May 23, 2008

Ms. B. Marie Moore, Vice President
Safety and Regulatory
Nuclear Fuel Services, Inc.
P.O. Box 337, MS 123
Erwin, TN 37650

SUBJECT: NUCLEAR FUEL SERVICES, INC., REQUEST FOR ADDITIONAL INFORMATION CONCERNING THE CD LINE FACILITY (TAC L32653)

Dear Ms. Moore:

This letter is in response to your letter dated August 31, 2007, by which you requested a license amendment authorizing operations in your CD line facility. Our review has identified that additional information is needed before your request can be approved.

The additional information specified in the enclosure should be provided to us within 30 days from the date of this letter. Please reference the TAC number for this action in your response.

If you have any questions concerning this letter, please contact me at (301) 492-3123, or via e-mail to kevin.ramsey@nrc.gov.

In accordance with 10 CFR 2.390 of the U.S. Nuclear Regulatory Commission's (NRC) "Rules of Practice," a redacted copy of this letter will be available electronically for public inspection in the NRC Public Document Room and the Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Kevin M. Ramsey, Project Manager
Fuel Manufacturing Branch
Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards

Enclosure: Request for Additional Information

Docket No.: 70-143
License No.: SNM-124

The enclosure to this letter contains SENSITIVE, UNCLASSIFIED information. Upon removal/redaction of the enclosure, this letter is DECONTROLLED.

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REQUEST FOR ADDITIONAL INFORMATION

NFS Amendment to Operate CD Line

Environmental Review:

1. The transmittal letter for your request states that no changes to your existing environmental reports are necessary. However, the existing reports fail to address contributions that the new processing line will make to environmental impacts (i.e., radiation exposures, effluents, etc.). In addition, the existing reports fail to address what alternatives are available for processing the material. Estimate the contributions to environmental impacts from the new processing line and discuss what alternatives are available for processing the material.

   This information is required to verify compliance with 10 CFR 70.23(a)(7), which requires a Commission finding that issuing the amendment is the appropriate action after weighing the environmental benefits against the environmental costs and considering available alternatives.

Integrated Safety Analysis Summary:

2. Section [redacted] and Table [redacted] of the Integrated Safety Analysis (ISA) Summary state that a full 5A cylinder contains [redacted] kg of UF6. In addition, Section [redacted] of the Nuclear Fuel Services, Inc. (NFS) Emergency Plan lists the airborne release of [redacted] kg of UF_6 as the worst UF_6 accident. However, ANSI N14.1, Table 1, lists a 5A cylinder as having a maximum fill limit of 25 kg (55 lbs.) of UF_6. Please explain why the accident analyses do not consider a cylinder containing 25 kg of UF_6.

   This information is needed to verify compliance with 10 CFR 70.62 which requires, in part, that each licensee perform an analysis that identifies the radiological and chemical hazards related to licensed processes at its facility.

3. Section [redacted] states that earthquakes are not expected to result in significant consequences because the building meets the requirements of the Building Code. This provides reasonable assurance that the building will not collapse during an earthquake. However, it will still shake. Describe how the new processing line was evaluated to identify components that could be damaged during the shaking of an earthquake, and whether the accident sequences cover all possible leaks and spills resulting from earthquake damage.

   This information is needed to verify compliance with 10 CFR 70.62 which requires, in part, that each licensee perform an analysis that identifies the radiological and chemical hazards related to licensed processes at its facility.

Enclosure

ISA Summary - Criticality Safety

4. Justify each use of modeling conservatism as an enabling event for accident sequences described in the ISA Summary. Replace the phrase "Modeling Conservatisms" in Table [redacted] with a description of the actual physical events that could contribute to the accident. The justification in the nuclear criticality safety evaluations (NCSEs) for crediting modeling conservatism is inadequate since only the bounding and realistic normal cases were compared. Process upsets are evaluated using the modeling assumptions in the bounding normal case but not the realistic normal case. Thus, it has not been demonstrated that the conservative conditions must occur before a criticality is possible. For example, if a leak occurs in an enclosure with two plugged drains (Sequence [redacted]) it has not been demonstrated that extreme reflection is also required before a criticality could occur.

