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NUCLEAR FUEL SERVICES, INC.

a subsidiary of The Babcock & Wilcox Company

**PROPRIETARY INFORMATION
COMMERCIAL INFORMATION/FINANCIAL**

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21G-10-0163
GOV-01-55-04
ACF-10-0230

August 16, 2010

Director, Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

- Reference:
- 1) Docket No. 70-143; SNM License 124
 - 2) Letter from B. Marie Moore to the NRC, dated June 30, 2009, (21G-09-0104), Renewal of Special Nuclear Material (SNM) License 124
 - 3) Letter from NRC to Mark P. Elliott, dated June 15, 2010, (TAC No. L32830), Request for Additional Information Concerning License Renewal
 - 4) Letter from NFS to the NRC, dated August 12, 2010, (24Y-10-006), Response to NRC Request for Additional Information (RAI) Concerning Security Portions of License Renewal (TAC L32830)

Subject: Response to the Request for Additional Information Concerning License Renewal for SNM-124

In Reference 4, Nuclear Fuel Services, Inc. (NFS) provided its responses to the security-related questions/comments from the June 15, 2010, request for additional information (RAI) concerning the renewal of Special Nuclear Material License (SNM) 124 (Reference 3): NFS hereby submits its responses to the remaining questions/comments in the RAI. A number of the responses included in Attachment 1 contain proposed text changes to SNM-124 sections previously submitted in Reference 2. After the Nuclear Regulatory Commission (NRC) and NFS have come to agreement on the proposed text changes, a full revision to SNM-124 that incorporates all of the aforementioned changes will be submitted.

Sensitive information in this response has been moved to Attachment 2 marked "Official Use Only" in accordance with U.S.C. 552, or "Proprietary" in accordance with 10 CFR 2.390(a)(4). An affidavit for the information marked "Proprietary" is enclosed. As such, Attachment 2 is not suitable for public release.

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If you or your staff have any questions, require additional information, or wish to discuss this, please contact me at (423) 743-1705, or Mr. Rik Droke, Senior Regulatory Advisor, at (423) 743-1741. Please reference our unique document identification number (21G-10-0163) in any correspondence concerning this letter.

Sincerely,

NUCLEAR FUEL SERVICES, INC.



Mark P. Elliott, Director
Quality, Safety, and Safeguards

JKW/pdj
Enclosure
Attachments

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**PROPRIETARY INFORMATION
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Enclosure

**NFS AFFIDAVIT
COMMERCIAL INFORMATION/FINANCIAL**

(2 pages to follow)

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**PROPRIETARY INFORMATION
COMMERCIAL INFORMATION/FINANCIAL**

Enclosure

AFFIDAVIT

COMMERCIAL INFORMATION/FINANCIAL

I, Mark P. Elliott, Director of Quality, Safety, & Safeguards at Nuclear Fuel Services, Inc. (NFS), that to the best of my knowledge and beliefs, make the following representation contained herein:

- A. The following document(s) which Nuclear Fuel Services, Inc. (NFS) wishes to have withheld from public disclosure is:

Attachment 2 to letter (21G-10-0163) dated August 16, 2010.

- B. The information contained in the document(s) cited in A above has been held in confidence by Nuclear Fuel Services, Inc. (NFS), in that it contains commercial information/financial information as specified in Title 10, Code of Federal Regulations, Part 2.390(a). The basis for requesting that this document(s) be withheld from public disclosure is explicitly marked on the cover page to each of the aforementioned documents and/or the top of each affected page, as appropriate, in accordance with 10 CFR 2.390(b)(i)(B).
- C. The information contained in the document(s) cited in A above is the intellectual property of Nuclear Fuel Services, Inc. (NFS), and as such is customarily held in confidence by Nuclear Fuel Services, Inc. (NFS). As such, Nuclear Fuel Services, Inc. (NFS) has customarily submitted privileged and confidential information of this type to the Nuclear Regulatory Commission (NRC) and to its predecessor, the Atomic Energy Commission (AEC), in confidence.
- D. The information contained in the document(s) cited in A above has not been made available to public sources by Nuclear Fuel Services, Inc. (NFS), nor has Nuclear Fuel Services, Inc. (NFS) authorized that it be made available. In accordance with Nuclear Fuel Services, Inc. (NFS) policies governing the protection and control of information, proprietary information contained herein has been made available, on a limited basis, to others outside NFS only as required and under suitable agreement providing for nondisclosure and limited use of the information.

