NON-PROPRIETARY

Request for Additional Information
for the Blended Low-Enriched Uranium Preparation Facility
License Amendment Request Dated October 11, 2002
Integrated Safety Assessment Summary dated October 14, 2002
Nuclear Fuel Services, Inc.
70-143

Please provide the following information:

License Amendment Request

1. Revise Section 5.2.7 to remove the words, "when the tanks are in use." Page 2 of the license amendment request letter states that use of the two 6,000-gallon tanks has been discontinued, however sampling of the downgradient groundwater monitoring wells will continue.

   This is needed to make the document consistent.

2. Describe how the design for the BLEU preparation facility provides for emergency capability to maintain control of: (i) licensed material and hazardous chemicals produced from licensed material, (ii) evacuation of on-site personnel, and (iii) onsite emergency facilities and services that facilitate the use of available offsite services.

   This information is requested in accordance with 10 CFR 70.64(a)(6), "Emergency capability."

3. Provide source term and dose rate profiles for the 300 complex for both normal and off-normal environment for both direct radiation and airborne radioactivity.

   This information is needed to establish a baseline for the radiation program requirements in 10 CFR 20.1101.

4. Describe how the facility design and procedures for operation will minimize contamination, facilitate decommissioning, and minimize waste generation.

   Standard Review Plan (SRP) 1520, Section 9.4.3.2.1, states that a radiation protection program is acceptable, in part, if it describes the waste minimization features of the facility pursuant to 10 CFR 20.1406.

Integrated Safety Analysis Summary

General

1. Provide discussion of the design reconstitution of the current design basis that has been done. Explain how that reconstitution was translated into a fixed baseline design basis against which subsequent changes will be measured.

   10 CFR 70.72 states that the licensee shall 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. In order to understand future configuration changes, there must first be a known baseline. The applicant is to describe the effort they have put forth to establish, organize, and document design requirements and design bases. Of particular importance are the methods used to evaluate, verify, and validate reconstituted design data for Items Relied On for Safety (IROFS).

2. Provide clarification that the boundaries in the Blended Low-Enriched Uranium (BLEU) Preparation Facility (BPF) submittal extend outside of the BPF building proper; that it includes the piping, valves, and other hardware, up-to-and-including HV-7B01B & C.

   10 CFR 70.65(a)(6) requires that the application provide a brief description of each IROFS in sufficient detail to understand its function(s) in relation to the performance requirements of 10 CFR 70.61.

3. Provide justification on the difference in assigned indices for the same IROFS. For example, Page 4-113 identifies an administrative IROFS, BPF-1, for accident sequence Spill-1 with an IROFS failure index of -2. The next accident sequence, Spill-2A, has the same administrative IROFS, BPF-1, but the IROFS failure index is -1. Also clarify why in general throughout the application passive engineering controls were assigned a -3 except in the criticality assessment which assigns passive engineering controls a -4.

   10 CFR 70.62(c)(vi) requires that the integrated safety analysis (ISA) identify the characteristics of preventive, mitigative or other safety function of each IROFS, and the assumptions and conditions under which the IROFS support compliance with the performance requirements of 10 CFR 70.61.

Criticality Safety

4. Provide in the ISA Summary a table of operating control limits for the controlled parameters. While the Nuclear Criticality Safety Evaluation (NCSE) gives the limiting condition of operation (LCO) for the U-235 concentration, it is not clear that the LCO is for other controlled parameters such as uranium concentration and solution volumes. Also, provide the routine operating limits.

Chapter 6, Section 6.5.4 of the license amendment request states that limiting conditions shall be placed on the above parameters for the blending operation. The requested information is necessary to evaluate the limits for all controlled parameters to ensure that these limits will maintain operations subcritical and to ensure that this operation meets the double contingency principle of 10 CFR 70.64(a)(9).

5. For the scenario described in Section 4.1.1.1 of the BLEU Preparation Facility (BPF) downblending NCSE, justify the assumption that the blend tank already contains a minimum volume of uranyl nitrate before any addition of additional material with a higher concentration.

