active safety device with trained operator backup
-4	0.0001	Protection by two independent, redundantly safety methods or systems each functionally tested (consistent with double contingency protection)

4-5. The following will be incorporated into Chapter 4 of the license application:

"The preventative, mitigative, or other safety function of each IROFS is characterized along with the conditions under which the item is relied upon for safety."

4-7. WEC will add the following statements to the end of the first paragraph of Section 4.1:

"The ISA is performed by a team consisting of members with expertise in the safety disciplines being evaluated, familiarity with the process, engineering, and operations involved. The team is supported by a member knowledgeable in the process hazard analysis techniques being used." The ISA Summary is generated from information extracted directly from the ISA. Updates to both the ISA's and the ISA Summaries are performed by individuals with the same levels of expertise as the original team members."

4-8. This RAI is similar to and addressed by the response to RAI Question 3-3.

4-9. This RAI is addressed by the response to RAI Question 4-10.

4-10. The CFFF is committed to procedures and criteria for managing configuration changes at the facility. These are described in Section 3.1, Configuration Management of Chapter 3, Conduct of Operations. The configuration manage process is performed in accordance with procedures that address the criteria in 10CFR70.72. All changes are reviewed in accordance with existing procedures by the same safety disciplines that were involved in preparation of the ISA's. If safety analyses are required, they are performed to the current standard. Documentation of configuration changes are filed with the applicable ISA's to provide a "living" framework for the facility safety basis.

The following will be incorporated into Section 4 of the License Application: "ISAs are maintained current through implementation of the Configuration Management program described in Section 3.1 of this License Application and in accordance with 10CFR70.72.

All subsequent changes that might affect the Baseline ISA are reviewed by the same safety disciplines that were involved in preparation of the Baseline ISA. If safety analyses are required for the change, they are performed to the current standards required for the Baseline ISA. Summary details of the change, including required approvals, are documented on a Configuration Change Control Form that is filed with the applicable Baseline ISA, thus providing a substantially complete "living" framework for the facility safety basis.

4-11. A commitment currently exists (3.1.1.2(a)) that addresses the evaluation of any facility changes or changes in the process safety information that may alter the parameters of an accident sequence. The integrated process described and the procedures followed necessitate that not only are new accident sequences considered, but also that configuration changes that could alter previously considered accident sequences be considered.

4-12. The second paragraph of Section 4.1 commits the CFFF to the "Baseline Integrated Safety Analysis and ISA Summary Handbook". This document defines team organization and skills required of those involved in the process. To further clarify, see the response to 4-7 which will be added to the license application.

4.13. The following will be added to Section 4 of the License Application..

"New or additional IROFS will be designated and appropriate management measures will be applied if necessary resulting from the evaluation of configuration control changes to the facility or its operation. Existing IROFS and the management measures associated with them will be evaluated for adequacy if they are impacted by configuration changes to ensure that the risk associated with a previously analyzed accident sequence remains acceptable and to designate additional or different IROFS if necessary."

4-14. The CFFF has identified numerous controls as Safety Significant Controls (SSC's). A subset of the SSC's are also identified as IROFS. A commitment currently exists in Section 3.7.1, Incident investigations Program Structure, related to documentation of the failure of an IROFS and / or a management measure associated with an IROF.

4-15. The CFFF is committed to ensuring that IROFS are available and reliable when called upon. The commitment is described in detail in Section 3.3.2, Graded Approach For Safety Systems.

Chapter 5: Radiation Protection

5-1. With regards to the RP required under 10 CFR 20.1101(a), please provide the following information:

(a) A detailed description of the RP organization. An organization chart would be helpful.

From Section 2.1.1.3 (c):

The Radiation Protection Program administered by the Regulatory Component includes, at minimum:

- The development of procedures to control contamination, exposure of individuals to radiation, and integrity and reliability of radiation detection instruments;
- The evaluation of releases of radioactive effluents and materials from the site;
- A robust subprogram for maintaining exposures to radiation and radioactive materials, and releases of radioactive materials to the environment, As Low As Reasonably Achievable (ALARA) and
- The maintenance of required records and reports to document Radiation Protection Program activities.

The RP organization is titled EH&S Operations and consists of a Manager, a Backshift Manager, three engineers, and 19 WEC technicians and various contractor employees. This organization is responsible for implementing all requirements of the radiation safety program described in chapter 5 and the environmental protection program described in chapter 10 of the license. An informal organization chart is attached.

(b) For each RP position, provide a description of its duties and responsibilities.

The EH&S Operations Manager is responsible for ensuring adequate resources are assigned to establish, implement, and maintain Radiation Protection (RP) and Environmental Protection (EP) Programs. The First Line Manager directly supervises the backshift manager, three engineers, contractors, and eight first shift RP technicians. The backshift manager supervises eleven RP technicians.
Engineers: There are two major functional engineers reporting under the EH&S Operations department with one backup engineer who supports both functions. The first major function is responsible for establishing, implementing, and maintaining Radiation Protection of the occupational workers at the site and, the second is responsible for establishing, implementing, and maintaining Environmental Protection including Radiation Protection of the public. The engineer functions are responsible for the technical interpretation and implementation of regulations through written procedures and training of technicians and operations. In addition to implementing the listed programs, engineer positions perform periodic evaluation of RP data which include trending and corrective actions for negative trends.
Technicians: There are currently nineteen technicians of various experience levels who are responsible for maintaining the listed RP and EP sub-programs:

- Routine Operation Surveillance
- Air Sampling
- Ventilation
- Contamination Control

- Bioassay
- Internal Dosimetry
- External Dosimetry
- Laboratory
- Instrument
- ALARA
- Postings
- Radiation Work Permits
- Records

See the attached organization chart which list these programs

(c) For each RP position, provide the minimum qualifications, or commit to an appropriate regulatory guide or industrial standard such as ANSI/ANS 3.1.