   In addition, provide revised NCSEs that address the following concerns:

   a) In the NCSE for the [redacted] station the realistic normal case assumes that UF_6 is the most reactive material normally available in the two-liter bottles. However, the process description indicates that removed valves will be placed in two-liter bottles of water, forming a UO_2F_2 solution. In addition, the cylinders are expected to contain varying amounts of UF_4, which has a higher density than UF_6.

   b) In the NCSE for [redacted] station [redacted] and the [redacted] station the realistic normal case assumes that that UF_6 is the most reactive material normally available in the 5A cylinder. This does not appear to account for any UF_4 that may be present. In addition, water is used in the [redacted] station as part of the normal operations to rinse out the cylinders, which could result in a UO_2F_2 solution.

   This information is needed to determine compliance with 10 CFR 70.65(b)(3) and 70.65(b)(4). 10 CFR 70.65(b)(4) requires that the ISA Summary contain information that demonstrates compliance with the performance requirements of 10 CFR 70.61. In addition, 10 CFR 70.65(b)(3) requires that the ISA Summary contain a general description of the types of accident sequences.

5. Revise the description of the item relied on for safety (IROFS) [redacted], in the CDL ISA Summary. [redacted] is listed as a passive engineered control; however, it is described as a management measure (pressure test) to ensure the structural integrity of the condenser tubes.

   This information is needed to determine compliance with 10 CFR 70.65(b)(4), which requires that the ISA Summary contain information that demonstrates compliance with the performance requirements of 10 CFR 70.61.

6. Revise the CDL ISA Summary to clearly indicate the IROFS that prevent accident sequences [redacted]. Administrative IROFS [redacted] is credited twice for each of these sequences. Once an IROFS has failed it cannot be considered available and reliable to perform its safety function.

This information is needed to determine compliance with 10 CFR 70.65(b)(4), which requires that the ISA Summary contain information that demonstrates compliance with the performance requirements of 10 CFR 70.61.

7. Revise accident sequences [redacted] for the CDL to clearly indicate the IROFS that have failed and the IROFS that remain available and reliable to prevent the accident. These sequences identify a leak test ([redacted]) as preventing a leak that has already occurred as an initiating event.

   This information is needed to determine compliance with 10 CFR 70.65(b)(4), which requires that the ISA Summary contain information that demonstrates compliance with the performance requirements of 10 CFR 70.61.

8. Justify why a leak in a connection is not a failure of one of the enclosure process lines ([redacted]) for CDL accident sequences [redacted]. Justify why the failures of [redacted] and [redacted] occur at an index frequency of -2, while a leak in connections occurs at an index frequency of -1. Revise the description of IROFS [redacted] to correctly identify the components as the [redacted] process lines.

   This information is needed to determine compliance with 10 CFR 70.65(b)(4), which requires that the ISA Summary contain information that demonstrates compliance with the performance requirements of 10 CFR 70.61.

9. Revise CDL accident sequences, [redacted] to include additional IROFS. Justify that this revision addresses the following concerns regarding these accident sequences:

   a) The sequences are protected by a single administrative IROFS that is credited with providing protection after it has failed. Once an IROFS has failed it cannot be considered available and reliable to perform its safety function. These IROFS are not listed as sole IROFS.

      This information is needed to determine compliance with 10 CFR 70.65(b)(4) and 70.65(b)(8). 10 CFR 70.65(b)(4) requires that the ISA Summary contain information that demonstrates compliance with the performance requirements of 10 CFR 70.61. In addition, 10 CFR 70.65(b)(8) requires that the ISA Summary contain a descriptive list identifying all sole IROFS.

   b) The sequences do not meet double contingency requirements. The NCSE suggests that a small number of related process upsets (e.g., [redacted] could lead to a criticality. Since these actions can be performed by a single operator, these process upsets cannot be considered independent.

      This information is needed to determine compliance with 10 CFR 70.64(a)(9), which requires adherence to the double contingency principle.

c) The sequences have not been demonstrated to be subcritical under all credible abnormal conditions. According to Section [redacted] of the NFS Site ISA Summary, an event is considered credible unless it consists of a sequence of many unlikely human actions or errors. The NCSE indicates that only one or two repeat failures of an administrative control were evaluated.

This information is needed to determine compliance with 10 CFR 70.61(d), which requires that all nuclear processes will remain subcritical under credible abnormal conditions.

d) The reliance on a single administrative control does not appear to meet defense-in-depth practices. Defense-in-depth requires a design preference for engineered controls and features that enhance safety by reducing challenges to IROFS.

This information is needed to determine compliance with 10 CFR 70.64(b), which requires that new system designs be based on defense-in-depth practices.

e) Section [redacted] of NCSE for the [redacted] station states that this enclosure is limited to three UF_6 cylinders and one two-liter bottle, but IROFS [redacted], that implements this limit, permits four containers of either type.