   This justification is required to determine if the scenario will meet the double contingency principle as required by 10 CFR 70.64(9)(a). This assumption is used to demonstrate that the in-line monitor has time to respond to changes in fissile concentration and thus prevent a criticality. The NCSE states that the monitor has adequate time to respond to any concentration changes due to the large amount of material required to raise the concentration from If there was less material in the blend tank initially than the assumed then the additional amount of U-235 required to raise the concentration is less and the time is correspondingly less.

6. Justify why favorable geometry equipment such as the staging, mix/measure, and feed columns in the downblending process, the staging columns in the solvent extraction process, and the test columns in the metal dissolution system are not designated as IROFS. Also, since the flatness of the BPF floor and the height of the dikes are controlled to maintain a favorable solution geometry in the event of a spill, justify why these are not designated as criticality IROFS.

   General exclusion from consideration of certain hazards can be justified by bounding conditions which ensure that the performance requirements of 10 CFR 70.61 cannot be exceeded. If the bounding condition is under the control of the applicant, the condition should be designated as an IROFS. Thus, items such as favorable geometry (diameter plus boron) columns, are inherently an IROFS. Without the favorable geometry, the highly enriched uranium (HEU) could be in a state that is critical. Also, dikes, or alternatives are IROFS if the height must be maintained to prevent criticality. This information is required to demonstrate compliance with the performance requirements of 10 CFR 70.61.

7. For Scenario 4.1.1.3, described in the BPF downblending NCSE, describe how the initiating event sample is independent from the second sample which is considered an IROFS.

   When determining the overall likelihood of an accident sequence, the two separate sampling operations should be independent to be credited in the initiating event and as an IROFS.

This information is required to determine whether this control is adequate to meet the performance requirements of 10 CFR 70.61.

8. For Scenario 4.1.1.5, described in the BPF downblending NCSE, justify the inconsistency of failure indices for similar enabling events.

   Also for this case, justify why the two human actions (double batching, which is the initiating event and checking the tank contents, which is the enabling event) are independent.

   This information is required to determine if the controls are adequate to meet the performance requirements of 10 CFR 70.61 and to determine if this scenario meets the double contingency principle of 10 CFR 70.64(a)(9).

9. Provide justification for crediting the enabling events when determining the overall likelihood of an accident sequence, without designating the enabling event as an IROFS.

   Enabling events should be either treated as IROFS or as defense-in-depth. Any event whose unlikeliness is used as demonstrating compliance with 10 CFR 70.61 is an IROFS. The only exception would be an event whose unlikeliness is guaranteed regardless of actions by the licensee, such as external events.

10. For Scenarios 4.1.1.6 and 4.1.4.1, described in the BPF downblending NCSE, justify assigning a -2 failure index to the second IROFS which is a single sample. The failure of a single sample without any other verification is not unlikely. This also is inconsistent with the failure indices assigned to the sampling IROFS in Scenario 4.1.1.3 which are dual samples and are assigned a failure index of -2. (See Comment #3)

    Also for these scenarios, clarify whether the first IROFS is only the surveillance of the seal legs as stated or if it is the actual seal legs failure along with failure to check the seal leg integrity.

    This information is required to determine if this accident sequence is rendered highly unlikely and meets the performance requirements of 10 CFR 70.61. In general, a failure of a single administrative control does not constitute a contingency and may not be unlikely. Generally, some type of independent verification or a large safety margin is required when relying on a single administrative control to make a contingency unlikely.

11. For Scenarios 4.1.1.7 and 4.1.4.2, described in the BPF downblending NCSE, describe how the two administrative IROFS are independent.

    The NCSE does not discuss any controls that would prohibit the same operator who brings a container into the area (IROFS #1) from adding the contents of the container

into the tanks (IROFS #2). If the IROFS failures are errors that can be made by the same person, they are not independent. Also, it is not clear that the duration failure of -3 is appropriate unless there are controls in the area that require looking for and removing prohibited items from the area once per shift.

This information is required to determine if this accident sequence is controlled to highly unlikely and meets the performance requirements of 10 CFR 70.61. This is also required to determine if this scenario meets the double contingency principle of 10 CFR 70.64.

12. Explain how you arrived at failure indices of -4 for certain passive engineered IROFS. (See comment #3)

    This information is required to determine if the controls are adequate to meet the performance requirements of 10 CFR 70.61.