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Attachment 1

**NFS RESPONSE TO RAI
CONCERNING LICENSE RENEWAL FOR SNM-124**

(82 pages to follow)

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Chapter 1
General Information

NFS Response to RAI Concerning License Renewal for SNM-124

RAI 1.1

The existing license excludes authority to possess uranium in pyrophoric forms. The application removes this restriction. Explain the basis for this change and why the U.S. Nuclear Regulatory Commission (NRC) should find that Nuclear Fuel Services, Inc. (NFS) can handle pyrophoric forms of uranium safely.

This information is required to verify compliance with Title 10 of the Code of Federal Regulations (10 CFR) 70.22 which requires, in part, that each application contain information on the activity for which the special nuclear material (SNM) is requested, the equipment and facilities which will be used to protect health and safety, and the procedures which will be used to protect health and safety.

NFS Response

During the 1992 renewal of SNM-124, NFS was not authorized by NRC to possess uranium in pyrophoric forms because NFS did not propose fire protection requirements for such materials. Since that time, the safety bases for the NFS site have been upgraded to meet the 10 CFR 70, Subpart H, Integrated Safety Analysis (ISA) requirements. The ISA includes initiating events for various types of accident scenarios that could result in a fire, including potential fires in glovebox operations which is most likely where a fire involving pyrophoric material would occur. The ISA also includes the controls necessary to prevent or mitigate the consequences of potential fires. Changes to plant operations are evaluated under 10 CFR 70.72 to determine whether or not a license amendment must be approved by NRC prior to implementation of a change. The ISA Program, the Fire Safety Program, and the Configuration Management Program are described in SNM-124, Chapters 3, 7, and 11, respectively. NFS has the appropriate experience, and programs are in place to evaluate potential hazards in order to protect health and safety; therefore, NFS should be authorized to possess uranium in pyrophoric forms.

RAI 1.2

The existing license authorizes possession of transuranic isotopes and fission products as waste resulting from processing enriched uranium. The application requests authority to continue processing enriched uranium, but it fails to include these possession limits. Explain why authority to possess these wastes is no longer required.

This information is required to verify compliance with 10 CFR 70.22 which requires, in part, that each application contain information on the activity for which the SNM is requested.

NFS Response

The possession limits for transuranic isotopes and fission products as waste resulting from processing enriched uranium were inadvertently omitted from the previous submittal. The following information will be added. The "Sensitive Information" can be found in Attachment 2 of this submittal.

1.2.3.4 Transuranic Isotopes

Maximum quantity on site – This information is "Official Use Only" and has been moved to the "Sensitive Information" ADDENDUM.

Chemical and physical forms – as waste resulting from processing enriched uranium.

1.2.3.5 Fission Products

Maximum quantity on site – This information is “Official Use Only” and has been moved to the “Sensitive Information” ADDENDUM.

Chemical and physical forms – as waste resulting from processing enriched uranium.

RAI 1.3

Section 1.2.4.6 requests a renewal period of 40 years. NRC has identified several, significant failures of NFS to comply with regulatory requirements in recent years. In response to these failures, NFS has committed to extensive and ongoing improvements in several program areas. These areas include configuration management, safety culture, and human performance. It will take several years to complete the program improvements and evaluate their effectiveness. In addition, the holding company which owns NFS was recently purchased by Babcock and Wilcox Nuclear Operations Group. It is unclear what impact this new corporate parent will have on the performance of NFS' programs. Provide the basis for requesting a 40-year license term while so many extensive and ongoing changes are being made.

This information is required to make the findings in 10 CFR 70.23 that the applicant's programs are adequate to protect health and to minimize danger to life or property.

