REQUEST FOR ADDITIONAL INFORMATION
Westinghouse Electric Company, LLC
License Renewal
(Cost Activity Code: 33317, Docket Number: 70-1151)

NOTE: Requests for Additional Information (RAIs) refer to the application to renew special nuclear materials (SNM) license of the Columbia Fuel Fabrication Facility (CFFF) dated December 17, 2015 (Ref. 1) and revised chapters (Integrated Safety Analysis (ISA), and Chemical Process Safety) of the license application submitted by letter dated March 7, 2016 (Ref. 2). RAI 39 through RAI 41 refer to the ISA summary dated January 25, 2016 (Ref. 3).

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GENERAL INFORMATION

RAI 1. Clarify the overview discussion of the CFFF site. Discuss main features of the site, such as buildings, and tanks. To the extent that engineering drawings are incorporated by reference.

Section 1.1.2, page 3, gives an overview of the CFFF that uses phrases such as “primarily engaged in” and the “well-known ADU process”. A reference is given to the ISA summary for details.

Regulatory Basis

10 CFR 70.22(a)(2) requires a discussion of the activity for which the special nuclear material is requested, or in which special nuclear material will be produced, the place at which the activity is to be performed and the general plan for carrying out the activity.

RAI 2. Discuss what is meant by “routine over-checks” in Section 1.1.2.1, Item (d).

In Section 1.1.2.1, Westinghouse states that, for solid waste disposal, “Administrative controls are in effect to assure that only authorized materials are packaged for disposal. These [controls] include … routine over-checks to verify that the controls are effective.”

Regulatory Basis

10 CFR 70.22(a)(8) requires a description of the proposed procedures to protect health and minimize danger to life or property.

Enclosure

RAI 3. Clarify the example a design philosophy that includes instrumentation and control systems. Discuss the boundary of the Items Relied on for Safety (IROFS). Address the Safety Instrumented System (SIS). Discuss what is meant by "preferably" when referring to the SIS being safety integrity level (SIL) or TUV certified.

Section 1.1.2.1(g) states that a design philosophy that includes instrumentation and control systems to monitor and control the behavior of active engineered control IROFS is implemented. This philosophy takes the form of a SIS. An example of a SIS would be a logic solver (preferably SIL rated and TUV Certified) with a connected level probe as the sensor, and a connected solenoid valve as the final element; such that, when the process liquid level reaches the level probe, the logic solver shuts off the fluid input via the solenoid valve.

Regulatory basis

10 CFR 70.22(a)(8) requires a description of the proposed procedures to protect health and minimize danger to life or property.

RAI 4. Discuss what is meant by "general operating philosophy". Discuss where the philosophy is documented. Explain the difference between "philosophy" and "procedures". Discuss why the operating philosophy is "general".

Section 2.1.1.2, Positions and Activities within Organizational Operating Units, states, "Operations at the CFFF are in accordance with the general operating philosophy and procedures that are employed in all Westinghouse plants and facilities.

Regulatory basis

10 CFR 70.23(a)(4) requires the applicant's proposed procedures to protect health and to minimize danger to life or property are adequate.

RAI 5. Discuss the work for other Westinghouse operations and customers.

In Section 1.1.3, Scope of Licensed Activities, states that, "The CFFF may also perform work for other Westinghouse operations, or outside customers, which is within the authorized capabilities of the facility."

Regulatory Basis

10 CFR 70.22(a)(2) requires a discussion of the activity for which the special nuclear material is requested, or in which special nuclear material will be produced, the place at which the activity is to be performed and the general plan for carrying out the activity.

RAI 6. Discuss elements and attributes of the means by which the Safety Component or Regulatory Component determine that an alternate test, procedure, or practice is deemed appropriate. Discuss what is meant by the proposed action being compared to this License Application.

Section 1.1.6.3 states that alternate "[t]ests, procedures or other practices that may be substituted for prescribed activities deemed appropriate by the Safety and/or Regulatory Component. In such case, a detailed analysis is performed and documented by the cognizant engineer. The analysis includes a comparison of the proposed action with that specified in this

License Application; and, a demonstration that action levels and limits are being met, and that health and safety of employees and the public, and quality of the environment is being protected."

Regulatory Basis

10 CFR 70.22(a)(8) requires a description of proposed procedures to protect health and minimize danger to life or property.

RAI 7. Discuss how an operator can promptly terminate a process when an imminent hazard develops, given that authority to prohibit the situation is through the cognizant first level manager.

Section 2.1.1.2 (page 20) states that "members of the Safety and/or Regulatory Component have the responsibility and authority to prohibit, through the cognizant first level manager, any situation that is believed to involve undue imminent hazard. Such terminated operations remain in a safe shutdown state until the situation is reviewed with cognizant management, and there is a consensus resolution of the situation."

Regulatory Basis

10 CFR 70.22(a)(8) requires proposed procedures to protect health and minimize danger to life or property.

ORGANIZATION AND ADMINISTRATION

RAI 8. Regarding Section 1.1.6.22, discuss the following:

8.1. How functions are staffed such that capabilities, responsibilities, and authority are continuously available.

8.2. How individuals are trained and qualified.

8.3. How experience is maintained as employees more to other positions, either within or outside the CFFF.

Section 1.1.6.22 defines a "Function", when used in an administrative context, as an individual (or individuals), designated by a Component Manager having the capability, responsibility, and authority to make and implement decisions required to carry out assigned duties, such as environmental protection, radiation safety, nuclear criticality safety, and safeguards.

Regulatory Basis

10 CFR 70.22(a)(6) states that each application for a license shall contain the technical qualifications, including training and experience of the applicant and staff members to engage in the proposed activities.

RAI 9. Discuss how cognizant staff groups are determined to ensure that all relevant technical disciplines are represented.

Section 2.1.1.2 of the license application states that a first level manager cannot make unilateral changes in documents without review and approval by cognizant staff groups.

Regulatory Basis

10 CFR 70.22(a)(8) requires proposed procedures to protect health and minimize danger to life or property.

RAI 10. Section 2.1.1.2 of the license application states that first level managers are responsible for assuring that personnel under their jurisdiction receive adequate training. Discuss what is meant by adequate training. Discuss the scope of such training (e.g., reading procedures, practicing procedures, taking written test, taking practical test).

Regulatory Basis

10 CFR 70.22(a)(8) requires proposed procedures to protect health and minimize danger to life or property.

RAI 11. Section 5.2.57 of the license application discusses the respirator protection policy, stating that the determination of fitness to use respiratory protection is performed by a physician prior to the initial fitting of respirators, and periodically at a frequency determined by a physician. By letter dated July 18, 2014, Westinghouse requested that the determination be done by a nurse practitioner under the supervision of a physician. The NRC staff approved the request (Refs. 4 and 5). In the context of the renewal application, state whether or not Westinghouse intends to continue to use a nurse practitioner as such.

Regulatory Basis

10 CFR 70.22(a)(8) requires 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).

RAI 12. Explain what is meant by two statements in Section 2.1.1.4. The Section begins by stating, in part, that, "Approved procedures are in place to assure that relevant organizational changes… are reviewed for impact on environmental and radiation protection, nuclear criticality safety, occupational safety and health, emergency preparedness, and other regulatory activities." Item (h) states, "Organizational changes are reviewed prior to implementation, whenever practicable." (Emphasis added.)

Regulatory Basis

10 CFR 70.22(a)(8) requires proposed procedures to protect health and minimize danger to life or property.

See also RAI 52 on page 19.

INTEGRATED SAFETY ANALYSIS (ISA)

NOTE: RAI 13 through RAI 33 refer to a revised Chapter 4 of the license application, submitted by letter dated (Ref. 2), and the ISA dated January 22, 2015 (Ref. 7). RAI 39 through RAI 41 refer to the ISA summary dated January 25, 2016 (Ref. 3).