13. For the scenarios discussed in 4.1.2.2 of the BPF downblending NCSE and 4.1.3.2.5 of the uranium/aluminum (U-Al) dissolution NCSE, justify the enabling event and IROFS failure indices. Also justify other scenarios involving unfavorable geometry containers where credit is taken for the actual location of a container with respect to a spill.

    The credit taken for the enabling event (container would have to reside in vicinity of leaking equipment) was not justified. Also, the failure index of IROFS #1 already considers having an unfavorable container in the facility (-2) and IROFS #2 failure index already credits either using the container or leaving an open unattended container in the area (-2). Given the qualitative nature of the analysis, additional credit taken for the actual location of the container with respect to the leak is not conservative.

    This information is required to determine if the licensee's methodology will correctly evaluate whether or not a scenario is highly unlikely and meets the performance requirements of 10 CFR 70.61.

14. For Scenarios 4.1.3.1 and 4.1.3.2 of the BPF downblending NCSE and 4.1.1.2.2 and 4.1.1.2.11 of the U-Al dissolution NCSE, justify the use of an initiating event index of -1 (valve or Rosemount failure). Also, describe the amount of time that the operator would have to respond to this event before there is an unacceptable risk of a criticality.

    The initiating event index conflicts with the initiating event index of 0 used in Scenario 4.1.2.1, which is the same type of failure. The amount of time the operator has to respond is necessary to evaluate whether the failure index assigned is justified. This information is required to determine if the accident sequence is highly unlikely and the performance requirements of 10 CFR 70.61 are met.

15. Explain the discrepancy between the freezing of the low enriched uranyl nitrate (LEUN) in the BPF which is given as 23 degrees F and in the Uranyl Nitrate Building (UNB) which is given as 32 degrees F.

    This information is necessary to determine if the scenario in the BPF is accurately evaluated, i.e., determine if the scenario is highly unlikely and meets the performance requirements of 10 CFR 70.61.

16. For the scenario discussed in 4.1.4.2.2 of the U-Al dissolution NCSE, describe the amount of time the operator would have to respond before this is an unacceptable risk of a criticality. Also, clarify whether the same person is responsible for closing the dissolver lid and detecting the overflow. If so, the two events are not independent.

    This information is required to determine if this accident sequence is controlled to highly unlikely and meets the performance requirements of 10 CFR 70.61. This is also required to determine if this scenario meets the double contingency principle of 10 CFR 70.64(a)(9).

17. For the U-Al dissolution process, describe how the spacing of equipment is controlled. The criticality analysis takes credit for the spacing of the equipment.

    This information is required to determine if this accident sequence is controlled to highly unlikely and meets the performance requirements of 10 CFR 70.61.

18. Describe how the boron-10 content of the glass columns is verified prior to use.

    Since credit is taken for the boron-10 content, this information is required to determine if this accident sequence is controlled to highly unlikely and if this scenario, under both normal and credible abnormal conditions, will be maintained subcritical as required by 10 CFR 70.61.

19. Justify the limit of [redacted] U-235 for the liquid waste discard tanks.

    This information is required to determine if this accident sequence, under both normal and credible abnormal is subcritical as required by 10 CFR 70.61.

20. Provide a list in the ISA Summary of the NCSEs.

    This is required since the NCSEs contain the analysis that demonstrates that the accident sequences are highly unlikely as required by 10 CFR 70.61 and that the double contingency principle is met.

21. Provide examples of the benchmark experiments in the current validation report that bounds the new operations in the BPF, specifically the U-Al dissolution process.

This information is required to determine if the BPF operations will be maintained subcritical, including use of an approved margin as required by 10 CFR 70.61.

22. For the uranium metal dissolution accident sequences on page 4-106 of the ISA Summary, describe how IROFS BPF-4 and BPF-5 are independent since they are used together in a sequence to render the accident highly unlikely. BPF-4 is an administrative limit on the and BPF-5 is an administrative limit on the .

Also, for the uranium metal dissolution accident sequences on page 4-106 of the ISA Summary, describe how IROFS BPF-7 and BPF-8 are independent when they are used together. BPF-7 is an administrative limit requiring and BPF-8 is an administrative limit requiring .

This information is required to determine if the controls are adequate to meet the performance requirements of 10 CFR 70.61 and to determine if this scenario meets the double contingency principle of 10 CFR 70.64(a)(9). (For these cases, it appears that even if there are two actions involved, they may not be independent.)