NFS Response

NFS acknowledges that regulatory issues have continued to present challenges in recent years. It should also be acknowledged that instead of seeking traditional enforcement relating to those failures, NFS asked to achieve resolution through the newly authorized Alternative Dispute Resolution (ADR) process, with the specific motive of creating the best possible conditions for future strong performance. This dedication to strengthening NFS is manifested in the sweeping commitments made in the ADR process to revolutionize our configuration management program, focus on strengthening the safety culture, and implementing industry best practice in the area of Human Performance.

These initiatives were not, and are not, a panacea, and the events in the fall of 2009 clearly showed their fragility. The unprecedented actions taken to shut-down the entire facility in early 2010 were taken to allow all personnel at NFS to focus on strengthening practices in all three of the aforementioned areas. The shutdown was a defining time for NFS that has resulted in demonstrable improvements that have been recognized by multiple stakeholders, including the Nuclear Regulatory Commission during the series of restart readiness assessments. Because the recent changes made to further strengthen NFS were focused on behaviors, and included structural changes to the organization and key programs, the changes are built to be sustainable. To help stay on-track, a series of metrics was developed to monitor performance and assure that continuous improvement is a fundamental part of NFS' conduct of business. In addition, NFS will continue to leverage its involvement with the Institute of Nuclear Power Operators for training, benchmarking opportunities with the specific intent of working toward excellence in all aspects of our operations.

NFS' ownership by the Babcock & Wilcox Company has proven to be a significant advantage and is increasingly helping position NFS for long-term reliable operations and, consequently,

enhanced overall safety. The advantage stems from a combination of increased access to additional resources (especially those at the Category I facility in Lynchburg, VA), extensive knowledge in high reliability operations, and an ability to invest in infrastructure and system improvements at a level previously unattainable.

RAI 1.4

Section 1.2.5.3 of the application requests to continue the special authorization to incinerate waste and scrap material. It is our understanding that the incinerator is not operating and has not operated for many years. In addition, incinerator technology has improved in recent years. NRC would need to review any decision to restart incinerator operations. Given the high safety significance of this system, the function and protection of this system would need to be addressed in the fire safety program. In addition, the hazards associated with the incinerator would need to be addressed in the Integrated Safety Analysis (ISA) and the results added to the appropriate ISA Summary. Explain the basis for continuing the special authorization to incinerate waste and scrap material.

This information is required to verify compliance with 10 CFR 70.22 which requires, in part, that each application contain information on the activity for which the SNM is requested, the equipment and facilities which will be used to protect health and safety, and the procedures which will be used to protect health and safety.

NFS Response

It is correct that its existing incinerator has not operated in many years and that the equipment technology has significantly improved during that time period. As such, NFS intends to decommission the existing incinerator and will need to install a new one if future waste disposal necessitates such an operation.

Changes to plant operations are evaluated under 10 CFR 70.72 to determine whether or not a license amendment must be approved by NRC prior to implementation of a change. The safety bases for the NFS site have been upgraded to meet the 10 CFR 70, Subpart H, ISA requirements. The ISA includes initiating events for various types of accident scenarios that could result in a fire, including potential fires due to the operation of calciners used for uranium recovery and volume reduction operations. The ISA also includes the controls necessary to prevent or mitigate the consequences of potential fires. Incinerator operations are similar to calciner operations, and it is possible that a license amendment would not be required. The ISA Program, the Fire Safety Program, and Configuration Management Program are described in SNM-124 Chapters 3, 7, and 11, respectively. NFS has the appropriate experience, and programs are in place to evaluate potential hazards in order to protect health and safety. Therefore, NFS requests the special authorization to incinerate waste and scrap material be maintained.

RAI 1.5

Section 1.2.5.5 of the application requests to continue the exemption from the requirements in 70.25 regarding funding methods for decommissioning financial assurance. Clarify the exemption to state that it is limited to the use of a statement of intent (or an equivalent contract clause) from a government agency.

This information is required to verify compliance with the requirements in 10 CFR 70.25 for decommissioning financial assurance.

NFS Response

Section 1.2.5.5 will be modified as follows.