This information is needed to determine compliance with 10 CFR 70.65(b)(4), which requires that the ISA Summary contain information that demonstrates compliance with the performance requirements of 10 CFR 70.61.

10. Revise the description of IROFS [redacted] in the CDL ISA Summary to indicate the size limit of the rinse bottle.

This information is needed to determine compliance with 10 CFR 70.65(b)(6), which requires that the ISA Summary contain a brief description of each IROFS.

11. Revise the process description in the CDL ISA Summary for [redacted] Station [redacted] to include the purpose of the two-liter bottle that is mentioned in IROFS [redacted].

This information is needed to determine compliance with 10 CFR 70.65(b)(3), which requires that the ISA Summary contain a description of each process in sufficient detail to understand the theory of operation.

12. Revise the CDL ISA Summary to indicate that the [redacted] station does not have drains. The ISA Summary should also indicate those features of this enclosure that ensure that accumulation of water or fissile material solution will not result in a criticality.

This information is needed to determine compliance with 10 CFR 70.65(b)(4), which requires that the ISA Summary contain information that demonstrates compliance with the performance requirements of 10 CFR 70.61.

ISA Summary - Fire Safety

13. What is the maximum allowable service temperature of the sample cylinders that are to be used ([redacted])? What is the peak temperature from the most severe fire conditions that the cylinders are expected to withstand?

    10 CFR 70.65(b)(3) states that the ISA Summary must contain "a general description of the facility, with emphasis on those areas that could affect safety." The acceptance criteria in Standard Review Plan, Section 7.4.3.4, Process Fire Safety, states - in areas that have fire hazards that may threaten licensed material, the application should identify the hazardous chemicals, processes, and design standards used to ensure fire safety.

14. There are various flammable, combustible, and explosive gasses and liquids referenced throughout the ISA Summary; however, no specific code commitments were found in reference to the safe handling, storage, and use of these materials. In the ISA Summary, provide either a code commitment or the details on how safe practices are insured in the handling, storage, and use of these materials.

    10 CFR 70.65(b)(3) states that the ISA Summary must contain "a general description of the facility with emphasis on those areas that could affect safety." The acceptance criteria in Standard Review Plan Section 7.4.3.4, Process Fire Safety, states - in areas that have fire hazards that may threaten licensed material, the application should identify the hazardous chemicals, processes, and design standards used to ensure fire safety.

15. Section [redacted] of the ISA Summary discusses the fire detection and alarm system in Building [redacted]. Provide clarification in the ISA Summary if the smoke detection system is provided throughout the building or only within the glove boxes.

    10 CFR 70.65(b)(3) states that the ISA Summary must contain "a general description of the facility with emphasis on those areas that could affect safety." The acceptance criteria in Standard Review Plan Section 7.4.3.3, Facility Design, states that an adequate application documents the fire safety considerations used in the general design of the facilities containing licensed material or facilities that impose an exposure threat to radiological facilities.

16. Provide details in the ISA Summary on the fire brigade's water supply or suppression agent availability. Provide a site plan showing fire hydrant and suppression agent cart locations nearby or within Building [redacted].

    10 CFR 70.65(b)(3) states that the ISA Summary must contain "a general description of the facility with emphasis on those areas that could affect safety." The acceptance criteria in Standard Review Plan Section 7.4.3.3, Facility Design, states that an adequate application documents the fire safety considerations used in the general design of the facilities containing licensed material or facilities that impose an exposure threat to radiological facilities.

17. Section [redacted] of the Fire Hazards Analysis (FHA) for Building [redacted] states that "this FHA assumes that following detection of a fire situation, a minimum [redacted] trained firefighters are always available, via the NFS Plant Fire Brigade or the Erwin Public Fire Department, to respond to this area and effectively suppress a fire within a [redacted] minute time frame." Given the cross-cutting nature of the detection system and fire

brigade availability, both of these features are required to be listed as IROFS, and comply with 10 CFR 70.61(e).

10 CFR 70.65(b)(4) states that the ISA Summary must contain "information that demonstrates the licensee's compliance with the performance requirements of 10 CFR 70.61." The acceptance criteria in Standard Review Plan, Section 7.4.3.2, Fire hazards Analysis, states - the ISA Summary is acceptable if the credible fire hazards (e.g., from the FHA) are identified for each process fire area, and information is provided to detail how each fire hazard was considered and addressed (i.e., the management measures and/or IROFS) for each process accident sequence that consequence could exceed the performance requirements in 10 CFR 70.61.