23. For the uranium metal dissolution accident sequence 4.1.19 on page 4-109 of the ISA Summary. BUM-1 is an administrative limit and BUM-2 is an administrative limit on
Describe how the initiating event (BUM-1) is independent from IROFS BUM-2.

Also, for the uranium metal sampling accident sequences, the initiating event is overbatching (exceeding container limit in the glovebox). Describe how this is independent from IROFS BMS-1 which is an administrative limit on .

This information is required to determine if the controls are adequate to meet the performance requirements of 10 CFR 70.61 and to determine if this scenario meets the double contingency principle of 10 CFR 70.64(a)(9). For these cases, it appears that even if there are two actions involved, there may be errors by the same person, and thus would not be independent.

24. For the High Security Storage Area accident sequence 4.1.5, justify the use of a duration failure index of -3.

Describe controls in the area that require looking for and removing prohibited items from the area once per shift.

This information is required to determine if this accident sequence is controlled to highly unlikely and meets the performance requirements of 10 CFR 70.61.

25. For the Liquid Waste Discard System accident sequences, explain why the failure indices used are not consistent. (See comment #3)

    No justification was given for the different failure indices assigned to the same IROFS in what appears to be the same operation. This information is required to determine if this accident sequence is controlled to highly unlikely and meets the performance requirements of 10 CFR 70.61.

26. For the Process Exhaust Ventilation accident sequences, describe how the administrative IROFS requiring a non-destructive assay (NDA) scan is independent from the second administrative IROFS requiring cleanout of the ventilation system when the NDA scan exceeds the mass limit. Also, justify the use of a duration failure index of -3.

    This information is required to determine if this accident sequence is controlled to highly unlikely and meets the performance requirements of 10 CFR 70.61. This is also required to determine if this scenario meets the double contingency principle of 10 CFR 70.64.

Chemical Safety

27. Provide balanced reactions to include the reaction that produces . The reactions provided during the on-site review were not all balanced, and the reaction that produces the was not identified in this information or in the ISA Summary Section 3.2.2.2.

    10 CFR 70.65(b)(3) requires that the ISA Summary include a "description of each process ... in sufficient detail to understand the theory of operation ...", and Section 6.4.3.1(1) of the SRP states that the applicant's description is acceptable if "process descriptions are sufficiently detailed to allow an understanding of the chemical process hazards..."

28. Provide Piping and Instrumentation Diagrams (P&ID) of the processes as well as a cross-reference of the tag numbers identified for IROFS, the specific process step, the chemical reaction occurring (or specific chemicals present in the case of no reaction), the temperature and pressure. Table 4-10 of the ISA Summary depicts the evaluation of the accidents that can occur in the facility and their respective level of consequence. The IROFS that can mitigate the proposed accidents are also part of the risk assessment. The table includes the identification names or tag numbers of the equipment designated as an IROFS or defense-in-depth, but the P&IDs of the processes are not provided. Additionally, the process descriptions and chemistry are not sufficient to perform an evaluation of the chemical process hazards.

10 CFR 70.65(b)(3) requires that the ISA Summary include a "description of each process ... in sufficient detail to understand the theory of operation ...," and Section 6.4.3.1(1) of the SRP states that the applicant's description is acceptable if "process descriptions are sufficiently detailed to allow an understanding of the chemical process hazards...."

29. Provide a mass balance for the of U-Aluminum step and the first pass solvent extraction and evaporator steps.

10 CFR 70.65(b)(3) requires that the ISA Summary include a "description of each process ... in sufficient detail to understand the theory of operation ...", and Section 6.4.3.1(1) of the SRP states that the applicant's description is acceptable if "process descriptions are sufficiently detailed to allow an understanding of the chemical process hazards...."

30. Provide additional information about the independence of administrative controls assigned as IROFS. Table 4-10 of the ISA Summary describes the IROFS related to chemical risks. Some of these IROFS are dependent on procedures or tasks to be performed by the operator. For example, the two administrative IROFS identified for UND 6.43 do not appear to be independent since the same person performs both the lockout/tagout procedure and the maintenance procedure.