1.2.5.5 Decommissioning Funding Plan

NFS is exempt from the requirements in 10 CFR 70.25(e) specifying that one of the listed methods in 10 CFR 70.25(f) must be used for financial assurance. The financial arrangements to assure that decommissioning funds will be available are set forth in Chapter 10. This exemption is limited to the use of a statement of intent (or an equivalent contract clause) from a government agency, as outlined below.

1. The exemption stated above is applicable to the decommissioning activities for which the U.S. Government has assumed liability per Appendix 10A of Chapter 10. The NFS/USDOE Contract language in said Appendix 10A also makes it necessary for NFS to establish a cost estimate and a financial assurance plan for those decommissioning activities not covered by the Government.
2. The exemption stated above is also applicable to the decommissioning activities for which the U.S. Government has assumed liability per the U.S. Department of Energy and Tennessee Valley Authority Interagency Agreement described in Appendix 10B of Chapter 10.

RAI 1.6

Section 1.2.5.6 of the application requests to continue a special authorization to remediate/decontaminate facilities or grounds. The existing Safety Condition S-26 states that before conducting these activities, NFS must determine the status of procedures and activities with respect to the requirements of 10 CFR 70.38(g)(1). If required, NFS must submit a decommissioning plan for NRC approval before starting the activities. Revise the special authorization to state that an evaluation concluding that no decommissioning plan is required shall be documented in accordance with the provisions of 10 CFR 70.72.

This information is required to verify compliance with 10 CFR 70.22 which requires, in part, that each application contain information on the procedures which will be used to protect health and safety.

NFS Response

Section 1.2.5.6 will be modified as follows.

1.2.5.6 Decommissioning-Related Activities Performed Prior to the End of Plant Life

Facilities or grounds may be remediated/decontaminated on a project-by-project basis prior to the end of plant life. These projects will address portions of the facility no longer in use or in need of decontamination to protect the environment. The portions of the NFS plant subject to these operations may be used for future licensed activities, require clean-up to protect the environment, or be conducted as a precursor to decommissioning

an area under a NRC approved final status survey and release plan. Decommissioning-related activities, including associated procedures, are reviewed against the criteria in 10 CFR 70.38(g)(1) to determine if a decommissioning plan is required and the results of the review are documented. If required, the plan must be submitted to NRC for review and approval prior to starting the activities. Such operations are described further in Chapter 10.

Similarly, Section 10.5 will also be modified.

10.5 Decommissioning Plan (DP)

NFS will decommission plant facilities and grounds in a timely manner and in accordance with applicable NRC regulations and guidance. Decommissioning-related activities, including associated procedures, are reviewed against the criteria in 10 CFR 70.38(g)(1) to determine if a decommissioning plan is required. If required, the plan must be submitted to NRC for review and approval prior to starting the activities.

Portions of the facility and grounds no longer in use, or in need of decontamination to protect the environment, may be decontaminated on a project-by-project basis prior to the end of plant life at NFS' discretion. The decommissioning-related decontamination is authorized by Chapter 1 of this license and activities may include:

- Dismantlement of contaminated buildings and equipment;
- Pumping and treatment of contaminated groundwater and surface water;
- Washing, spraying, stripping, vacuuming, or otherwise cleaning the surfaces of structures or equipment;
- Scabbling, scaling, or otherwise decontaminating structural and equipment surfaces;
- Characterization efforts; and,
- Source reduction measures, including removal of soil and debris.
- Release of a plant area from this license will require NRC review and approval.

The following DP was approved by the NRC and authorizes excavation of contaminated materials (primarily soil, debris, and waste materials) from the North Site:

North Site Decommissioning Plan, Revision 3, March 2006 (as well as associated addendums, amendments, and revisions).

RAI 1.7

Section 1.3.2 of the application states that approximately 4,500 people live within one mile of the NFS site. However, the Site ISA Summary states that the number is 2,800 people; and the Emergency Plan states that the number is 1,800 people. Confirm which number is correct and revise the other documents to match.

This information is required to verify compliance with 10 CFR 70.9 which requires that information provided by an applicant must be complete and accurate in all material respects.

NFS Response

Per the 2000 Census there are 2,713 people that live within one mile of the NFS site. Section 1.3.2 of the application will be revised to make the correction. The 2011 revisions of the ISA

Summary and the Emergency Plan will be updated based on the 2000 Census data or the current data that is available at that time.