RAI 13. Remove the ambiguity in the definition of "incredible" in Section 1.1.6.23 by clarifying that "many unlikely upsets, including human actions" may not include failures of controls.

The definition of incredible in Section 1.1.6.23 gives three criteria, one of which states, "A process deviation that consists of a sequence of many unlikely upsets, including human actions or errors for which there is no reason or motive. (In determining that there is no reason for such actions, a wide range of possible motives, short of intent to cause harm, must be considered. Necessarily, no such sequence of events can ever have actually happened in any fuel cycle facility)." This definition does explicitly state that the unlikely upsets should not include the failure of controls.

Regulatory Basis

10 CFR 70.61(e) requires, in part, each engineered or administrative control or control system necessary to comply with performance requirements be designated as an item relied on for safety.

10 CFR 70.65(b)(9) requires a description of the definitions of unlikely, highly unlikely, and credible as used in the evaluations in the integrated safety analysis.

RAI 14. Section 1.1.6.23 states three criteria for determining an event is "not credible", and thus, excluded from the ISA Summary. Discuss applying the criteria such that a determination of "not credible" avoids facility features that could fail to function or be rendered ineffective as the result of changes to the facility. For any feature used to make a determination of "not-credible," discuss performing and documenting an analysis that enumerates and evaluates failure modes whereby the safety function can be defeated, including, but not limited to, wearing, fatigue, degradation, and modifications. The analysis must demonstrate that the facility feature cannot credibly fail or be rendered ineffective as the result of a change.

If a feature of the plant is used as a means of determining that an event is not credible, then the feature is being relied upon to meet the performance requirements. If the feature is relied upon, then by definition, it is an IROFS according to the definition in 10 CFR 70.4. Features can fail by wearing, fatiguing, and degrading. Furthermore, maintenance and modifications can have unintended consequences. The existence of any such failure pathways would make a seemingly not-credible event credible.

Regulatory Basis

10 CFR 70.4 defines items relied on for safety as 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. This does not limit the licensee from identifying additional structures, systems, equipment, components, or activities of personnel (i.e., beyond those in the minimum set necessary for compliance with the performance requirements) as items relied on for safety.

RAI 15. Discuss the criteria used when an event frequency is close to the bound of a performance requirement.

For example, if the calculated event frequency is $9x10^{-4}$/year, according to the note from Table 4.4, the sequence would be given an index of -4 even though the frequency is close to $1x10^{-3}$. In this case, ignoring the mantissa is equivalent to decreasing the sequence frequency by nearly an order of magnitude without a change in the IROFS reliability. Table 4.4 is a Risk Analysis Table, representing the criteria used for determining whether the likelihood and consequence of an accident sequence meets the performance requirements of 10 CFR 70.61. A note from the table states, “When the overall likelihood is calculated quantitatively in units of "events per year," the exponent of the likelihood value is used. That is, for an event calculated to occur $4x10^{-5}$ / year, the overall likelihood index is -5.”

Regulatory Basis

10 CFR 70.65(b)(9) requires a description of the definitions of unlikely, highly unlikely, and credible as used in the evaluations in the integrated safety analysis.

10 CFR 70.62(c)(v) requires a licensee to conduct and maintain an integrated safety analysis that identifies the consequence and the likelihood of occurrence of each potential accident sequence and the methods used to determine the consequences and likelihoods.

RAI 16. Describe the process for maintaining the "Baseline Integrated Safety Analysis (ISA) and ISA Summary Handbook" and the qualifications of the Regulatory Component Manager and other ISA team members to perform the ISA and develop and maintain the ISA handbook.

Section 4.1 describes the ISA program structure, stating that the Regulatory Component Manager reviews and approves the original and subsequent versions of the licensee’s "Baseline Integrated Safety Analysis (ISA) and ISA Summary Handbook."

Regulatory Basis

10 CFR 70.62(c)(2) requires that the ISA be performed by a team with expertise in engineering and process operations. The team shall include at least one person who has experience and knowledge specific to each process being evaluated, and persons who have experience in nuclear criticality safety, radiation safety, fire safety, and chemical process safety. One member of the team must be knowledgeable in the specific integrated safety analysis methodology being used.

10 CFR 70.22(a)(6) requires the technical qualifications, including training and experience to engage in the proposed activities.

RAI 17. Describe the process and criteria used to determine the appropriate hazards analysis method. Provide an example of implementing this process.

Section 4.1 states, “What-if/checklist analysis, Failure Modes and Effects Analysis Fault Tree/Event Tree, Loss of Protection Analysis, or other generally recognized process hazards analysis methods may also be used, as applicable.”

Regulatory Basis

10 CFR 70.62(c)(1) states, in part, that each licensee or applicant shall conduct and maintain an integrated safety analysis, that is of appropriate detail for the complexity of the process.

RAI 18. Describe the criteria used to determine the details required and the process to provide reasonable assurance that the appropriate summary details are included in the Configuration Change Control Form. Describe the process for documenting and maintaining evaluations for those changes that do not require prior Commission approval.

Section 4.1.2.2 states, "Summary details of the change, including required approvals, are documented on a Configuration Change Control Form."

Regulatory Basis

10 CFR 70.62(c)(1) states, in part, that each licensee or applicant shall conduct and maintain an integrated safety analysis, that is of appropriate detail for the complexity of the process.

10 CFR 70.72(f) requires a licensee to maintain records of changes to its facility. These records must include a written evaluation that provides the bases for the determination that the changes do not require prior Commission approval. These records must be maintained until termination of the license.

RAI 19. Resolve the apparent discrepancy among the items from Section 4.1 highlighted below and discuss the elements of the ISA program that will address Items 19.1 through 19.9, specifically, and throughout the ISA Summary, in general.

Section 4.1 states, "An ISA Summary (1) presents key aspects of the ISA in sufficient detail to enable an independent overview of the subject systems, and (2) provides reasonable assurance that operation of these systems will not lead to situations that would exceed the performance requirements specified in Section 70.61 of the 10 CFR Part 70 regulations." During a review of the ISA submitted in January 2015 and January 2016, the NRC staff identified Items 19.1 through 19.9

19.1. Cut set tables include a column labeled "Prob./Frequency." The documentation is unclear as to whether this column heading means the probability of the cut-set divided by the frequency or contains either the probability or frequency of the cut set. The terms probability (the number of times outcome "A" occurs divided by the total number of possible outcomes) and frequency (the number of times an event happens during a particular time period, e.g. per hour, per year) are not interchangeable.

19.2. Some fault tree event descriptions state an event in terms of what an IROFS or control may prevent, while other descriptions state the event as a failure that may occur. Furthermore, other fault tree events contain short descriptions that are not fully described elsewhere in the document. For example, CSE-1-D, NONFAV-ACCUM, which reads "Prevent Non-favorable Accum", and CSE-1-J, VENT-URRS-111-SOLX, which reads "OPER INSPEC CLEAN OUT." In general, fault trees should discuss events in terms of failures that may occur; therefore, it is clear that the associated probabilities are failure probabilities.

19.3. Several event descriptions involve the failure of an inspection. For example, multiple scenarios in CSE-1 and CSE-3 contain descriptions such as “Failure Periodic Visual Insp of Vessel and Packing” and “Cylinder inspection for cleanliness fails.” The documentation is unclear whether the general heading of “failure to inspect” means that a person failed to inspect or the person performed the inspection but failed to detect a problem. If the heading is meant to include both cases, then it is not clear in the documentation that the probability cited accounts for both cases.

19.4. The meaning of the probabilities for the failures of operator actions is unclear. If one operator is required to take action, the probability that the operator fails to take a second required action will be conditioned upon whether there was a failure of the first required action. Or, if there are two individuals failing two different actions, the failure of one individual could influence the failure of the second individual. Some scenarios involving these types of operator actions do not clearly describe how and whether interdependencies are considered in the resulting probabilities used to demonstrate that the performance requirements are met. For example, CSE-1-K Scenario 1a, CSE-1-J Scenario 1, CSE-2-A-SCEN-7, UN-148, and UN-149, involve operator actions which may involve interdependencies.