18. It is our understanding that an automatic sprinkler system is normally required by the Building Code, however a sprinkler system has not been installed because of criticality safety concerns. During our meeting on March 10, 2008, it was noted that the sprinkler system would have been considered an IROFS. Demonstrate in the ISA Summary how the proposed IROFS provide an equivalent level of safety to an automatic sprinkler system.

    10 CFR 70.65(b)(4) states that the ISA Summary must contain "information that demonstrates the licensee's compliance with the performance requirements of 10 CFR 70.61." The acceptance criteria in Standard Review Plan Section 7.4.3.2, Fire hazards Analysis, states - the ISA Summary is acceptable if the credible fire hazards (e.g., from the FHA) are identified for each process fire are, and information is provided to detail how each fire hazard was considered and addressed (i.e., the management measures and/or IROFS) for each process accident sequence whose consequence could exceed the performance requirements in 10 CFR 70.61.

ISA Summary - Radiation Safety

19. Table [redacted] on page [redacted] indicates that [redacted] kg of material could be released and entrained in an off-gas trap. Section [redacted] "Radiological Controls-Occupational" indicates process containment and the ventilation system prevent exposure to individuals. If this same amount of material was released without the mitigating effects of containment (glovebox) and ventilation (trap), internal exposure above 70.61(b) limits to a worker appears possible. Consistent with 10 CFR 70.65(b)3, clarify under what conditions [redacted] kg of material (Table [redacted]) could be released, and specify the path (to workers or through the stack). In addition, Section [redacted] on page [redacted] of the ISA Summary indicates the off-gas trap system is sized to capture the uncontrolled release of a full 5A cylinder of UF_6. Justify why the maximum uranium in the off-gas trap system would be limited to [redacted] kg (Table [redacted]). Specify the amount of time over which this material would accumulate, (single release or slow accumulation). Describe what inherent conditions (chemical form, time, particle size, etc.) would exist to make the unmitigated release of the [redacted] kg not meet the criteria for intermediate or high consequence to workers. If necessary, declare the containment (glovebox) and ventilation (trap) as IROFS.

ISA Summary - Chemical Safety

20. Table [redacted], Hazard Summary for Process Ventilation UF_6 Off-gas Trap System, lists two controls for fire; one Passive Engineered Control, "Fire Rated Materials Of Construction," and one Administrative Control, "Combustible Control Program." Table [redacted], Fire Safety

Risk Assessment, and Table [redacted], Fire Safety IROFS list two controls, "[redacted] Passive Engineered Control: Bldg [redacted] Main Processing Room (Process Area [redacted]) is separated by a two-hour rated firewall and fire-rated penetration barriers in the North and West directions to prevent a fire in Bldg [redacted] Main Processing Room from migrating to adjacent areas" and "[redacted], Administrative Control: Monthly surveillances are conducted to ensure compliance with the combustible control program to minimize fire potential. Monthly surveillances are conducted for the following area in Building [redacted]: UF_6 cylinder feed storage racks/staging areas located in the Main Processing Room."

a) Clarify whether passive engineered control IROFS is "Fire rated materials of construction" or if it is "[redacted] Firewall and penetration barriers." This is necessary to determine compliance with 10 CFR 70.65(b)(6).

b) Clarify whether administrative control IROFS is "Combustible Control Program" or if it is "Monthly surveillances of the UF6 cylinder feed storage racks." Provide criteria used to determine if this IROFS is available and effective. Identify management measures used to maintain this IROFS. This is necessary to determine compliance with 10 CFR 70.65(b)(6) and 70.62(d).

c) Identify credible scenarios leading to a fire in the UF_6 cylinder storage area and provide initiating Event Frequency Index and IROFS Effectiveness of Protection Index for these scenarios, as described in the Section [redacted], Event Frequency, IROFS, and Risk Categorization, or an equivalent method of likelihood determination (describe methodology if different method is used). This information is needed to determine if a fire in the UF_6 cylinder storage area, which has been identified as a high consequence chemical and radiological hazard, has been mitigated to "highly unlikely" as required per 10 CFR 70.61(b).

21. Section [redacted], Chemical Hazards – Occupational lists as chemical inputs "uranium compounds—toxic;" however, there is no further discussion in this section regarding any possible accident sequences leading to operator exposure to these chemicals. Establish whether the controls afforded by NFS' Radiation Protection Program for CDL operations, as discussed in Section [redacted], Radiological Controls - Occupational, are sufficient to also protect against chemical toxicity of these compounds as required per 10 CFR 70.61(b)(4) and 70.61(c)(4).