RAI 1.8

Section 1.3.4 of the application describes the hydrology of the site. NUREG-1520 states that an acceptable application should describe the characteristics of the uppermost aquifer. Describe the characteristics of the uppermost aquifer.

This information is required to verify compliance with 10 CFR 70.22 which requires, in part, that each application contain information on the place where the activity is to be performed.

NFS Response

Section 1.3.4 will be modified to include the following description of the uppermost aquifer:

The uppermost aquifer at the NFS site is the alluvial aquifer. This alluvial aquifer is limited in areal extent and is found mainly in the lowland areas. The alluvial aquifer pinches out just north and south of the site due to the presence of shallow bedrock. Alluvial deposits are generally very heterogeneous in sediment size, composition, and depositional pattern, causing varying degrees of anisotropy throughout these deposits. The presence of large amounts of clay in suspended and mixed-load stream deposits commonly causes the vertical hydraulic conductivity to be orders of magnitude less than in a horizontal direction.

Additionally, the uppermost aquifer at the NFS site has been described extensively in three groundwater models. The first groundwater model was performed in 1996 (Final Project Report Groundwater Flow and Constituent Transport Modeling At The Nuclear Fuel Services Facility, April 25, 1996). The second groundwater model was performed in 1999 to revise the original model (Revised Groundwater Flow and Solute-Transport Modeling Report, February 1999). In the 2009/2010 timeframe, another revision to the groundwater model was performed (Revised Groundwater Flow and Solute-Transport Modeling Report, February 2010). These three documents were submitted to NRC in Enclosure E of the RAI Response for the Environmental Assessment (21G-10-0110, dated May 27, 2010).

RAI 1.9

Section 1.2.2 of the application addresses the financial qualifications of NFS to conduct licensed activities. It refers to information submitted by letter dated August 8, 2008, to support an indirect transfer of control of the license. Provide an updated balance sheet forecast and an updated income statement. The updated information should include the two most recent fiscal years for which audited data is available, and the forecast should be approximately five years into the future.

This information is required to make the finding specified in 10 CFR 70.23(a)(5) that the applicant appears to be financially qualified to engage in the proposed activities.

NFS Response

The updated income statement and the updated balance sheet forecast are provided on pages in Attachment 2. The balance sheet is only forecasted for 2 years due to data availability.

RAI 1.10

Section 1.3.5 states that bedrock strata at the site are consolidated, providing firm foundations for the buildings that lie directly on the strata or that are supported by footings. It is unclear whether buildings that house licensed activities have foundations supported by bedrock strata or the unconsolidated alluvium above the bedrock. Clarify what material is supporting the building foundations.

This information is required to verify compliance with 10 CFR 70.22 which requires, in part, that each application contain information on the place where the activity is to be performed.

NFS Response

Buildings that house licensed activities do not have foundations supported by bedrock strata. However, the foundations are supported by soil which meets the bearing capacities required by the building design.

Section 1.3.5 will be modified as follows to provide clarification.

1.3.5 Geology

The NFS site lies in the Valley and Ridge physiographic province of northeastern Tennessee. The area topography consists of a series of alternating valleys and ridges that have a northeast-southeast trend, with the NFS site located in a valley. The present topography of the valley is the result of stream erosion of softer shales and limestones. The bedrock strata at the NFS site are consolidated, providing firm foundations for buildings that lie directly on the strata or that are supported by footings. Foundations for buildings that house licensed activities are supported by soil which meets the bearing capacities required by the building design.

Although common in the mountainous terrain surrounding the NFS site, slope failures are not common on the former flood plain where slopes are flat. Structures are set back sufficiently from the Nolichucky River and Martin Creek to avoid destabilization due to erosion or slope failures along the waterway banks.

The NFS site is located in the moderately active Appalachian Tectonic Belt, Seismic Zone 2, indicating that moderate damage could occur as the result of earthquakes. There is no evidence of capable faults as defined by 10 CFR 100 in the immediate vicinity of the NFS site. A seismic analysis of the NFS site conducted in 2001 determined that the horizontal component of ground motion for a safe shutdown earthquake with a 1000-year return period has a peak ground acceleration of 0.06 gravity, and the vertical acceleration is two-thirds of the horizontal, or 0.04 gravity.