Manager: In general the minimum requirements for this function are a High School Diploma, or equivalent, and two years of experience in the nuclear business. A First Level Manager-in-training that does not meet these minimum requirements has an individual, formally designated by the next highest level of management, to provide direct advice and consultation, until the minimum requirements are fully met. Typically, this designated advisor is an individual who formerly held the position, another First Level Manager, or an individual (or individuals) experienced in the skills needed by the First Level Manager-in-training. The job description for this function specifically, requires at least 5 years of nuclear industry related experience, of which 2 years must be in practical RP applications. Also, this function must have a working knowledge of RP standards, calculations and applications, a general knowledge of the Columbia Plant equipment, processes and operations. Finally, knowledge and experience with the Emergency response Organization is required.

Engineers: The minimum requirements for a position of a Regulatory Function Engineer is a baccalaureate degree, or equivalent, with a science or engineering emphasis and two years of experience in positions involving assigned function activities, in the nuclear business. A Regulatory Function Engineer-in-training that does not meet these minimum requirements has an individual, formally designated by a Regulatory Manager, to provide direct advice and consultation until the minimum requirements prescribed by an approved training checklist are fully met. Typically, this designated advisor is an individual who formerly held the position, another Regulatory Function Engineer, or an individual (or individuals) experienced in the skills needed by the Regulatory Function Engineer-in-training. A Regulatory Function Engineer has knowledge in the quality execution of assigned function programs (typically demonstrated by formal performance reviews by a Regulatory Component Manager) and in administration of assigned functional programs.

Technicians: In general the minimum requirements for this function are a High School Diploma, or equivalent. Specific on-the-job training by an experienced employee and or

prior experience is the basis of qualification of each individual for their respective job assignments.

(d) For each RP position, describe the training provided. Include frequencies of refresher training.

In addition to the training described in (c) above, site specific procedures are read and acknowledged prior to performing a specific job duty. More complex procedures may require participating in classroom instruction and passing written test.

General RP and EP refresher training is provided at least annually and procedures must be acknowledged at least biennially or whenever they are revised.

(e) Explain how the Regulatory Function engineers and their managers, mentioned in section 3.4.2.2 of the application, relates to the RP.

The training and qualification of regulatory engineers, described in 3.4.2.2, applies to the RP function. A training checklist exists for both the RP managers and engineers.

(f) Identify how the First Line Managers' RP responsibilities, defined in Section 2.1.1.3b of the application, correlate with the RP staff.

First level managers follow both operation and regulatory procedures which include all regulatory significant actions. In addition, their job description and performance ratings include regulatory significant objectives.

(g) Indicate who in the organization has been given the responsibility to ensure that the license possession limit is not exceeded.

The Plant Manager, who has overall accountability for all nuclear fuel manufacturing activities at the CFFF delegates safeguards and Material Control and Accountability(MC&A) responsibilities to individuals within the EH&S organization.

The MC&A organization, in compliance with the Fundamental Nuclear Control Plan referenced in 1.1.2.1(e) tracks the amount of SNM on inventory at the facility.

(h) Describe in detail the employee radiation protection training program that complies with the requirements of 10 CFR part 19 and 20. Indicate how the training program will be reviewed and updated.

All new employees designated as radiation workers receive additional training relative to regulatory aspects concerning radiation and radioactive materials, risks involved in receiving low level radiation exposure, basic criteria and practices for radiation protection, maintaining radiation exposures and radioactivity in effluents As Low As Reasonably Achievable (ALARA).

Employees or visitors for whom respiratory protection devices might be required, receive pre-work training in the proper use of such devices. Employees designated to take part in emergency response receive training commensurate with their assigned activities during such response.

Radiation workers receive annual refresher training consisting of:

(a) Providing each employee with a current revision of the Integrated Safety Manual or providing each employee with access to an electronic copy of the Manual.
(b) Presenting each employee supplementary instruction on general regulatory topics.
(c) Requiring each employee to successfully pass an examination.

The Training Manual addresses such subjects as: ALARA;

(a) General health physics practices;
(b) Health Physics rules and recommendations;
(c) Area-specific health physics practices;
(d) General nuclear criticality safety practices;
(e) Area-specific nuclear criticality safety practices;
(f) Industrial safety and hygiene, practices;
(g) Chemical Area work practices;
(h) Radiation risks;
(i) Fire safety practices;
(j) Emergency planning, and
(k) Safeguards.

(i) Describe in detail the training provided to all personnel and visitors entering restricted areas.

The orientation given to all visitors includes site specific information for each of the following topics:

- Introduction
- Policies and Guidelines
- Site Services, Hazmat Security and Site Security Briefing
- Nuclear Materials Control and Accountability Safeguards
- Health Physics & Radiation Protection
- Industrial Hygiene, Safety & Human Performance
- Nuclear Criticality Safety
- Foreign Material Exclusion
- Quality Policy
- Emergency Response
- Risk Training

- Respiratory Protection
- Written Test
- Scheduling Fit tests, Body Counts, Bioassay, Dosimetry

(j) Provide a commitment in the application to provide adequate resources to the RP program.