19.5. The failure of alarms or equipment associated with operator actions is not always modeled. Similarly, some scenarios do not model improper operation, as stated in the system description. For example, CSE-1-K Scenario 1a discusses the failure of operators to actuate alarms, but do not model the failure of the alarms. The scenario description for CSE-7-A Scenario 1 discusses the failure to operate the system properly, but the failure is not modeled in the fault trees.

19.6. The failure event, “fail struct integ piping & equipment” appears to involve the failure of several pieces of equipment, yet it is assigned a failure probability of 10^{-3} regardless of the system in question. For example, a failure event is mentioned in CSE-1-A, K, and U without further description as to the assumptions underlying the failure probability.

19.7. Some fault tree diagrams show a single basic event connected to an OR gate. Typically, an “OR” logic gate has at least two options. For example, the fault trees associated with CSE-1, 3, 4, 7, and 14 depict a single basic event as an OR gate.

19.8. The failure probability for infrequent operator actions does not match the human error probability cited in Table 7.3, of the Westinghouse Baseline ISA and ISA Summary Handbook, Revision 3, August 15, 2006. The failure probability of 10^{-2} for routine tasks, instead of 10^{-1}, is used for non-routine tasks. For example, probabilities for operator actions for non-routine tasks in CSE-1-J and K are cited as 10^{-2} without further justification.

19.9. ISA 03 states that PLANT-SEP-901 and 902 are controls associated with training and execution of the Site Emergency Plan to mitigate exposure to facility workers from a seismic induced UF_6 or chemical release. The January 2016 update to the ISA Summary states that these controls are IROFS.

The 2016 ISA Summary states that PLANT-SEP-901 is “Seismic Event Response” to “mitigate exposure from major UF_6 or chemical release after a seismic event.” However, ISA 03 lacks specific reference to the management measures that would maintain this IROFS available and reliable when needed during a seismic event.

The 2016 ISA Summary states that PLANT-SEP-902 is “Training on PLANT-SEP-901.” Training is a management measure. 10 CFR 70.4 defines management measures as the functions performed by the licensee, generally on a continuing basis, that are applied to items relied on for safety, to ensure the items are available and reliable to perform their functions when needed. Management measures include configuration management, maintenance, training and qualifications, procedures, audits and assessments, incident investigations, records management, and other quality assurance elements.

Neither management measures nor emergency response actions without appropriate management measures can be IROFS. The values of any overall likelihood indices that include controls similar to PLANT-SEP-901 and 902 could increase and potentially reveal scenarios that do not demonstrate compliance with 10 CFR 70.61.

Regulatory Basis

10 CFR 70.62(c)(1) states, in part, that each licensee or applicant shall conduct and maintain an integrated safety analysis, that is of appropriate detail for the complexity of the process.

10 CFR 70.65(b) states, in part, that the licensee shall submit an ISA Summary with its license renewal application that contains a description of each process analyzed in the integrated safety analysis in sufficient detail.

RAI 20. Describe how the ISA program takes into consideration the potential effects of generic communications such as IN-15-18, “Criticality and Chemical Safety Events Involving Unanalyzed Conditions and Unanticipated Unavailability of IROFS at Fuel Cycle Facilities.”

Regulatory Basis

10 CFR 70.62(c)(1) states, in part, that each licensee or applicant shall conduct and maintain an integrated safety analysis, that is of appropriate detail for the complexity of the process.

RAI 21. Describe how the ISA program uses 10 CFR Part 20 limits to evaluate radiological consequences. Clarify the definition of the qualifying term “substantially” as described in Table 4.3.

In Table 4.3, under the column, “Radiological Consequence,” for a consequence score of “4,” the licensee states, “Exposure of worker or member of the public substantially in excess of 10 CFR 20 limits.”

Regulatory Basis

10 CFR 70.62(c)(1) states, in part, that each licensee or applicant shall conduct and maintain an integrated safety analysis, that is of appropriate detail for the complexity of the process.

RAI 22. In Table 4.3, under the column, “Chemical Consequence”, for a consequence score of “3,” the table states, “Chemical accident that could result in exceeding radiological criteria.” Clarify the meaning of this statement considering the column is referring to chemical consequences. Describe how the ISA program uses this table and supplemental information to provide reasonable assurance that risk evaluation scores, depending on the chemical consequence, are reasonable and appropriate for a given hazard or accident sequence.

Regulatory Basis

10 CFR 70.62(c)(1) states, in part, that each licensee or applicant shall conduct and maintain an integrated safety analysis, that is of appropriate detail for the complexity of the process.

RAI 23. In Table 4.3, under the column, “Criticality Consequence” for a consequence score of “3,” the table states, “Loss of double contingency protection.” Describe the elements of the ISA program that provide justification to conclude this score should not be “4” or higher, i.e. intermediate or high consequence.

Regulatory Basis

10 CFR 70.62(c)(1) states, in part, that each licensee or applicant shall conduct and maintain an integrated safety analysis, that is of appropriate detail for the complexity of the process.

RAI 24. Describe the elements of the ISA program and the criteria used that justify Footnote 1 in Table 4.3, considering the performance requirements include consequences involving the worker. Footnote 1 states, “Does not include plant conditions that result in an occupational risk, but do not affect the safety of licensed radioactive materials.”

Regulatory Basis

10 CFR 70.62(c)(1) states, in part, that each licensee or applicant shall conduct and maintain an integrated safety analysis that is of appropriate detail for the complexity of the process.

10 CFR 70.61 requires an evaluation, in the integrated safety analysis performed in accordance with 10 CFR 70.62, compliance with stated performance requirements.

RAI 25. Describe how maintenance activities are evaluated as part of the ISA process. Clarify what components of the “Maintenance Work Control System,” as documented, provides reasonable assurance that, prior to the performance of maintenance activities, the licensee performs an analysis that identifies all relevant IROFS then determines and implements a plan for continued compliance with the performance requirements during maintenance. Identify where, in the CFFF organization, these responsibilities reside.

Section 3.2 describes the elements of the maintenance program, stating, “IROFS shall not be disconnected or removed from service (while the process continues to operate) during calibration or functional testing, unless authorized in a written procedure specifically approved in advance by EH&S.”

Regulatory Basis

10 CFR 70.62(c)(1) states, in part, that each licensee or applicant shall conduct and maintain an integrated safety analysis, that is of appropriate detail for the complexity of the process.

10 CFR 62(d) states, in part, that a licensee to establish management measures to ensure compliance with the performance requirements of § 70.61. The management measures shall ensure that engineered and administrative controls and control systems that are identified as items relied on for safety are designed, implemented, and maintained, as necessary, to ensure they are available and reliable to perform their function when needed.

10 CFR 70.61 requires an evaluation, in the integrated safety analysis performed in accordance with 10 CFR 70.62, compliance with stated performance requirements.

RAI 26. Describe how the ISA program documents accident sequences that are screened out based on the criterion stated in Section 4.1.1.12 and how these evaluations are maintained.

Section 4.1.1.12 states, "Accident sequences having unmitigated consequences that will not exceed the performance requirements, once identified as such, are not reported in the ISA Summary."

Regulatory Basis

10 CFR 70.62(c)(1) states, in part, that each licensee or applicant shall conduct and maintain an integrated safety analysis, that is of appropriate detail for the complexity of the process.

RAI 27. Discuss the human performance program as it applies to the ISA process. Discuss the organization within the CFFF that is responsible for the program. In the context of the ISA and the administration and operation of IROFS, discuss how human performance issues are identified, disseminated, and resolved. The identification and adequate resolution of human performance issues within the team, as well as among the operators who administer and operate IROFS, is fundamental to demonstrating compliance with 10 CFR 70.62(c)(2) and 10 CFR 70.22(a)(6).