Chapter 2
Organization and Administration

NFS Response to RAI Concerning License Renewal for SNM-124

RAI 2.1

Section 2.2 of the application states that Figure 2-1 shows the current NFS functional organization. However, Figure 2-1 differs from organizational charts and resumes provided during recent management meetings. For example, in recent management meetings, information was provided about a chief nuclear safety officer who reports to the President. Figure 2-1 of the application fails to identify this position. The resume for the chief nuclear safety officer states that the officer oversees licensing activities, critical safety investigations, safety and regulatory initiatives, and planning activities. In addition, the chief nuclear safety officer serves as an alternate to the Director of Safety and Regulatory. The responsibilities and authorities of the chief nuclear safety officer appear to conflict with those of other managers described in the application.

Explain (by current title) how the managers in your existing organizational units fit into the framework described in your application. Demonstrate effective lines of communication and authority among the organizational units. Confirm which organizational units have responsibility for health, safety, or environmental protection. This information is required to make the finding in 10 CFR 70.23 that the procedures are adequate.

NFS Response

Figure 2-1 has been updated to reflect recent organizational changes and is included on page 12. Minor changes also need to be made to sections 2.2 and 2.3 for consistency with Figure 2-1. As stated in the cover letter, these will be submitted at a later date. The chief nuclear safety officer position has been eliminated; therefore, the questions concerning this position are no longer applicable. All functional areas shown in Figure 2-1 have responsibility for health, safety, and environmental protection.

A table has been provided on page 13 that maps current job titles for managers to the functional area framework provided in Figure 2-1. As job titles do tend to change over time, this table has been provided as an illustration in order to answer the question and will not be added to SNM-124.

RAI 2.2

Section 2.3.1 of the application states that the President has the overall responsibility for safety, security, quality, and operational aspects of all activities. However, no qualifications are listed for the President. Specify the minimum qualifications for this key management position.

This information is required to make the findings in 10 CFR 70.23 that the workers are qualified by training and experience.

NFS Response

Section 2.3.1 will be updated as follows to include minimum qualifications for the President.