A commitment is made in chapter 2 to implement an RP program.

From Section 2.1.1.3(a)

The Plant Manager has overall accountability for all nuclear fuel manufacturing activities at the CFFF. This individual directs all activities of licensed operations and staff functions, either directly or through designated management personnel. This individual also coordinates any necessary support activities obtained from higher WEC management and performs all assigned management activities in accordance with WEC policies and higher management directives.

From Section 2.1.1.3(c)

The Regulatory Component has responsibilities for control of environmental pollution, radiation protection, nuclear criticality safety, occupational safety and health, emergency planning, and related licensed programs; and, for evaluating the effectiveness and compliance of these programs. The Regulatory Component is particularly responsible for assuring that these requirements, nuclear criticality safety requirements, and occupational safety and health requirements have been evaluated and communicated to other Component management for incorporation into facilities, equipment, and procedures prior to their use for processing licensed material.

(k) Commit to the independence of the RP from the facility's operations.

From Section 2.1.1.3(b) "To the extent practicable, the Regulatory Component is administratively independent of the Manufacturing, Engineering, and Quality Components. "

Also, the following was revised

5.2.4 The appropriate Senior Component Management, whose level of reporting and independence from operations is described in 2.1.1.3(b), maintains oversight of the CFFF commitment to ensure exposures to radiation and radioactive materials remain As Low As Reasonably Achievable (ALARA).

(l) State that the corrective action process will be implemented if personnel dose-monitoring results or personnel contamination levels exceed the administrative personnel limits.

Add 5.2.41 to require entering contamination events into CAPS.

(m) Provide commitments to report specific exposures or doses to the CAPS program, if airborne occupational exposures exceeding the administrative limits or the dose limits in Part 20 Appendix B or 10 CFR 70.61 are exceeded.

Add 5.2.53 to require entering exposure events into CAPS.

5-2 With regards to the as low as reasonably achievable (ALARA) program required under 10 CFR 20.1101(b), please provide the following information:

(a) Establish an ALARA Committee, or equivalent organization, with sufficient staff, resources, and clear responsibilities to ensure that the occupational radiation exposure dose limits of 10 CFR Part 20 are not exceeded under normal operations.

Revised Section 5.2.3. to include ALARA Committee.

(b) Commit that the ALARA Committee will review the ALARA program and that the review will include an evaluation of the results of audits made by the radiation protection organization, reports of radiation levels in the facility, contamination levels, employee exposures, and effluent releases, etc. The review should determine if there are any upward trends in personnel exposure for identified categories of workers and types of operations. The review should identify any upward trends in effluent releases and contamination levels. Finally, the review should determine if exposures, releases and contamination levels are in accordance with the ALARA concept. Recommendations of the ALARA Committee should be documented and tracked to completion.

Revised Section 5.2.3. to include ALARA Committee and revised 5.2.5 and 5.2.6.

(c) Commit that the ALARA Committee will meet at least annually and the membership will include management, radiation protection, environmental safety, industrial safety, production, etc. personnel or representatives.

Revised Section 5.2.3. to include ALARA Committee and revised 5.2.5 and 5.2.6.

5-3 Verify that you will periodically (at least annually) review the content and implementation of the RP as required by 10 CFR 20.1101(c).

Revised Section 5.2.7.

5-4 With regards to the radiation protection procedures and Radiation Work Permit (RWP) system as required by 10 CFR 70.22(8) and 10 CFR 20.1101(b), please provide the following information:

(a) Commit that approved radiation protection procedures will be prepared for all activities related to the RP.

Refer to chapter 3.4.1 for the commitment to prepare and follow written procedures for all operations.

(b) Specify how the radiation protection procedures will be prepared, authorized, approved, and distributed.

Sections, 3.4.1.1, 3.4.1.2, 3.4.1.3 and 3.4.1.4 describe the procedure structure, issuance and approval process, review frequencies, and use and adherence criteria that apply to all plant procedures.

(c) Commit to preparing written, approved RWPs for activities involving licensed material.

Most routine activities involving licensed material, such as pellet pressing or rod loading, are covered by detailed procedures and do not require an RWP. A Radiation Work Permit is required for all jobs where radiation protection requirements are not covered by operating procedures and when one or more of the following conditions is met:

- Release of contamination outside of Chemical Areas is likely to exceed 200 dpm/100 cm2 for personnel or to the environs.
- The local concentration of radioactive contaminants is predicted to average 50%, or more, of DAC.
- Deep-dose equivalent is likely to exceed 100 millirem in a week.
- The total effective dose equivalent is predicted to exceed 10% of the 10CFR20 limit, as a result of the work under consideration.
- The work involves a potential environmental impact.

(d) Describe the information that will be included on the RWP such as: dose rates, contamination, airborne radioactivity, necessary precautions, stay times, dose limits, required records, coverage by RP technician.

Revise Section 5.2.9 to list details.

(e) Describe the key components of the RWP. RWP's should require necessary safety controls, personnel monitoring devices, protective clothing, respiratory protective equipment, and air sampling equipment, and the attendance of RP technicians at the work location.

The RWP procedure requires that EH&S Operations review each request for a Radiation work permit to determine the risks associated with the job and the defenses for the risks which include PPE, respiratory protection, and surveillance activities by EH&S Operations during the course of the job. The surveillance activities include taking air samples, contamination smears, setting up boundaries for respiratory protection, etc.