10 CFR 70.62(d) requires each applicant to establish management measures to ensure compliance with the performance requirements of 10 CFR 70.61. SRP Section 6.4.3.2(3)(b) states that "the application should demonstrate the management measures proposed to assure IROFS are available and reliable when required by briefly describing: ... (b) its procedures to ensure that administrative controls will be correctly implemented, when required (e.g., employee training and qualification in operating procedures, refresher training, safe work practices, development of standard operating procedures, training program evaluation)."

31. Provide determination of effectiveness of protection indices for administrative IROFS BPF-9, BPF-10 and BPF-12, as -2 in Table 4-10 and provide information on whether these procedures are equipment specific or generic. BPF-10 was reviewed during the on-site review. This procedure appeared generic in nature and would be performed on a routine basis. However, performing a procedure for the nitric acid line specifically may not be routine.

10 CFR 70.62(c)(vi) requires that the integrated safety analysis shall identify the characteristics of preventive, mitigative or other safety functions of IROFS, and the assumptions and conditions under which the IROFS support compliance with the performance requirements of 10 CFR 70.61.

32. Provide information on how NFS plans to manage the changes in temporary emergency exposure limits (TEELs) that can occur annually, and provide supporting documentation for using less conservative standards. Some of the TEELs listed in Table 7-3 of the ISA Summary have already changed. Some of the chemicals with TEELs identified have established immediately dangerous to life or health (IDLHs) that are more conservative than the TEEL-3. The TEELs identified in the table for NO_x are for nitrogen oxide, while the TEELs for nitrogen dioxide are lower but are not used.

    10 CFR 70.65(b)(7) requires that the ISA Summary include a "A description of the proposed quantitative standards used to assess the consequences to an individual from acute chemical exposure ...", and SRP Section 6.4.3.1 (6), page 6-4 states, "the applicant has proposed appropriate chemical exposure standards to assess chemical consequences. Acceptable exposure standards include, but are not limited to, the Emergency Response Planning Guidelines (ERPGs), the Acute Exposure Guideline Levels (AEGLs)," etc.

    NOTE: Table 7-3, ERPG-2 and ERPG-3 units for hydrogen peroxide should be ppm and not mg/m^3. Correct these units.

33. Provide justification for using the Department of Energy standard for soluble uranium versus calculating a value from the ERPG-3 value for uranyl nitrate. In Section 7.0, the proposed chemical consequence exposure level for chemicals is based on the Emergency Response Planning Guidance (ERPG) values. The high consequence level for the worker is depicted as a value greater than or equal to ERPG-3. The value chosen as the high consequence limit for soluble uranium is the threshold for 50% lethality (LD50).

    10 CFR 70.61(b)(4), (c)(4) and 70.65(b)(7) require that the applicant shall propose quantitative standards for health effects caused by chemical exposures and the description of these standards.

34. Provide information to support the assumption that nitrogen releases cannot create asphyxiating atmospheres affecting the judgement of the operator. In Sections 3.4.2.2 and 3.1.2.2, nitrogen gas is identified as a chemical hazard in the Downblending and U Metal Dissolution area, respectively, in that "a release of nitrogen to the work area is not expected to create an oxygen deficient atmosphere." Provide the basis for this assumption.

    This information is required to determine compliance with 10 CFR 70.22 (a)(7) which requires that the application of a license should contain a description of the equipment and facilities to protect health and minimize danger to life or property. Also, the description of each process analyzed in the ISA should be in sufficient detail to understand the process, the operation, and the hazards associated with them.

35. Verify why some chemicals are not part of the standards established for chemical exposure. Section 3.2.2.2. of the ISA Summary identifies exposure limits that have been established for some of the listed materials or for those that can represent physical hazards. uranyl nitrate, and uranium dioxide are mentioned as part of the chemicals or byproducts present in the U-Al process in Table 3-3 but are not included in Section 7.0, Table 7-3. Verify consistency between tables and text mentioning chemicals.

    10 CFR 70.61 (b)(4), (c)(4) and 70.65(b)(7) require that the applicant propose quantitative standards for health effects caused by chemical exposures and the description of these standards. SRP Section 6.4.3.1 (6) states that appropriate chemical exposure standards to assess chemical consequences should be proposed and "acceptable exposure standards include, but are not limited to, the ERPG, the AEGLs, etc."