Regulatory Basis

10 CFR 70.62(c)(2) requires that the ISA be performed by a team with expertise in engineering and process operations. The team shall include at least one person who has experience and knowledge specific to each process being evaluated, and persons who have experience in nuclear criticality safety, radiation safety, fire safety, and chemical process safety. One member of the team must be knowledgeable in the specific integrated safety analysis methodology being used.

10 CFR 70.22(a)(6) requires the technical qualifications, including training and experience to engage in the proposed activities

RAI 28. Describe the process and any applicable criteria for the retention and disposal of documents related to the ISA process.

Regulatory Basis

10 CFR 70.72(a) requires a licensee to establish a configuration management system to evaluate, implement, and track each change to the site, structures, processes, systems, equipment, components, computer programs, and activities of personnel. This system must be

documented in written procedures and must assure that stated topics are addressed prior to implementing any change.

RAI 29. Discuss the criteria or requirements that engineers must meet before performing analyses that determine if changes may affect IROFS. Explain the process engineers follow to become qualified to make configuration control changes as defined in the CFFF configuration management program.

Section 3.1 describes the elements and implementation of configuration management at the CFFF. For change control, the licensee states engineers "are not authorized to make configuration control changes until they are appropriately qualified in EH&S [Environemntal Health & Safety] requirements."

Regulatory Basis

10 CFR 70.72(a) requires a licensee to establish a configuration management system to evaluate, implement, and track each change to the site, structures, processes, systems, equipment, components, computer programs, and activities of personnel. This system must be documented in written procedures and must assure that stated topics are addressed prior to implementing any change.

RAI 30. Discuss the training Westinghouse personnel at the CFFF receive in ISA methods that provide the qualifications to update and maintain the ISA and ISA Summary.

Training Westinghouse personnel, instead of contractors, provides reasonable assurance that personnel are both knowledgeable of the CFFF and applicable ISA methods.

Regulatory Basis

Per 10 CFR 70.22(a)(6), the licensee must demonstrate that its staff has the training and qualifications necessary to engage in the activities proposed in the application.

RAI 31. Describe the elements of the ISA Program providing reasonable assurance of consistency and repeatability when determining the appropriate analysis methods, demonstrating the performance requirements are met, and designating IROFS and management measures.

Regulatory Basis

10 CFR 62(d) states, in part, that a licensee is to establish management measures for ensuring compliance with the performance requirements of § 70.61.

RAI 32. Describe the program, system, or process for documenting and maintaining programmatic and individual training records related to the training and qualification of personnel that implement the ISA.

Regulatory Basis

10 CFR 70.22(a) requires the technical qualifications, including training and experience of the applicant and members of his staff to engage in the proposed activities.

RAI 33. Discuss how the potential for red oil reactions was considered in, or excluded from, the ISA.

ISA 07 which discusses the solvent extraction system, states that the uranium products from the solvent extraction systems use steam-heated, forced-circulation reboiler type evaporators. If there is organic entrainment or carryover into this system, the system has the constituents (i.e., organic compounds, nitric acid, and heat) for the red oil reaction.

Regulatory Basis

10 CFR 70.62(c)(ii) requires a licensee to conduct and maintain an integrated safety analysis, that is of appropriate detail for the complexity of the process, that identifies chemical hazards of licensed material and hazardous chemicals produced from licensed material.

10 CFR 70.4 defined hazardous chemicals produced from licensed materials as substances having licensed material as precursor compound(s) or substances that physically or chemically interact with licensed materials; and that are toxic, explosive, flammable, corrosive, or reactive to the extent that they can endanger life or health if not adequately controlled. These include substances commingled with licensed material, and include substances such as hydrogen fluoride that is produced by the reaction of uranium hexafluoride and water, but do not include substances prior to process addition to licensed material or after process separation from licensed material.

NOTE: RAI 34 through RAI 36 refer to the ISA summary dated January 25, 2016 (Ref. 3).

RAI 34. Clarify whether the subcritical nature of the scenario on page 70 of ISA 01 would be affected if the upstream knock-out pots leak. If so, justify the exclusion of sequences involving leaks in the knock-out pots.

Page 70 of ISA 01 includes a new scenario, CSE-1-K Scenario 6, “Failure of the Design of the Vacuum Pump Silencers.” The description of the scenario includes the statement, “unless the upstream knock-out pots leak, the bulk of any material collected will not reach the silencer.” The description further states that the scenario “is subcritical by geometry.”

Regulatory Basis

10 CFR 70.62(c)(1) states, in part, that each licensee or applicant shall conduct and maintain an integrated safety analysis, that is of appropriate detail for the complexity of the process.

10 CFR 70.65(b)(3) states, in part, that ISA Summaries contain a description of each process (defined as a single reasonably simple integrated unit operation within an overall production line) analyzed in the integrated safety analysis in sufficient detail to understand the theory of operation.

RAI 35. In the following scenarios, discuss the IROFS that will replace ADUVAP-945, 946, and 950 to demonstrate compliance with 10 CFR 70.61.

Page 214 of ISA 03 shows the criticality likelihood for the process stages of ADU conversion. For stage (l), a seismic event (CSE-99-M), the likelihood is 6.0 x10-5. Several cutsets of scenario #5 for CSE-99-M, however, rely on IROFS ADUVAP-945, 946 and 950 which are meant to protect against falling debris from a nearby masonry wall. Scenario # 5, however,

describes an event where the UF6 line ruptures as a result of seismic displacement such that ADUVAP-945, 946, and 950 should no longer be credited. Removal of those IROFS from Scenario 5 increases the likelihood O(1E-3) which is unlikely.

Regulatory Basis

10 CFR 70.65(b)(4) states, in part, that ISA summaries must contain information that demonstrates the licensee's compliance with the performance requirements of § 70.61, including a description of the management measures.

RAI 36. As indicated, justify and clarify the scenarios on pages 25 through 28 of ISA 11.

Pages 25 through 28 of ISA 11 describe a loss of protection analysis whereby a pump explodes as a result of ammonium nitrate detonation. The analysis concludes that no SIF is required because the risk integral of fatalities is approximately 2.0E-5. Furthermore, no IROFS are designated to prevent or mitigate pump explosions. The risk integral was estimated using an occupancy frequency, the frequency of a fatality and assuming that the explosions are random events, as opposed to being caused by particular chemical conditions. And although no IROFS are designated, page 22 of ISA 11 credits three preventative controls, ADUSCRP-401, 402, and 403 which provide high temperature and low/no flow interlocks for two of 15 pumps, pumps P-707A and B, which could experience an ammonium nitrate detonation. ISA 03 indicates that 12 of those 15 pumps, denoted by P-x06 A and B, also have tank level and flow interlocks to prevent detonation. However, again, those interlocks are not designated as IROFS. The remaining pump, P-702, does not appear to be addressed in the ISA Summary.

36.1. Justify not designating the preventative controls for P-707 A and B as IROFS, considering they were used to reduce the overall likelihood index (OLI) of the accident sequence.

36.2. Justify not designating the other interlocks for P-x06 A and B as controls, considering they are used to prevent an accident sequence with the potential for high consequences.

36.3. Justify not designating the occupancy of the room as an IROFS, considering it was used to reduce the risk integral within the tolerable risk frequency rate.

36.4. Justify an initiating event estimate on the order of 1 in 1000 years when two pump explosions happened within nine years at this facility, and Information Notice 90-70, “PUMP EXPLOSIONS INVOLVING AMMONIUM NITRATE” describes two events at two different facilities within two years.

36.5. Justify the estimation for the initiating event frequency under the supposition that pump explosions are random events, as opposed to analyzing the process mechanisms that could lead to a pump explosion.

36.6. Clarify how the results of the loss protection analysis demonstrate compliance with 10 CFR 70.61 considering only fatalities were considered in the risk integral. Discuss the apparent exclusion of the possibilities of intermediate or high consequences other than death.