(f) State where RWP's will be posted, (i.e. access points to Contamination Controlled Areas).

The RWP must be posted at the work site. See 5.2.10

(g) State how RWP's records will be maintained.

All RP records are maintained in accordance with Section 3.9.

Records specifically required by applicable regulations are maintained in accordance with those regulations. Records data is reported as prescribed by applicable regulations. Record keeping and reporting are management measures controlled by the quality program described in Section 3.3 of this License Application.

Records include all those required by the regulations in addition to regulatory correspondence, procedures, logs, reports, results of assessments, program audit and compliance inspection reports, commitments, etc., *whether or not required by regulatory agencies. Record custodians are identified, and their responsibilities are listed in an approved Records Flow Schedule (RFS) that also describes records to be retained, retention locations and retention time limits. Records and revisions to records are controlled by approved procedures.*

All retained records are properly identified, including a "permanent" or "nonpermanent" classification, and can be retrieved in a timely manner. Records are protected against deterioration, damage or loss.

5-5. With regard to the respiratory protection program required under 10CFR 20.1703, please provide the following information:

(a) Provide a commitment to maintain records of the respiratory protection program, respiratory training, and respirator maintenance.

All RP records are maintained in accordance with Section 3.9.

(b) Provide a description of the written procedures for the selection, fitting, issuance, maintenance, testing, and monitoring of individual repertory protection equipment.

EH&S Operations shall, identify work areas, processes or tasks that require workers to wear respirators, and designate the appropriate respirator for the airborne hazard.

The Production Team Manager shall verify the appropriate respirator is used for the routine work being conducted taking into account any foreseeable emergency.

Employees who are required to wear respirators must pass a medical exam before being permitted to wear a respirator. Employees are not permitted to wear respirators until a physician has determined that they are medically able to do so.

The Medical Department shall develop guidelines to determine that each employee required to wear respirators are physically and psychologically able to do so. They will perform medical examinations in accordance with these guidelines and have a physician sign all medical examination forms.

Follow up medical examinations will be conducted:

- Every 3 years for employees under 40 years old
- Every 2 years for employees 40 to 49 years old
- Every year for employees 50 and up
- Additional medical examinations will be provided when an employee reports signs and/or symptoms related to their ability to use a respirator, such as shortness of breath, dizziness, chest pains, or wheezing, when the Medical Department informs the Program Administrator that the employee needs to be reevaluated, or a change in the workplace conditions that may result in an increased physiological burden on the employee, or when observations made during fit testing or program evaluations indicate a need for reevaluation.
- Employees will be fit tested prior to being allowed to wear any respirator and at least annually or when there are changes in the employee's physical condition that could affect respiratory fit (e.g., obvious change in body weight, facial scarring, etc.)
- Employees will be fit tested with the make, model and size of respirator they will actually wear.
- EH&S Operations shall not fit test employees with facial hair that comes between the sealing surface of the facepiece and the face or that interferes with valve function.
- EH&S Operations will conduct quantitative fit tests using the FITTESTER 3000 or equivalent.
- Employees shall use their respirators in accordance with the training they receive.
- Employees shall verify they are qualified by using ETAPS.
- Respirators shall not be used in a manner for which it is not certified by NIOSH or by its manufacturer.

Employees shall be permitted to leave the work area when their respirator is impeding their ability to work, the work conditions change or the respirator malfunctions.

5-6. With regard to the radiation surveys and monitoring programs required under 10 CFR 20.1502, please provide the following information:

(a) Specify a minimal time frame for assessing personal dosimeters.

The following was revised in the license application:

5.2.45 Personnel dosimeters are evaluated on a frequency, not greater than quarterly, specified by the Radiation Safety Function

(b) Provide a description of the air monitoring alarms, their type, sensitivity, and maintenance frequency.

Air monitoring is based primarily on fixed air samples, but also includes, portable high volume samplers. We currently are not using CAM's to monitor airborne. Whenever fixed air samples exceed the action limits as specified in 5.2.26 an investigation is initiated to identify and correct the source of the elevated airborne concentration as soon as possible and to minimize exposures by requiring respiratory protection.
The sensitivity of these measurements is based on sample collection time (typically eight hours for fixed sample) and the, representativeness of samples and a ten minute alpha/beta counting measurement uncertainty.

Air sampling criteria is covered in Sections 5.2.23 through 5.2.28.

(c) Identify the facility's administrative exposure levels at which actions are taken to investigate the cause of exposures exceeding these levels. Differentiate between alpha contamination and beta/gamma contamination.

The following was revised in the license application:

5.2.26 Air sampling practices provide for investigation and/or special sampling, if the radioactivity concentration outside of containment structures exceeds 250 percent of DAC for a single sample collected for eight hours or longer or when the monthly average for a sample location exceeds 100 percent DAC.

Internal exposures are based on measurement of air sample alpha activity. External dose is based entirely on dosimetry badges measuring gamma/beta radiation. Gamma/Beta radiation surveys are performed routinely to detect trends resulting from changing SNM inventories, and performance of shields for x-ray machines and sealed sources.

(d) Define additional contamination control procedures in place to control the concentration of airborne radioactive material, such as control of access, limitation of exposure times to licensed materials, and use of respiratory protection equipment.