36. Identify whether TE-2O17 and TE-2P17 are measuring the process stream or the heater for the red oil related scenarios included in Table 4-10.

    This information is required to determine compliance with 10 CFR 70.22 (a)(7) which requires that the application of a license should contain a description of the equipment and facilities to protect health and minimize danger to life or property. Also, the description of each process analyzed in the ISA should be in sufficient detail to understand the process, the operation, and the hazards associated with them.

37. Identify whether there were facility-specific or process specific relaxations or additions to the baseline design criteria.

    10 CFR 70.64 requires the baseline design criteria be applied to the design of new facilities and new processes.

38. Describe how the chemical safety baseline design criteria were applied in establishing the design principles, features, and control systems of the new processes.

    10 CFR 70.64 requires the baseline design criteria be applied to the design of new facilities and new processes.

39. Provide the chemical reactions and assumptions considered in the red oil scenario.

    This information is required to determine compliance with 10 CFR 70.65(b)(3) which requires that the application should contain a description of each process analyzed in sufficient detail to understand the theory of operation and its hazards.

Fire Safety

40. Provide the calculations used to determine the minimum air flow required in the air dilution exhaust ventilation system (i.e., connected to four dissolvers) to maintain the average and maximum off-gas below 25% of lower explosive limit (LED) for the U-Al dissolution process discussed in Section 3.2.2.4. Also provide calculations used to determine the generation rates from the dissolution process.

This information is required to determine compliance with 10 CFR 70.22(a)(7) which requires that the application of a license contain a description of the equipment and facilities to protect health and minimize danger to life or property. Also, the description of each process analyzed in the ISA should be in sufficient detail to understand the process, the operation, and the hazards associated with them.

41. Provide additional information and assumptions to support the expected types of failure of glass columns exposed to the design basis fire described in Section 3.3.2.4.

This information is required to determine compliance with 10 CFR 70.22(a)(7) which requires that the application of a license should contain a description of the equipment and facilities to protect health and minimize danger to life or property.

42. The ISA Summary and supporting analyses (i.e., fire hazard analysis (FHA), process hazard analysis (PHA), and NCSE) did not sufficiently address potential consequences in Section 3.3.2.4 of an unmitigated design basis fire in the solvent extraction process area. Provide additional analysis and conclusions related to: (a) whether the unmitigated fire would initiate a different accident (i.e., a nuclear criticality, a red oil explosion, chemical spills, etc.); and (b) whether the unmitigated fire could cause a loss of IROFS that could lead to a high or intermediate consequence.

10 CFR 70.62(c)(1) requires that the analysis identify the potential accident sequences caused by process deviation or other events internal to the facility as well as the consequence and likelihood of occurrence. The SRP states in Section 7.4.3.2 that the ISA Summary is acceptable if the credible fire hazards are identified for each process and the information is provided to detail how each fire hazard was considered and addressed for each process accident sequence whose consequence could exceed the performance requirements in 10 CFR 70.61.

43. Provide specific data on the material fire properties for the mixture of TBP and which forms the specific solvent that will be used in the solvent extraction process discussed in Section 3.3.2.4 (page 3-54 and page 3-56). Also provide your assumptions related to potential changes to solvent material properties (i.e., viscosity, ignition temperatures, flash point) due to operating conditions (i.e., repeated extraction passes, degradation of solvent).

10 CFR 70.64(a)(3) requires the applicant provide for adequate protection against fires and explosives. Section 7.4.3.4 of the SRP states that in areas that have fire hazards that may threaten licensed material, applicant should identify the hazardous chemicals, processes, and design standards used to ensure fire safety.

44. Provide clarification on what controls described in the ISA Summary and supporting FHA are necessary to maintain the safety assumptions for fire protection (Section 3.3.2.4, page 3-59). Identify controls that are IROFS. Examples of controls and assumptions in your analyses are: (a) The material fire properties of the solvent which minimizes the likelihood of ignition; (b) containment around the first and second pass solvent extraction processes which minimizes the severity of an unmitigated solvent fire and prevents possible challenge to structural steel; and (c) a [redacted] rated enclosure prevents fire exposures and propagation to adjacent process areas and minimizes possible consequences beyond the room of fire origin.