Regulatory Basis

10 CFR 70.61(e) requires, in part, each engineered or administrative control or control system necessary to comply with performance requirements be designated as an item relied on for safety.

10 CFR 70.62(c)(v) requires a licensee to conduct and maintain an integrated safety analysis that identifies the consequence and the likelihood of occurrence of each potential accident sequence and the methods used to determine the consequences and likelihoods.

10 CFR 70.62(c)(1) states, in part, that each licensee or applicant shall conduct and maintain an integrated safety analysis, that is of appropriate detail for the complexity of the process.

10 CFR 70.65(b)(4) states, in part, that ISA summaries must contain information that demonstrates the licensee's compliance with the performance requirements of § 70.61, including a description of the management measures.

RADIATION PROTECTION

RAI 37. Explain the bases for determining when to issue dosimetry for a CFFF employee.

Section 5.2.4.2 states that dosimetry is provided to adults likely to receive greater than 0.5 rem in a year. Discuss how Westinghouse makes a determination on those who might receive greater than 0.5 rem per year.

Regulatory Basis

10 CFR 20.1502(a)(1) states that each licensee shall monitor exposures to radiation and radioactive material at level sufficient to demonstrate compliance with occupational dose limits. As a minimum, Adults likely to receive, in one year, from sources external to the body, a dose in excess of 10 percent of the limits in § 20.1201(a).

RAI 38. Identify criteria to determine when dosimetry is to be provided to employees or contractors, such as declared pregnant women, minors, or any other administrative limits the CFFF employs.

Section 5.2.42 states that dosimetry is provide for adults likely to receive greater than 0.5 rem in a year. Other criteria, if any, are not stated.

Regulatory Basis

10 CFR 20.1502(a)(1) states that each licensee shall monitor exposures to radiation and radioactive material at level sufficient to demonstrate compliance with occupational dose limits.

RAI 39. Describe how occupational internal and external doses are reported to employees.

Section 5.2.52 states that internal and external occupational doses are combined in accordance with criteria in 10 CFR Part 20, and in applicable guidance contained in both Regulatory Guide 8.7, “Instructions to Exposure Data”, and in Regulatory Guide 8.34, “Monitoring Criteria and methods to Calculate Occupational Radiation Doses.”

Regulatory Basis

10 CFR 19.13(b) states that each licensee shall make dose information available to workers as shown in records maintained by the licensee under the provisions of 10 CFR 20.2106.

RAI 40. State the duration to calibrate radiation protection instrumentation.

Section 5.2.59 of the license application states, in part, that radiation protection instruments are calibrated on a routine schedule established by the Radiation Safety Function. The schedule requires calibration … at least semiannually. By letter dated July 8, 2014, Westinghouse requested that calibration be done at least annually. The NRC staff approved the request (Refs. 5 and 6).

Regulatory Basis

10 CFR 70.22(a)(8) requires 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).

RAI 41. Discuss how procedures of activities involving licensed material and IROFS are prepared, authorized, and approved for distribution, when multiple disciplines are involved.

Section 3.4.1 states that activities involving licensed material and IROFS are conducted in accordance with properly issued and approved procedures.

Regulatory Basis

10 CFR 20.1101(b) states that the licensee shall use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are As Low As Reasonably Achievable (ALARA).

RAI 42. Provide the minimum training requirements for the Radiation Safety Function Manager. Provide the training requirements for Regulatory Function Engineers working in the Radiation Safety Function.

Section 2.1.1.3 describes minimum requirements for a Safety or Regulatory Component Manager as well as Regulatory Function Engineers.

Regulatory Basis

10 CFR 70(a)(6) requires the technical qualifications, including training and experience of the applicant and members of the staff to engage in the proposed activities.

RAI 43. Identify refresher training or requalification requirement for engineers, operating technicians, and process operators, above the annual refresher training requirement for radiation workers.

Section 3.4.2.2 through Section 3.3.2.4 describe additional training and qualification requirements for engineers, operating technicians, and process operators.

Regulatory Basis

10 CFR 19.12 specifies training requirements for all individuals who, in the course of their employment, are likely to receive in a year, an occupational dose in excess of 100 mrem.

RAI 44. Describe survey requirements, procedures or surveys performed, for personnel or areas to detect contamination and any limits associated.

Section 5.2.29 describes the CFFF contamination control program. Contamination survey limits and survey frequencies are shown in Table 5.1. Survey limits are provided only for smear (alpha contamination) surveys.

Regulatory Basis

10 CFR 20.1501(a)(2)(iii) states that each licensee shall make or cause to be made, surveys of areas, including the subsurface that are reasonable under the circumstances to evaluate the potential radiological hazards of the radiation levels and residual radioactivity detected.

RAI 45. Discuss how the radiation protection training program is included in triennial assessment of the radiation safety program. Describe how the effectiveness of training and instructors is evaluated.

Section 5.2.67 states the entire is assessed on a triennial frequency.

Regulatory Basis

10 CFR 20.2102(a)(2) states that each licensee shall maintain records of the radiation protection program, including audits and other reviews of program content and implementation.

RAI 46. Discuss the participation (e.g., as a member, chairperson) of a senior component manager is a member or chairs this in the ALARA Committee.

Section 5.2.3 states that the Regulatory Component establishes an ALARA Committee with membership from radiation protection, environmental safety, environmental health and safety, operations managers and other professionals as needed.

Regulatory Basis

10 CFR 20.1101(c) states the licensee shall periodically (at least annually) review the radiation protection program content and implementation.

RAI 47. Describe the effectiveness of ventilation systems as they relate to public exposure.

Section 5.2.3 describes several actions taken by the CFFF to maintain exposure to the public ALARA.

Regulatory Basis

10 CFR 20.1101(d) states a constraint on air emissions systems shall be established by licensees such that the individual member of the public likely to receive the highest dose will not be expected to receive a total effective dose equivalent in excess of 10 mrem.

RAI 48. Identify the type and sensitivity of dosimeters. Discuss how often the dosimeters are collected and processed. In addition to annual limits specified in Section 5.2.42, discuss administrative control limits which, if exceeded, prompt an investigation into circumstances of the exposure.

Section 5.2.43 states that personnel dosimeters are issued to measure external exposure to beta, gamma, and x-rays.

Regulatory Basis

10 CFR 20.1502 states that each licensee shall monitor exposures to radiation and radioactive material at level sufficient to demonstrate compliance with occupational dose limits.

RAI 49. Describe sealed sources used in calibration and fuel facility activities. Describe storage, handling, and control procedures, for the use of such sources. Include inventory and leak check procedures.

Regulatory Basis

10 CFR 70.22(a)(7) requires a description of equipment and facilities which will be used by the applicant to protect and minimize health and minimize danger to life or property.

RAI 50. State the commitment of the CFFF to report individual exposures annually.

Regulatory Basis

10 CFR 20.2206(b) states that each licensee in a category listed in paragraph (a) of this section shall submit an annual report of the results of individual monitoring carried out by the licensee for each individual for whom monitoring was required by § 20.1502 during that year.

RAI 51. Demonstrate that the proposed increase in the concentration of contaminants in calcium fluoride and other mixtures sent off-site are within applicable regulatory limits.

Section 12.1.6 of the renewal application requests authorization to release calcium fluoride (containing a minimum of 60-percent solids) and other homogeneous mixtures in which the mean concentration of uranium constituents does not exceed 60-picocuries per gram. The limit of 60-picocuries per gram concentration is an increase from the 30-picocuries per gram concentration previously approved by NRC. Demonstrate that dose to members of the public from enriched uranium and other contaminants (e.g., Technicium-99) in calcium fluoride and other mixtures sent off-site are within applicable regulatory limits. Provide a plan consistent with the requirements of 10 CFR 20.2002 that includes an analysis of potential doses to members of the public (e.g., workers, end-users) from calcium fluoride as well as other mixtures containing residual enriched uranium and other contaminants. Discuss the conditions under which products containing uranium and Tc-99 in calcium fluoride and the other mixtures in the waste stream remain in a stable form and the potential environmental conditions that would affect the stability. Discuss the environmental impacts of the proposed releases of enriched uranium and other contaminants in calcium fluoride and the other mixtures (e.g., radiological and toxicity impacts) for all off-site uses for each proposed option (such as drying and briquette manufacturing, cement manufacturing, brick manufacturing, disposition at a chemical disposal site, and disposition at industrial landfill).