The sections labeled "Access Control" in 5.2.33 through 5.2.41 describe control of access to areas in the plant where unencapsulated uranium is handled. Respiratory protection is used in this area of the plant when ventilation is not sufficient to protect the employee such as during a process upset or maintenance activity. The use of respiratory protection is initiated either by detection of elevated airborne on fixed air samples or lack of ventilation. Exposure time is restricted as describe in 5.2.49"Work restrictions without

diagnostic evaluations are imposed when individuals exceed administrative limits or 80 % of applicable annual limits (i.e., 0.8 ALI, 1600 DAC-Hours, 4.0 REM CEDE, 4.0 REM TEDE, 4.0 REM DDE, 40 REM CDE, etc.)."

Chapter 6: Nuclear Criticality Safety

6-1. WEC will revise the license application to include a commitment to ANSI/ANS-8.23-1997, "Nuclear Criticality Accident Emergency Planning and Response. WEC may either include this commitment in Chapter 6, Nuclear Criticality Safety Program, or in Chapter 9, Emergency Management Program.

6-2. WEC will revise the current wording in Chapter 6, Section 6.1.8 as follows:

"If the CAAS is out of service for more than four hours, actions will be initiated to suspend movement and processing of fissile material in the coverage area and continued until the process is brought to a safe shutdown condition. Movement and processing of fissile material will not resume unless the CAAS is returned to service, or continuously attended portable detection instruments, capable of detection and alarm, are provided to monitor the area normally covered by the installed CAAS. These actions will be directed and enforced by the plant emergency response team. The portable detection and alarm devices shall be of a type pre-approved for this use by the Nuclear Criticality Safety Function. Once the installed CAAS is returned to service, the monitoring provided by the portable devices may be discontinued. Routine testing, calibration, and/or maintenance of the CAAS for up to four hours are permitted without suspension of fissile material movement or processing."

Additional Information: The ISA summaries provide a calculated potential for Nuclear Criticality events per year for the various process areas. Those whose calculated event frequencies are less than 10^{-5}/yr, which corresponds to a non-credible event in the WEC Baseline Integrated Safety Analysis (ISA) and ISA Summary Handbook, are considered of such a low probability of occurrence, that the 4 hour period proposed in the license amendment is a justifiable risk period. The 4 hours provides sufficient time for maintenance to restore the out of service CAAS to service for any routine postulated failures (e.g., relays, detectors).

For the ADU Conversion process, it is anticipated that to place an impacted conversion line(s) into a safe shutdown condition could be completed within one hour. Due to the nature of the chemical process, shutdown of the conversion lines solely due to an inoperable CAAS unit is a significant operational impact with minimal safety significance. The four hour period to restore operability corresponds to a 4.0E-9/hr demand frequency for the alarm function. This is judged an acceptable risk.

For the ADU Bulk Blending Process, the process can be placed in safe shutdown in a manner of minutes once that action is required. The risk of a shutdown is an operational

impact with minimal safety significance. The four hour period to restore operability corresponds to a 1.0E-9/hr demand frequency for the alarm function. This is judged an acceptable risk.

For the ADU Pelleting System, it is neither an insignificant risk, nor an insignificant operational impact, to shutdown the pelleting process solely due to an inoperable CAAS unit. To place a pelleting line furnace into a safe shutdown condition would take up to 17 hours. Other operations could be ceased within a manner of minutes once that action is required. One of the bounding worse case events in pelleting is a pelleting furnace explosion scenario which is postulated to occur only during startup and shutdown sequences. The four hour period to restore operability corresponds to a 7.0E-9/hr demand frequency for the alarm function. This is judged an acceptable risk.

For the ADU Fuel Rod Area, the process can be placed in safe shutdown in a manner of minutes once that action is required. The risk of a shutdown is an operational impact with minimal safety significance. The four hour period to restore operability corresponds to a 2.0E-9/hr demand frequency for the alarm function. This is judged an acceptable risk.

For the Low Level Radioactive Waste System, the process can be placed in safe shutdown within an hour once that action is required. The risk is not insignificant for the incinerator system, as the more severe events are related to startup and shutdown. The four hour period to restore operability corresponds to a 8.0E-9/hr demand frequency for the alarm function. This is judged an acceptable risk.

For the Storage of Uranium Bearing Materials, the process can be placed in safe shutdown within an hour once that action is required. The risk is an operational impact with minimal safety significance. The four hour period to restore operability corresponds to a 9.0E-9/hr demand frequency for the alarm function. This is judged an acceptable risk.

For the ERBIA System, the risk is similar to the Pelleting Area. The four hour period to restore operability corresponds to a 3.0E-9/hr demand frequency for the alarm function. This is judged an acceptable risk.

For the BWR System, the process can be viewed as an additional risk for criticality in other process areas. The safe shutdown periods and risk described above for those areas would apply once that action is required. The four hour period to restore operability corresponds to a 5.0E-9/hr demand frequency for the alarm function. This is judged an acceptable risk.

6-3. The set of calculations used to demonstrate compliance with 10CFR70 with respect to nuclear criticality safety is vast and diverse. Each individual calculation assumes different bounding values for process parameter such as H/X ratio, reflection, fissile form, geometry, etc. In most cases, a graded approach is employed wherein simple,

absolutely bounding values (i.e., the worst conditions possible irrespective of actual process and equipment considerations) are first assumed for process parameters (e.g., full water reflection, optimally moderated UO_2/water mixtures, simplified spherical geometries). If the results based on these absolutely bounding values are acceptable, the analysis is complete. If the results are unacceptable, these conservatisms are reduced (while always remaining bounding) until acceptable k_{EFF} results are obtained.