10 CFR 70.64(a)(3) requires the applicant provide for adequate protection against fires and explosives. Section 7.4.3.4 of the SRP states that in areas that have fire hazards that may threaten licensed material, applicant should identify the hazardous chemicals, processes, and design standards used to ensure fire safety.

45. Provide the basis for listing portable fire extinguishers in Section 3.3.2.4 (page 3-59) as an active engineered control. Although portable fire extinguishers are engineered system or equipment, they cannot perform suppression functions without operator response and the use of extinguishers by trained operators. Describe whether credit was taken for operator response (using portable fire extinguishers) as an enhanced administrative control for mitigation.

10 CFR 70.62(c)(vi) requires that the ISA identify the characteristics of preventive, mitigative or other safety function of IROFS, and the assumptions and conditions under which the IROFS support compliance with the performance requirements of 10 CFR 70.61.

46. Provide additional descriptions of your configuration management (CM) program regarding how design and defense-in-depth features are maintained for fire protection to ensure that related assumptions of the ISA Summary and supporting analysis are maintained for safety of operations. Current descriptions in Section 4.4 do not sufficiently describe whether fire protection is controlled within the CM program.

10 CFR 70.62(d) requires each applicant to establish management measures to ensure compliance with the performance requirements of 10 CFR 70.61. This information is needed to document the role of the CM program in the ISA Summary and the NFS license.

Electrical Safety and Instrumentation & Control

47. There are a number of systems which use Programmable Logic Arrays,

Justify the reliability assigned to the Program Logic Controllers. Identify the commercial industrial standards, such as ISA 84.01 or IC 61508, used to select and design these systems.

This information is required to determine if these IROFS are sufficiently reliable to meet the performance requirements of 10 CFR 70.61.

48. Section 3.2.2.4, page 3-34 mentions a gas analyzer and detection system which will monitor in the wet off-gas dissolver vent line and in the process off-gas glovebox. Describe how this system works and how the system performance is maintained.

This information is required to determine if these IROFS are sufficiently reliable to meet the performance requirements of 10 CFR 70.61.

49. The ISA for the BPF lists several sets of independent interlocks serving as multiple, diverse IROFS for prevention/mitigation of specific event sequences. For example, on Page 4-144 S Interlock #1 and S Interlock #2 as shown, for event sequence 1PX10.55, as active engineered controls each with a failure index of -2. Onsite review indicates that these interlocks (like other similar interlocks) receive electrical power from the same electrical power source. Discuss the independence of S Interlock #1 and S Interlock #2 in light of their common, shared power supply. Since the interlocks are designed to fail safe on loss of power, provide a description of the robustness of this IROFS in light of other credible failure modes of the power supply such as output voltage degradation/failure. Also describe the methodology used to establish the interlock set points and functional testing (e.g. periodicity).

This information is required to determine if these IROFS are sufficiently reliable to meet the performance requirements of 10 CFR 70.61.

50. The first sentence in the first paragraph of the section on Environmental and Dynamic Effects on Page 6-27 contains the words "appropriate consideration." Explain those words in regard to the requirements of 10 CFR 70.64(a)(4). Describe how this design will provide adequate protection from environmental conditions and dynamic effects associated with normal operations, maintenance, testing, and postulated accidents that could lead to loss of safety functions. Describe actions taken to ensure IROFS perform their safety functions under the environmental and dynamic service conditions in which they will be required to function and for the length of time their function is required.

This information is required to determine if these IROFS are sufficiently reliable to meet the performance requirements of 10 CFR 70.61 and the requirements of 10 CFR 70.64(a)(4).

51. The first paragraph under Instrumentation and Controls on Page 6-28 states: "identified alarms, indications, etc., provide added assurance..." Describe how the instrumentation and control systems monitor and control the behavior of IROFS.

    This information is required to determine if these components meet the requirements of 10 CFR 70.64(a)(10).

52. Table 6-6 on Page 6-29 contains notes used to show compliance with the Baseline Design Criteria of 10 CFR 70.64(a). Explain the protective action in Note "C" that provides for the continued operation of essential utility services. As required by 10 CFR 70.64(a)(7), expand the discussion under the section on Utility Services on Page 6-28 to identify the essential utility services and discuss how their continued operation is ensured by the design.