Regulatory Basis

10 CFR 20.1301(a)(1) requires that each licensee shall conduct operations so that the total effective dose equivalent to individual members of the public from the licensed operation does not exceed 0.1 rem (1 mSv) in a year, exclusive of the dose contributions from background radiation, from any administration the individual has received, from exposure to individuals administered radioactive material and released under § 35.75, from voluntary participation in medical research programs, and from the licensee's disposal of radioactive material into sanitary sewerage in accordance with § 20.2003.

10 CFR 20.2001(a) requires that each licensee shall dispose of licensed material only by specified methods, including proposed disposal procedures via 10 CFR 20.2002.

10 CFR 20.2002 requires that each application for a proposed disposal procedure include:

- A description of the waste containing licensed material to be disposed of, including the physical and chemical properties important to risk evaluation, and the proposed manner and conditions of waste disposal;

- An analysis and evaluation of pertinent information on the nature of the environment;

- The nature and location of other potentially affected licensed and unlicensed facilities; and

- Analyses and procedures to ensure that doses are maintained ALARA and within applicable dose limits.

10 CFR 51.45 states, in part, that the environmental report shall contain a description of the environment affected, and discuss the considerations of the impact of the proposed action on the environment and must include an analysis that considers and balances the environmental effects of the proposed action.

CHEMICAL PROCESS SAFETY

NOTE: RAI 52 through RAI 58 refer to a revised Chapter 4 of the license application, submitted by letter dated March 7, 2016 (Ref. 2), and the ISA dated January 22, 2015 (Ref. 7).

RAI 52. Discuss the responsibilities of the chemical safety component within NRC's regulatory jurisdiction.

Chapter 2, Organization, presents an organization chart (Figure 2.2) that identifies the safety components. Section 2.1.1.3(b) lacks a discussion of responsibilities of the chemical safety component within NRC's regulatory jurisdiction.

52.1. Describe the activities or responsibilities included under the Chemical Safety Component. Discuss compliance with the NRC chemical safety requirements (e.g., chemical safety aspect of the ISA, chemical safety IROFS, procedures, training, audits, as they are related to chemical safety issues that are within NRC's regulatory jurisdiction) under the

"Regulatory Component" and the "Safety Component" which are discussed in Section 2.1.1.3 and Figure 2.2.

52.2. Demonstrate that the Chemical Safety Function has sufficient training and practical chemical safety experience.

Regulatory Basis

10 CFR 70.22(a)(6) require an applicant to provide information on the technical qualifications of applicant and members of his staff to engage in the proposed activities.

RAI 53. Describe the elements of training (e.g. appropriate personal protective equipment, lessons learned from conducting ISA) for the safe handling of hazardous chemicals within NRC's jurisdiction. Discuss the process in place to assure that the safety insights obtained from the ISA are incorporated into procedures and training. Discuss the types of personnel (e.g., operators, area supervisors, contractors, management) gaining such insights.

Section 7.1.2.4 of the license application states that employees using hazardous chemicals are specifically trained in procedures for safe handling and disposal of them.

Regulatory Basis

10 CFR 70.22(a)(8) requires that each application for a license must contain proposed procedures to protect health and minimize danger to life or property. 10 CFR 70.62(d) requires an applicant to establish management measures for engineered and administrative controls and control systems that are identified as IROFS, in accordance with 10 CFR 70.61(e), so that they are available and reliable to perform their functions when needed.

RAI 54. Clarify the chemical safety commitments related to compliance with 10 CFR 70 Subpart H described in Chapter 4.0 and Chapter 7.0.

Section 7.1 states that all CFFF chemical safety commitments related to compliance with 10 CFR 70 Subpart H requirements are described in Chapter 4.0 of this license application. The purpose and scope of Chapter 7.0 is unclear.

Regulatory Basis

10 CFR 70.62(a) requires an applicant to establish and maintain a safety program that demonstrates compliance with the performance requirements in 70.61.

RAI 55. Discuss the phases of operation (e.g., start up, shut down, maintenance, non-routine operations) addressed by the ISA. Clarify the phases of operation included in the ISA.

Section 7.1 states that Chemical Safety is an element of the ISA program. The ISA is discussed in Chapter 4 of the license application, but the scope of the ISA is unclear as it relates to chemical safety. Section 4.1.1.2 discusses guidance for preparing the process description, but only discusses "normal operations".

Regulatory Basis

10 CFR 70.62(a) requires an applicant to establish and maintain a safety program that demonstrates compliance with the performance requirements in 70.61.10 CFR 70.62(c) requires an applicant to conduct and maintain an ISA that demonstrates compliance with the performance requirements in 70.61.

RAI 56. Discuss the relevant chemical hazards exposures included in the Chemical Safety Analysis (e.g. inhalation, dermal absorption, ocular contact, ingestion). Describe the method used to identify relevant exposure pathways that could lead to high or intermediate consequences as defined in 70.61.

Section 7.1.3.4(a)(3) states that all relevant chemical hazard exposure pathways are included in the Chemical Safety Analysis.

Regulatory Basis

10 CFR 70.62(a) requires an applicant to establish and maintain a safety program that demonstrates compliance with the performance requirements in 70.61.

10 CFR 70.62(c) requires an applicant to conduct and maintain an ISA that demonstrates compliance with the performance requirements in 70.61.

RAI 57. Discuss the following:

57.1. Explain the apparent discrepancies between the detailed descriptions (e.g. process safety information) in ISA Summaries describing non-inhalation exposures as consequences of concern and tables lacking the quantitative standard for those consequences.

57.2. List the quantitative standards of chemical safety used to assess the consequences to an individual from acute chemical exposure analyzed in the ISA.

Section 7.1.1.1 states that chemical safety commitments related to Subpart H requirements are described in Chapter 4.0 of the license Application. Chapter 4.0 of the license application states that the “CFFF Baseline Integrated Safety Analysis (ISA) and ISA Summary Handbook” provides details describing the key features and practices for conducting the ISA and preparing the ISA Summaries. Both the ISA Summaries and ISA Handbook identifies inhalation standards, such as ERPG-3 and ERPG-2, taken as consequences of concern for high and intermediate consequences. Specific ISA Summary chapters and detailed descriptions of specific accident sequences (e.g., chemical release sequences for ADU vaporization system) identify other consequences of concern (e.g. dermal exposure to hydrogen fluoride (HF) considered high consequence).

Regulatory Basis

10 CFR 70.65(b)(7) requires the ISA Summary to include a description of the proposed quantitative standards used to assess the consequences to an individual from acute chemical exposure to licensed materials or chemicals produced from licensed materials.

RAI 58. Provide the basis for excluding that 49 percent HF pipe inside the enclosed area of the HF spiking station. Provide assurance all credible chemical safety related accident sequences

in this HF spiking station have been considered. Demonstrate that there are no chemical hazards of licensed material and facility hazards (e.g. releases from HF piping) that could affect the safety of licensed materials (including routine and non-routine operations).