In addition, the nominal values of many of these process parameters are not exactly defined in the criticality evaluations. For example, defining a nominal H/X ratio for calciner operations is not a simple endeavor, since the ratio may change during the process and depending on the specific operating mode in use for a specific campaign. Instead, a more bounding process parameter envelope is assumed for these processes, in order to demonstrate that normal operation results in k_{EFF} values that meet the license acceptance criterion of 0.95.

Given the large diverse set of calculations in use at the CFFF for all of the process areas, the graded calculational approach described above, and the lack of existing definitions for nominal conditions for all these processes, there is no simple listing of nominal values, assumed values, and delta-k_{EFF} values for all process subsystems in the CFFF. It would be extremely impractical to attempt to generate such a listing, an effort that (if possible) could take several man-months. 10CFR70 contains no requirements to specifically quantify this margin, as long as normal conditions and bounding credible upsets are all demonstrated to be below the license acceptance criteria.

6-4. A calculation methodology should have a bias that either has no dependence on a characteristic or is a smooth function of a parameter. If a trend exists, the bias will vary as a function of that trend over the parameter range. If no trend exists, then the bias will be constant over the area of applicability.

A study was conducted (LTR-EHS-05-440, Rev. 1) to determine if a trend in the calculation methodology bias, documented in LTR-ESH-05-146, Rev.1, occurs as a function of incident neutron energy when the energy spectrum is divided into broad thermal, intermediate, and fast ranges. Each experiment calculation result is used to create a fission fraction weighted incident neutron energy causing fission in each broad energy range. The fission fraction weighted incident neutron energy causing fission is plotted using the appropriate calculated experiment kEFF. The graphs are examined to determine if any trends are apparent. Based on the study, there does not appear to be a trend established with respect to the fission fraction weighted incident neutron energy causing fission when the energy spectrum is divided into fast, intermediate, and thermal ranges. This supports the finding in the validation report, LTR-ESH-05-146, Rev.1, that no trend exists with respect to the Energy of the Average Lethargy Causing Fission (EALF).

6-5. Two of the parameters that were varied in the validation cases in LTR-ESH-146 were H/X ratio and EALF. Therefore, the AOA of the validation includes these two ranges,

requiring that any subsequent calculations employing the validation be within both of these ranges (or appropriate margins and justifications provided for any extrapolation).

Additional analysis provided in LTR-ESH-05-420 demonstrates that for well-moderated LEU systems with hydrogenous moderators, the H/X and EALF parameters exhibit a very high correlation and are therefore identical indicators of the neutron energy. Therefore, the validation results form a narrow band in H/X vs. EALF space, as noted in the comment.

Note that the various parameters that define an AOA (H/X ratio, EALF, fissile density, reflector type and abundance, etc.) are intended to create an envelope to define acceptable ranges for future applications. However, the intent of the envelope is to ensure that comparable neutron physics exist between the validation and any future application. Applications with similar neutron physics (i.e., well-thermalized fissions in hydrogenously-moderated LEU), then it is not necessary for the application to be identical to any one benchmark experiment in the validation. If the AOA of a validation analysis is only defined as the exact combination of parameters modeled in each experiment, no future application would lie within any AOA validation unless it was identical to an existing benchmark experiment.

Based on the large number of experiments modeled in the validation (i.e., no experiments were identified that did not correlate with this band) and our understanding of neutron scattering physics in well-moderated LEU systems with hydrogenous moderation (i.e., the population of moderating atoms will be inversely related to the average fission energy), there is a high degree of assurance that any future application that lies within the AOAs for both H/X and EALF will also lie within the narrow band previously identified.

Neither of the examples in the NOTE would invalidate our conclusions. In the first example, if neutrons are being moderated in the reflector, then a portion of the hydrogen in the reflector should be counted in the moderator H/X. In the second example, such a thin slab (or cylinder) of solution would be deeply subcritical. ANSI standards define minimal thickness (and diameters) for unreflected solutions and these minimally proportioned systems are represented in the validation experiments

It is possible to imagine a few strange systems that would not lie on the band, however. For example, postulate a well-moderated LEU systems with regions of unmoderated LEU (e.g., as a reflector). In such a case, the H/X ratio could be within the AOA of the existing validation analysis. While the vast majority of the fissions would occur in the moderated LEU region (resulting in large numbers of thermal fissions), some fissions could occur in the unmoderated region (resulting in a smaller population of fast fissions). However, in such a case, the calculation of EALF would involve a linear average of many thermal fissions (~0.05 eV) combined with a few fast fissions (~millions of eV), resulting in an EALF well outside of the validation AOA (0.050 to 2.369 eV for solids, 0.0339 to 0.0592 eV for solutions), i.e., outside of the H/X vs. EALF "box."

Based on the discussion above, we judge that any future application that is demonstrated to be within both the H/X and EALF AOAs would be well characterized by the existing validation analyses. For rare cases, that may or may not exist in the future, which do not lie directly on the band defined by the strong correlation between H/X and EALF, any deviation from the band would be small, the neutron physics would still be the same (thermal fissions in well-moderated LEU systems), and the validation would still be valid. For even rarer postulated cases that could be far off this band, it is not considered credible that such a case could simultaneously be far off the band, still be within the EALF and H/X AOAs, and still be within the other AOAs of the validation (hydrogenous, well-moderated LEU systems).