2.3.1 President

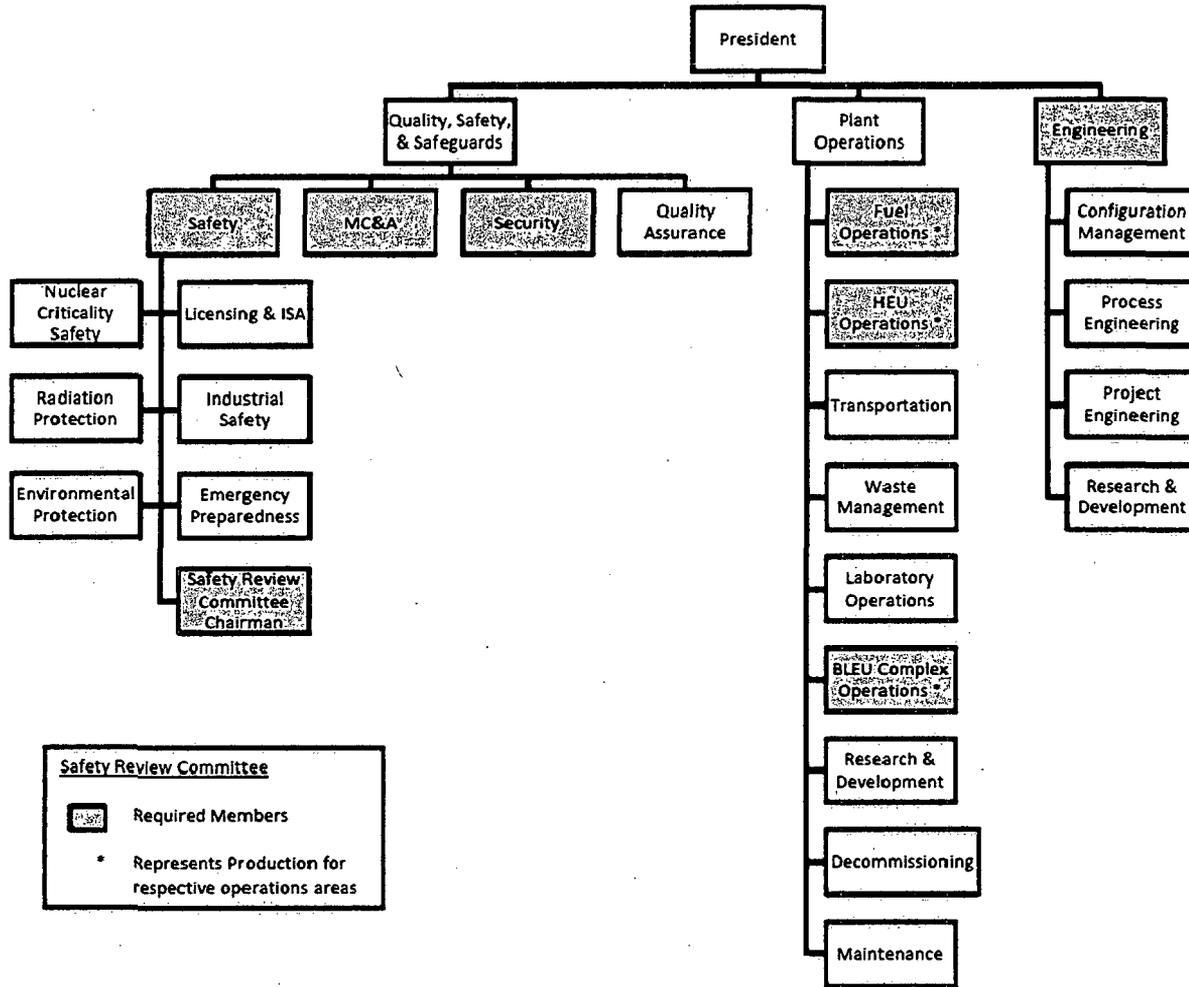
The president, or the vice-president/director authorized to be his alternate, has the overall responsibility for the safety, security, quality, and operational aspects of all activities conducted at the NFS site. Daily responsibility for licensed activities may be

delegated in writing to one or more of the vice-president/director positions specified in Sections 2.3.2, 2.3.5, and 2.3.9.

The minimum qualifications for the president are a BS/BA degree in science or engineering and ten years of experience in industry or nuclear reactor operations – five of which have been in a supervisor position in the nuclear industry or reactor operations.

REVISED

Figure 2-1



Cross Reference of Functional Positions to NFS Organization

Functional Position	Responsible NFS Position*
President	President
Discipline Vice President/ Director	
<i>Production</i>	Vice President Operations BLEU Complex Plant Manager
<i>Safety</i>	Director, Quality, Safety, & Safeguards
Discipline Manager	
<i>Production</i>	Deputy Fuel Facilities Section Manager Deputy HEU Operations Section Manager Analytical Services Section Manager Transportation & Waste Unit Manager WWTF & Utilities Unit Manager
<i>Decommissioning</i>	Decommissioning Unit Manager
<i>Engineering</i>	Engineering Director
<i>Safety</i>	Nuclear Safety & Licensing Section Manager Environmental Protection & Industrial Safety Manager Senior Regulatory Advisor / Acting Safety Director BLEU Complex Safety & Regulatory Manager
<i>Material Control & Accountability</i>	MC&A Section Manager
<i>Security</i>	Security Section Manager
<i>Configuration Management</i>	Configuration Management Section Manager
<i>Quality Assurance</i>	Quality Assurance Section Manager
Safety Function Manager	
<i>Nuclear Criticality Safety</i>	Nuclear Criticality Safety Unit Manager
<i>Radiation Protection</i>	Radiation Protection Unit Manager Radiation Monitoring Manager
<i>Environmental Protection</i>	Environmental Safety Unit Manager
<i>Industrial Safety</i>	Industrial Safety Unit Manager
<i>Licensing & Integrated Safety Analysis</i>	Licensing & ISA Manager

* Some NFS positions may be responsible for more than one functional position.