Section 7.1.3.4 states that the Chemical Safety Analysis is a comprehensive assessment of each component within a defined system. This section also states that the scope and content of a Chemical Safety Analysis are customized to reflect the particular characteristics and needs of the system being analyzed. To gain reasonable assurance that the ISA demonstrates the appropriately identified hazards delineated in 10 CFR 70.62(c)(1)(ii) – (iii), the NRC staff performed vertical slice reviews of the ISA Summary, to provide assurance that the ISA is adequately evaluating chemical hazards within NRC Jurisdiction. On page 117 of ISA 03, Westinghouse states that the supply piping contains 49 weight percent HF solution. On page 126 of ISA 03, Westinghouse states, "A 5 percent (maximum) HF solution co-mingled with SNM is contained in vessels T-1280, T-1281, … and the piping and equipment (e.g. pumps) attached to these vessels. The supply piping to T-1280 and T-1281 is excluded since no SNM is contained in this piping."

Regulatory Basis

10 CFR 70.62 (c)(ii) and (c)(iii) requires an applicant to conduct and maintain an ISA that includes chemical hazards of licensed material and hazardous chemicals produced from licensed material, and facility hazards that could affect the safety of licensed materials and thus present an increased radiological risk.

FIRE SAFETY

RAI 59. Discuss and demonstrate that the Fire Safety Function has sufficient training and practical fire safety experience in nuclear facilities.

Section 2.1.1.3.e of the license application describes the qualifications of Regulatory Engineering Functions.

Regulatory Basis

10 CFR 70.22(a) (6) requires the technical qualifications, including training and experience of the applicant to engage in the proposed activities.

RAI 60. Discuss, in detail, training and qualification of the Emergency Response Team, including general operations, risk management policy, education, training, organization, medical/physical requirements, incident command, protective clothing, equipment, apparatus, and any agreements with outside emergency organizations.

Regulatory Basis

10 CFR 70.22(a) (6) requires the technical qualifications, including training and experience of the applicant and members of his staff to engage in the proposed activities.

10 CFR 70.62(a) requires the licensee to establish and maintain a safety program that demonstrates compliance with the performance criteria in 10 CFR 70.61.

RAI 61. Discuss, in detail, combustible/flammable liquids and gases, including the design, construction, installation, labeling, testing, operation, and maintenance of tanks, containers, and cabinets; the control of ignition sources in these areas; and the procedures for the dispensing, handling, transfer, and use.

Regulatory Basis

10 CFR 70.22(a) (6) requires the technical qualifications, including training and experience of the applicant and members of his staff to engage in the proposed activities.

10 CFR 70.62(a) requires the licensee to establish and maintain a safety program that demonstrates compliance with the performance criteria in 10 CFR 70.61.

RAI 62. Discuss, in detail, the determination of areas of “substantial combustible loading,” as referenced in Section 8.1.5.1 of the license application. Include training, procedures, and any correlations with the Fire Hazards Analysis.

Regulatory Basis

10 CFR 70.22(a) (6) requires the technical qualifications, including training and experience of the applicant and members of his staff to engage in the proposed activities.

10 CFR 70.62(a) requires the licensee to establish and maintain a safety program that demonstrates compliance with the performance criteria in 10 CFR 70.61.

ENVIRONMENTAL PROTECTION

RAI 63. Describe how air effluents are controlled. Specifically, describe how gaseous effluent controls ensure compliance with the dose constraint in 20.1101(d).

Regulatory Basis

10 CFR 20 Subpart B, "Radiation Protection Programs"; Subpart D, "Radiation Dose Limits for Individual Members of the Public"; and Subpart F, "Surveys and Monitoring," specify the effluent control and treatment measures necessary to meet the dose limits and dose constraints for members of the public. Subpart F also states the survey requirements. Subpart K, "Waste Disposal," specifies the waste disposal requirements; Subpart L, "Records," specifies the records requirements; and Subpart M, "Reports," specifies the reporting requirements.

10 CFR Part 70 requires the applicant to demonstrate that proposed facilities and equipment, including measuring and monitoring instruments and devices for the disposal of radioactive effluents and wastes, are adequate to protect the environment and public health and safety, as specified in 10 CFR 70.22(a)(7).

RAI 64. Discuss how stack sampling is performed, or commit to follow Regulatory Guide 4.16, Monitoring and Reporting Radioactive Materials in Liquid and Gaseous Effluents from Nuclear Fuel Cycle Facilities, Revision 2, December 2010; and Regulatory Guide 4.20, Constraint on Releases of Airborne Radioactive Materials to the Environment for Licensees Other Than Power Reactors, Revision 1, April 2012. American National Standards Institute (ANSI) standard ANSI N42.18-1980, "Specification and Performance of On-Site Instrumentation for Continuously Monitoring Radioactive Effluents" provides additional guidance for effluent monitoring.

Regulatory Basis

10 CFR 20 Subpart B, "Radiation Protection Programs"; Subpart D, "Radiation Dose Limits for Individual Members of the Public"; and Subpart F, "Surveys and Monitoring," specify the effluent control and treatment measures necessary to meet the dose limits and dose constraints for members of the public. Subpart F states the survey requirements. Subpart K, "Waste Disposal," specifies the waste disposal requirements; Subpart L, "Records," specifies the records requirements; and Subpart M, "Reports," specifies the reporting requirements.

10 CFR Part 70 requires the applicant to demonstrate that proposed facilities and equipment, including measuring and monitoring instruments and devices for the disposal of radioactive effluents and wastes, are adequate to protect the environment and public health and safety, as specified in 10 CFR 70.22(a)(7).

RAI 65. Provide ALARA goals for gaseous and liquid effluents.

Guidance for establishing ALARA goals are given in Regulatory Guide 8.37, "ALARA Levels for Effluents from Materials Facilities," July 1993.

Regulatory Basis

10 CFR 20.11.0 states that the licensee shall use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and radiation doses to members of the public that are ALARA.

RAI 66. Describe the program for waste minimization.

Guidance for a waste minimization program is given in NRC Information Notice 94-23, "Guidance to Hazardous, Radioactive, and Mixed Waste Generators on the Elements of a Waste Minimization Program," March 25, 1994. Waste minimization programs proposed by applicants for both new and existing licenses are acceptable if the programs include the following:

- top management support
- methods used to characterize waste generation (including types and amounts) and waste management costs (including costs of regulatory compliance, paperwork, transportation, treatment, storage, and disposal)
- periodic waste minimization assessments to identify waste minimization opportunities and solicit employee or external recommendations
- provisions for technology transfer to seek and exchange technical information on waste minimization
- methods used to implement and evaluate waste minimization recommendations

Regulatory Basis

10 CFR 20.1406, Minimization of contamination, states that applicants requesting amendment or renewal of existing licenses must minimize and control waste generation during operations as part of the radiation protection program, in accordance with 10 CFR 20.1101 (Volume 62 of the

Federal Register, page 39,082 (62 FR 39082); July 21, 1997). NRC Information Notice 94-23 offers guidance for waste minimization programs.

RAI 67. Correct the coordinates of Pond (Gator) or spring in Section 10.1.4, unless they are duplicates. The coordinates are identical.

Regulatory Basis

10 CFR Part 70.22(e) requires that each application and statement contain complete and accurate disclosure as to all matters and things required to be disclosed.

RAI 68. Describe how leakage from the Ponds would be detected.

Regulatory Basis

10 CFR Part 70.22(a)(7) requires 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).

RAI 69. Describe laboratory quality control procedures.

Laboratory quality control procedures must be adequate to validate the analytical results of effluent and environmental samples. These laboratory procedures include the use of established standards, such as those provided by the National Institute of Standards and Technology, and standard analytical procedures, such as those established by the National Environmental Laboratory Accreditation Conference. If the applicant proposes to use its own analytical laboratory for the analysis of effluent and environmental samples, the applicant must commit to providing third-party verification of the laboratory's methods (such as that obtained by participation in a round-robin measurement program).

Regulatory Basis

10 CFR 70.22(a) (8) requires 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).

RAI 70. Identify the locations of river water and sediment samples listed in Figure 10.1.

10 CFR Part 70 requires the applicant to demonstrate that proposed facilities and equipment, including measuring and monitoring instruments and devices for the disposal of radioactive effluents and wastes, are adequate to protect the environment and public health and safety, as specified in 10 CFR 70.22(a)(7).