6-6. The validation report LTR-ESH-146 examined the two-dimensional relationships of H/X vs k-eff and EALF vs. k-eff concluding that there was no trend (with acceptable goodness of fit, R2) for either parameter. Additional analysis provided (LTR-ESH-05-420) demonstrates that for hydrogenous moderators the H/X and EALF parameters exhibit a very high correlation and are identical indicators of the neutron energy. Therefore, these are not independent variables and are not candidates for multiple regression analysis. Nonetheless, for your information, a least squares fit of the form:

k-eff = a + b*(H/X) + c*(EALF)

has been calculated with the following results.

	solid	solution
a =	0.9946	0.9850
b =	5.6155E-06	2.0117E-05
c =	2.7845E-03	-4.0056E-02
R2 =	0.22	0.54

A 3-dimensional graphical presentation of this data and the fit is not available. The R2 values do not indicate that the fits are acceptable. The USL is not dependent upon a trend or lack of a trend in the data, thus remains valid.

6-7. The average value of the slight underprediction is 0.0022 which is bounded by the bias and bias uncertainty correction from the validation report LTR-ESH-146: 0.0067 for homogeneous and 0.0161 for heterogeneous systems. It is well known that the group structure of the 238 group library does not explicitly model the 238U resonances. The evaluation of the benchmark experiments for the cross section library is to establish a bias and bias uncertainty accounting for such things as the characterization of the 238U resonance region. While this characterization is suggested as a potential reason for the observed effect, the observed effect is included within the current validation bias and bias uncertainty.

6-8. The current SCALE-4.4 homogeneous UO_2 validation report (LTR-ESH-05-146, Rev. 2) has been revised to indicate that the referenced requirements are mandatory ("The

following guidelines are mandatory when using SCALE-4.4 for evaluations at the WEC CFFF"). Similar statements will be incorporated into future validation reports as they are completed.

Chapter 7: Chemical Safety Program

7-1. The need to address the regulatory significant chemical hazards and confirmation of chemical exposure levels updates for when the values of these standards change is already encompassed in the commitments in Chapter 4 of the license application. Section 4.1.2.1 (c) commits the CFFF to the baseline ISA for "Chemical Receipt, Handling and Storage". Section 4.1.3.1 for ISA Summary Content commits WEC to assessing chemical consequences specified in 10 CFR 70.61. Section 4.1.3.2 requires that ISA summaries be kept current, and updates to the ISA summaries are provided to the NRC on an annual basis. If significant changes to current or new ERPG values are established, they would be captured in the annual updates to the ISA. The ISA Baseline Summary is required by the license application (Section 4.1.3) to be developed in accordance with the Handbook requirements. The specific attribute to require a review for updated chemical exposure level thresholds will be specifically added to the Handbook to ensure they are reviewed and addressed in the annual updates.

7-2. Reference to the program audits and inspections performed at the CFFF is contained in the introductory paragraph of Section 7.1.4 in the license application.

As audits are conducted from a sampling of the attributes of a program, not all aspects are necessarily evaluated. The CFFF will perform audits (on a triennial frequency) to address the majority of the Chemical Safety Program elements in Section 7.1.1.3 of the license application. As not every element is expected to be addressed at each audit event, all of the elements in Section 7.1.1.3 will not be added to Section 7.1.4.1 In addition, many of these elements in Section 7.1.1.3 are evaluated in Section 7.1.4.2 in the form of process assessments (compliance inspections). Also, informal compliance audits are continually performed by EH&S personnel that address these elements.

Corrective actions implemented by the CFFF to address findings from audits of the Chemical Safety Program are tracked through the Corrective Action Process (CAPs) in accordance with Section 3.8 of the license application. This CAPs database captures issues, ownership assignments, and completion dates for corrective and preventive action.

Chapter 8: Fire Safety Program

8-1. In summary, as discussed below in detail, the regulatory requirements of concern in the RAI Question are already addressed in Section 8.1 and elsewhere in the license application. While a commitment to NFPA 801 would certainly address these same issues, the scope of NFPA 801 is broader than needed to comply with the regulations.

NFPA 801 is one of many fire codes that are evaluated for applicability when new projects/modifications are considered in accordance with the change control process.

10 CFR 70.22 (a)(7) states:
"(7) A description of equipment and facilities which will be used by the applicant to protect health and minimize danger to life or property (such as handling devices, working areas, shields, measuring and monitoring instruments, devices for the disposal of radioactive effluents and wastes, storage facilities, criticality accident alarm systems, etc.);"

This requirement not only relates to the fire protection program but other elements of 10 CFR 70. The license application Sections 8.1.2 through 8.1.6 provide the fire protection related equipment and facilities descriptions of the CFFF used to protect health and minimize danger to life or property.

10 CFR 70.22 (a)(7) states:
"(8) Proposed procedures to protect health and minimize danger to life or property (such as procedures to avoid accidental criticality, procedures for personnel monitoring and waste disposal, post-criticality accident emergency procedures, etc.)."

This requirement not only relates to the fire protection program but other elements of 10 CFR 70. The license application Sections 8.1.8 (pre-plans) and 8.1.9 (fire hazards analysis) provide the fire protection related program process documentation (procedures) the CFFF uses to protect health and minimize danger to life or property. The license application Section 9.1.2 (n) contains the requirement for the CFFF to have in place implementing procedures for fire emergencies.

WEC will revise the license application Chapter 2, Section 2.1.1.3 (c) to insert "fire and chemical safety," in the first sentence along with the current listings of the other safety disciplines. A similar change will be made in the 8th, 10th, 11th and 12th bullets following the lead paragraph to ensure it is clear that fire and chemical safety functions are included in the regulatory functions related to procedures and plant configuration.