22. Section [redacted], Chemical Hazards-Occupational states that all postulated scenarios with the potential to release Hydrofluoric Acid (HF) into the CDL process yielded airborne concentrations that are significantly below the TEEL-2 threshold. No mention is made of exposure other than airborne. Evaluate whether credible release scenarios are capable of producing high or intermediate consequences via skin or eye contact, to workers if unmitigated. Describe methodology and/or assumptions used, as appropriate, for this evaluation. This information is needed to determine compliance with 10 CFR 70.61(b)(4) and 70.61(c)(4).

23. Section [redacted], Occupational and Environmental Chemical Exposure Levels, Occupational Exposure methodology states that for indoor spills, it is assumed that materials spread "uniformly and instantaneously throughout the available volume." Determine whether a worker may be in close proximity to a leak in the postulated HF release scenarios, and, if so, whether the above assumption is valid for that scenario. If the assumption is not valid, evaluate whether the worker could credibly be exposed to

HF vapor concentrations higher than calculated by the above assumption. This information is needed to determine compliance with 10 CFR 70.61(b)(4) and 70.61(c)(4).

24. Section [redacted] refers to a definition of "credible" which means "an external event whose frequency of occurrence can be... quantitatively determined to be </= 1E-6 events per year." Section [redacted] Flooding, states that "Building [redacted] is located above the 100 year flood plain base flood evaluation threshold. As such, there is no credible accident scenario that could result in a flood of the facility." By definition, 100-year flood plain is expected one flood per 100 years, or 1E-2 events per year. By definition, a 100-year flood is still credible. Previous NRC evaluations of flood scenarios have considered the height above the 100-year flood plan and the consequences of a layer of water in the building. Specify the height of building floor above the 100-year flood plain and describe the consequences that would result if a layer of water entered the building and covered the floor. This information is needed to determine compliance with 10 CFR 70.62(c).

25. Per Site ISA Summary, Section [redacted] "without specified code protection there is a moderate to severe risk of facilities being damaged by lightning." Per CD Line ISA Summary, Section [redacted] "Lightning protection is installed in Building [redacted] per the applicable portions of NFPA 780. There are no credible accident scenarios that result in an intermediate or high consequence event as a result of a lightning strike." Clarify whether Section [redacted] is stating that a lightning strike to the building would not result in an intermediate or high consequence event or if a lightning strike is not credible due to the installed lightning protection.

Decommissioning Cost Estimate

26. The cost estimate needs to include the costs for transportation of waste material. Discuss the estimated costs for this item and confirm that it is included in the cost estimate. This information is necessary to confirm compliance with 10 CFR 70.25(e).

27. NUREG-1757, "Consolidated Decommissioning Guidance," Vol. 3, App. A.3.1.2.1 states, "Labor costs associated with all decommissioning tasks and activities should include basic wages and benefits for licensee and contractor staff performing decommissioning-related tasks, overhead costs, and contractor profit (sufficient to allow an independent third party to carry out the decommissioning project)." Discuss the estimated costs for these items and confirm that they are included in the cost estimate. This information is necessary to confirm compliance with 10 CFR 70.25(e).

28. NUREG-1757, Vol. 3, App. A.3.1.2.3 states: "Because of the uncertainty in contamination levels, waste disposal costs, and other costs associated with decommissioning, the cost estimate should apply a contingency factor of 25 percent to the sum of all estimated decommissioning costs." Discuss the estimated cost of this item and confirm that it is included in the cost estimate. This information is necessary to confirm compliance with 10 CFR 70.25(e).

29. Describe the means of adjusting the cost estimate and associated funding level periodically over the life of the facility. This information is necessary to confirm compliance with 10 CFR 70.25(e).

30. The NRC has previously accepted U.S. Government assurances of decommissioning funds for NFS facilities processing U.S. Government material. This was documented in an amendment issued on November 24, 1993, and referenced in the license renewal issued on July 2, 1999. Please clarify whether the material to be processed in the new CD line is U.S. Government material or commercial material.

31. If the answer to the previous question is U.S. Government material, please provide a letter of intent from the appropriate Government agency confirming that it is aware of the cost estimate, and intends to budget funds in that amount, when the facility is decommissioned. Otherwise, provide a funding mechanism that guarantees the amount of the cost estimate, using one of the methods specified in 10 CFR 70.25(f).