RAI 71. Describe all applicable Federal and State standards for discharges and any permits issued by Federal, State, or local governments, for gaseous and liquid effluents.

Regulatory Basis

10 CFR 70.22(a) (8) requires 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).

ENVIRONMENTAL ASSESSMENT

The application from the Westinghouse Electric Company LLC for a license renewal dated December 17, 2014 (Ref. 1), includes an Environmental Report. The following RAIs pertain to the Environmental Report and portions of the license application as indicated.

NOTE: See also RAI 51 on page 18 regarding the environmental impacts of dispositioning calcium fluoride.

RAI 72. Provide gross alpha monitoring data including exceedances of the maximum contaminant level for ground water and surface water and above regulatory concern for soil contamination since 2008. Identify the year(s) of occurrence(s), source(s), amount of estimated releases, and location of any gross alpha contamination, and the status of the measures used to identify the source of contamination, and the contaminant elements contributing to the contamination in ground water, surface water, and soil. Discuss ground water and surface water pathways, and the understandings within the conceptual site model of the contaminant plumes, the technical basis of gross alpha contamination to the drinking water sources, potable water wells south of the site, and the environmental impacts on ground water, surface water, and soil resources due to gross alpha contamination for the proposed action and no-action alternative.

Regulatory Basis

Title 10 of the Code of Federal Regulations (10 CFR) Section 51.45.(b)(1) requires that the environmental report contain a description of the proposed action, a statement of its purposes, a description of the environment affected, and discuss the considerations of the impact of the proposed action on the environment. Impacts shall be discussed in proportion to their significance.

10 CFR 51.45.(b)(2) requires that the environmental report contain a description of the proposed action, a statement of its purposes, a description of the environment affected, and discuss any adverse environmental effects which cannot be avoided should the proposal be implemented.

10 CFR 51.45.(b)(3) requires that the environmental report contain a description of the proposed action, a statement of its purposes, a description of the environment affected, and discuss alternatives to the proposed action. The discussion of alternatives shall be sufficiently complete to aid the Commission in developing and exploring, pursuant to section 102(2)(E) of the National Environmental Policy Act, "…appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." To the extent practicable, the environmental impacts of the proposal and the alternatives should be presented in comparative form.

RAI 73. Provide the mitigation measures used to reduce gross alpha contamination for the proposed action and no-action alternative and the year of implementation of such measures.

Regulatory Basis

10 CFR 51.103(a)(4) requires that the record of decision shall be clearly identified and shall state whether the Commission has taken all practicable measures within its jurisdiction to avoid or minimize environmental harm from the alternative selected, and if not, to explain why those measures were not adopted. Summarize any license conditions and monitoring programs adopted in connection with mitigation measures.

RAI 74. Provide an estimate of the amount of gross alpha contamination that has been released to the environment. Discuss the cumulative effects of the proposed action and no action alternative on ground water, surface water, and soil resources due to gross alpha contamination.

By 40 CFR 1508.7, cumulative effects are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person takes such other actions. Cumulative impacts can result from individually minor, but collective significant actions taking place over a period of time". Examples of cumulative impacts are given in Section 4.2.5.2 of the NRC staff's environmental review guidance (Ref. 2).

Regulatory Basis

10 CFR 51.45(c) states, in part, that the environmental report must include an analysis considering and balancing the environmental effects of the proposed action, the environmental impacts of alternatives to the proposed action, and alternatives available for reducing or avoiding adverse environmental effects.

RAI 75. Discuss the environmental impacts from the flooding at CFFF caused by the October 2015 storm. Address if any of the lagoons especially those which contained radionuclides were impacted by the flood either by flooding and overtopping or by elevated water table causing ground flooding. Provide estimates of amount and type of contaminants, particularly radionuclides, released from the site due to flooding. Address the impacts (e.g., radioactivity, chemical toxicity) of these releases to the environment from contaminants such as uranium and Technecium-99 from the lagoons and solids in calcium fluoride and other mixtures from the site.

Regulatory Basis

10 CFR 51.45 states, in part, that the environmental report shall contain a description of the environment affected, and discuss the considerations of the impact of the proposed action on the environment and must include an analysis that considers and balances the environmental effects of the proposed action.

RAI 76. Provide references from which data was obtained or conclusions drawn for use in the preparation of the responses to RAIs, the environmental report (e.g., AECOM Remedial Investigation Reports), and other documents prepared for the NRC's environmental review. Provide a written justification for references that should be withheld from public disclosure in accordance with 10 CFR 51.16.

Regulatory Basis

10 CFR 51.45 (c) states, in part, the environmental report should contain sufficient data to aid the Commission in its development of an independent analysis.

10 CFR 51.16 states, in part, that any proprietary information which a person seeks to have withheld from public disclosure shall be submitted in accordance with § 2.390 of this chapter. When submitted, the proprietary information should be clearly identified and accompanied by a request, containing detailed reasons and justifications, that the proprietary information be withheld from public disclosure. A non-proprietary summary describing the general content of the proprietary information should also be provided.

RAI 77. Reconcile the following statements in the environmental report (emphasis added):

In Chapter 4 (page 4-6) of the Environmental Report, Westinghouse states that the "cylinder recertification building liquid from the hydrostatic test process appeared to have the highest potential of being a major contributor since this liquid (from remnants of activity in the cleaned cylinders) could contain elevated uranium daughter beta, Tc-99 beta, and low alpha concentrations."

In Chapter 8 (page 8-1) of the Environmental Report, Westinghouse states the "source as traced to technicium-99 (Tc-99), originating from UF6 cylinder washing."

Regulatory Basis

10 CFR 51.45 states, in part, that the environmental report shall contain a description of the environment affected, and discuss the considerations of the impact of the proposed action on the environment and must include an analysis that considers and balances the environmental effects of the proposed action.

REFERENCES

1. Letter from N. Parr, Westinghouse Electric Company, "SNM-1107 License Renewal Supplement", December 17, 2013. ADAMS accession number ML14352A111.

2. Letter from N. Parr, Westinghouse Electric Company LLC, "Westinghouse License Renewal Application Revised Chapters (TAC #: L33317)", March 7, 2016. ADAMS accession number ML16067A295.

3. Letter from N. Parr, Westinghouse Electric Company LLC, "Westinghouse January 2016 Updated Integrated Safety Analysis (ISA) Summary", January 25, 2016. ADAMS accession number ML16026A052.

4. Letter to N. Parr, Westinghouse Electric Company LLC, "Approval of Westinghouse Exemption from Title 10 of the Code of Federal Regulations, Part 20.1703(C) (5) (Technical Assignment Control Number L33340)", December 12, 2014. ADAMS accession number ML14303A351.

5. Letter to N. Parr, Westinghouse Electric Company LLC, "Amendment 18 – Exemption From 10 CFR Part 30, Appendix A, Section Ii.C.1; Exemption From 10 CFR, Part 20.1703(C)(5); Change in the Calibration Interval of Portable Radiation Survey

Instrumentation; Increase in Possession Limits; Approval of Physical Security Plan, Revision 45; Change in Principal Officers; Removal of Completed License Conditions (Technical Assignment Control Number L33353)", November 2, 2015. ADAMS accession number ML15125A279.

6. Letter from R. Johnson, U.S. Nuclear Regulatory Commission, "Approval of Westinghouse Request for Both Calibrating Portable Radiation Survey Instrumentation Annually and Clarifying Text (Technical Assignment Control Number L33338)", November 13, 2014. ADAMS accession number ML14304A136.

7. Westinghouse Electric Company LLC, "ISA 07 URRS Solvent Extraction System Summary 2015 Update, Revision 9", January 22, 2015. ADAMS accession number ML15026A009.

8. U.S. Nuclear Regulatory Commission, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs—Final Report," NUREG–1748, August 2003, ADAMS accession number ML032450279.