10 CFR 70.61 states:
"(a) Each applicant or licensee shall evaluate, in the integrated safety analysis performed in accordance with § 70.62, its compliance with the performance requirements in paragraphs (b), (c), and (d) of this section "

10 CFR 70.62 states:
"a) Safety program. (1) Each licensee or applicant shall establish and maintain a safety program that demonstrates compliance with the performance requirements of § 70.61. The safety program may be graded such that management measures applied are graded commensurate with the reduction of the risk attributable to that item. Three elements of this safety program; namely, process safety information, integrated safety analysis, and management measures, are described in paragraphs (b) through (d) of this section."

10 CFR 70.65 states:
"(a) In addition to the contents required by § 70.22, each application must include a description of the applicant's safety program established under § 70.62.
(b) The integrated safety analysis summary must be submitted with the license or renewal application (and amendment application as necessary), but shall not be incorporated in the license. However, changes to the integrated safety analysis summary shall meet the conditions of § 70.72. The integrated safety analysis summary must contain:" (Then the CFR lists specific attributes.)

The need to address the regulatory significant fire hazards is already encompassed in the commitments in Section 4 of the license application. Section 4.1 commits the CFFF to the ISA process required by 10 CFR 70.61, which includes the hazards analyzed for fire safety. A table is provided in the license application, Table 4.1, which provides the link between the 10CFR Part 70.65 requirements and the section of the CFFF Guidelines for ISA development which address that attribute. Section 4.1.3.2 requires that ISA summaries be kept current, and updates to the ISA summaries are provided to the NRC on an annual basis. The ISA Baseline Summary is required by the license application Section 4.1.3 to be developed in accordance with the Handbook requirements. The contents of the ISAs include the process safety information, integrated safety analysis, and management measures pr 10 CFR 70.62. The license application specifically addresses the performance requirements of 10 CFR 70.61 in Section 4.1.1.12, which includes those from fire related scenarios.

As practical examples of the use of the ISAs to address fires/explosion hazards, the ISA summary for the Pelleting Area submitted in January 06, Section 4.1.1 developed IROFS based on a postulated Hydrogen Deflagration within a Pellet Area Sintering Furnace. The ventilation ISA summary evaluated failure of a HEPA Filter Roof Containment Ventilation System due to a fire event.

10 CFR 64
"(a) *Baseline design criteria.* Each prospective applicant or licensee shall address the following baseline design criteria in the design of new facilities. Each existing licensee shall address the following baseline design criteria in the design of new processes at existing facilities that require a license amendment under § 70.72. The baseline design criteria must be applied to the design of new facilities and new processes, but do not require retrofits to existing facilities or existing processes (e.g., those housing or adjacent to the new process); however, all facilities and processes must comply with the performance requirements in § 70.61. Licensees shall maintain the application of these criteria unless the analysis performed pursuant to § 70.62(c) demonstrates that a given item is not relied on for safety or does not require adherence to the specified criteria."
(among others)
"(3) Fire protection. The design must provide for adequate protection against fires and explosions."

The license application Sections 8.1.2 through 8.1.6 provide the fire protection related equipment and facilities descriptions of the CFFF used to protect health and minimize danger to life or property. These commitments, along with the ISA discussions of risk and IROFS designations in accordance with Chapter 4 of the license application, address the adequacy of the design for the facility. The commitment within the license application for Configuration Management (Chapter 3) addresses the aspects of design control necessary to maintain and / or upgrade the technical and analytical baseline information. Specifically for fire protection, Section 8.1.2 of the license application commits the CFFF to the following: Whenever the building structure is expanded, or otherwise modified, prevailing NFPA code requirements are met.

8-2. WEC will revise the current wording in Section 8.1.1.1 of the license application to add the following sentence:

"The Authority Having Jurisdiction (AHJ) at the CFFF for fire safety program implementation is held by the Fire Safety Function within the Regulatory Component, unless mandated by local regulation, where the specifically required AHJ is utilized (e.g., Richland County Fire Marshall)."

Note that WEC personnel are pursuing training to obtain South Carolina Fire Marshall qualification, thus the use of (e.g.) versus (i.e.) in the reference to Richland County Fire Marshall in the license. Once that qualification is obtained, WEC personnel will be capable of fulfilling the local regulation requirements for the AHJ.

Chapter 11: Decommissioning Program

11-1. WEC will revise the last sentence to state the following: The most recent triennial update of the cost estimate to terminate License SNM-1107 was completed in March 2006 and is on file at the CFFF.

Material Control and Accounting SG1-9

Westinghouse requests that existing License Condition S-9 be deleted and that License Condition SG-1.9 be revised to the following:

"Not withstanding the requirement of section 2.1.1, block 6.b, of NUREG/BR-0006, which is incorporated via 10 CFR 74.15, to complete receiver's measurements of scrap receipts (following recovery processing) within 60 days of receipt, the licensee shall not be subject to any time limit relative to recovering and measuring UF_6 heels when the block 6.b action code N (of DOE/NRC Form 741) is used to book such receipts."

Physical Security Plan

WEC will revise the Physical Security Plan to incorporate the information requested in RAI Questions PSP-1, PSP-2 and PSP-3. The amended Physical Security Plan will be submitted in accordance with a schedule that is mutually agreed to between WEC and NRC.