    This information is required to determine if the design meets the requirements of 10 CFR 70.64(a)(7).

53. Revise Table 4-14 on Page 4-208 to include enhanced administrative controls and appropriate management measures as discussed with the staff during review of the UNB review.

    This information is required to determine if these IROFS and applied management measures ensure IROFS meet the performance requirements of 10 CFR 70.61.

54. The BPF design relies heavily on a fail-safe design principle. Provide a detailed discussion of fail-safe design features (similar to the description provided to the staff for the UNB design) including fault detection and internal online diagnostic checks associated with interlocks identified as IROFS.

    This information is required to determine if these IROFS are adequate such that they meet the performance requirements of 10 CFR 70.61.

External Events and Natural Phenomena Hazards

55. Provide information addressing external events and natural phenomena. Specifically, for each natural phenomenon (earthquake, wind and storm, tornado, hurricane, flood) provide:
    1. The most severe documented historical events for the site
    2. Identify the consequences of each event
    3. Identify IROFS to prevent or mitigate these consequences

For the external event of a describe the consequences of this event on the BPF and identify preventive or mitigative IROFS to control these consequences.

10 CFR 70.64(a)(2) requires the design provide for adequate protection against natural phenomena with consideration of the most severe documented historical events for the site. For external events, 10 CFR 70.62(c)(1)(iv) requires the ISA identify potential accident sequences caused by external events.

56. Provide justification for not including lightning events in the list of natural phenomena, fire, and external event scenarios in Appendix B. Section 1.3.4 of the October 14, 2003, submittal states that considerations included lightning. The BPF is characterized as having a moderate to severe risk of being damaged by lighting. Describe lightning event scenario frequency and consequences, IROFS and management measures involved.

10 CFR 70.64(a) requires that each prospective applicant or licensee address the baseline design criteria in the design of new facilities and requires that all facilities and processes comply with the 10 CFR 70.61 performance requirements. Specifically, the regulation requires that the design provide adequate protection against natural phenomena with consideration for the most severe documented historical events for the site.

Air Operated Valves

57. Identify IROFS valves that are air-operated. If there are air-operated IROFS valves, provide codes and standards used to reduce the likelihood of common cause failure due to design, operation and maintenance.

10 CFR 70.65(a)(6) requires a brief description of each item relied on for safety be provided in sufficient detail to understand their functions in relation to the performance requirements of 10 CFR 70.61.

Filters

58. Describe the functionality of IROFS filters in Uranium Dissolution (3C05 & 3C06) to reduce the likelihood of "solids" passing into columns under different process environments and how the filters reduce the likelihood of solids passing into columns.

10 CFR 70.65(a)(6) requires a brief description of each item relied on for safety be provided in sufficient detail to understand their functions in relation to the performance requirements of 10 CFR 70.61.

Configuration Management Program

59. The application's description of the CM program in Section 4.4.1 is not clear. Describe how the CM program integrates with other management measures. If not related to management measures, describe how the process will be controlled (relative to the NFS license).

    10 CFR 70.62(d) requires the application describe management measures to ensure compliance with the performance requirements of 10 CFR 70.61. This information is needed to clarify the role of the CM program in the ISA Summary and the NFS license.

Waste Solidification

60. Describe how the recent decision[1] to solidify the raffinate effluent stream instead of discharging it to the Nolichucky River impacts the following:

    a. Procedures and facilities for safe storage and timely disposition of radioactive waste, and
    b. Accident sequences that result in a high or intermediate consequence.

    10 CFR 20.1406 requires a description of how facility design and procedures for operation will minimize, to the extent practicable, contamination of the facility and the environment. 10 CFR 70.61 requires control of risks for credible high and intermediate consequences. 10 CFR 70.62(c)(v) requires identification of the consequence and the likelihood of occurrence of each potential accident sequence.

High Security Racks

61. Provide the Structural Design Criteria (Job 28681-12) calculations for the seismic design of the racks.

    10 CFR 70.64(a)(2) requires that the design provide for adequate protection against natural phenomena with consideration of the most severe documented historical events for the site.

[1] Letter from B.M. Moore to NRC, Supplemental Information to Complete an Environmental Review for the BLEU Preparation Facility, dated May 28, 2003 (21G-03-0132).