Chapter 4
Radiation Protection

NFS Response to RAI Concerning License Renewal for SNM-124

RAI 4.1

NUREG-1520, Section 4.4.1.3, Bullet 2 states that an application should "outline the radiation protection program structure and define the responsibilities of key program personnel." Revise Section 2.3.5.2 of the application to include organizational relationships and responsibilities of technicians, health physicists, the radiation protection manager, and the radiation monitoring manager. Also, Section 4.1 of the application (bottom of the page) states that "key program personnel ... will be established." Clarify this sentence to better associate the program's ownership responsibility with respect to key personnel discussed in Section 2.3.5.2.

This information is required to verify compliance with 10 CFR 20.1101(a).

NFS Response

Sections 2.3.5.2 and 4.1 will be revised as follows:

2.3.5.2 Radiation Protection Function

The radiation protection function has responsibility for establishing and maintaining the radiation safety program necessary to ensure the protection of employees at NFS and the community, as defined in Chapter 4. Key responsibilities include management of the ALARA, dosimetry, and radiation monitoring and surveillance programs; analysis and approval of operations involving radiological safety and proposed changes to those operations; establishing radiation protection criteria, procedures, and training programs to control contamination and exposure to individuals and the environment; and monitoring plant compliance with the radiological protection criteria through inspections and audits. Radiation monitoring includes measurement of airborne radionuclide concentration, contamination level, and external radiation levels; evaluation of the operational integrity and reliability of radiation detection instruments; and maintenance of records related to the radiation monitoring program. These tasks are accomplished through the use of radiation technicians, radiation technician supervisors, health physicists, the radiation monitoring manager, and the manager of the radiation protection function.

The manager of the radiation protection function is responsible for administering the activities associated with radiological safety. He or she is responsible directly to the NFS president (or equivalent) in vital matters of radiological safety. This includes monitoring and control of areas of airborne radioactivity, surface contamination, containment, ventilation, internal and external dosimetry, and bioassay services. To assist the manager, health physicists have been charged with developing and implementing radiological control programs to meet program goals and objectives.

The radiation monitoring manager administers the safety monitoring program to comply with license conditions and government regulations. The radiation technician supervisors coordinate and assign daily radiation monitoring tasks supporting health physics. The radiation technicians perform the monitoring tasks as assigned by the supervisors.

The qualifications for the manager of the radiation protection function are a BS/BA degree in science or engineering and at least three years of experience in applied health

physics in a program dealing with radiation safety problems similar to the one managed. The qualifications for a health physicist are a BS/BA degree in science or engineering, or equivalent experience, and at least one year of experience in health physics. A Master's degree in health physics or related discipline may be substituted for one year of experience.

The qualifications for the radiation monitoring manager and the radiation technician supervisor are at least two years of college, or equivalent experience, and one year of experience in applied health physics. A radiation technician must at have, at a minimum, a high school diploma and one year of college physics or chemistry.

Training and qualifications for radiation protection personnel are based on guidance from NRC Regulatory Guide 1.8 (2000).

4.1 Radiation Protection Program

NFS will establish, maintain, and implement a Radiation Protection Program (RPP) commensurate with the scope and extent of licensed activities and sufficient to ensure compliance with the provisions of 10 CFR 20.1101. This will include:

- Use of Engineered and Administrative Controls to maintain radiation exposure as low as reasonably achievable (ALARA).
- Development of procedures for implementation of the RPP.
- Implementation of a self assessment program to periodically (at least annually) review the RPP.
- A staff of suitably trained radiation protection personnel, with sufficient resources to implement the RPP independent from facility operations.

The RPP will be structured to include a specific program for:

- ALARA
- Contamination Control
- Internal and External Dosimetry
- Dose Registry
- Training
- Safety (Radiation) Work Permits
- Airborne Radioactivity Monitoring
- Sealed Source Control

Key program personnel with program ownership and responsibility, as defined in Section 2.3.5.2 of this license, will be established.

RAI 4.2

NUREG-1520, Section 4.4.2.3, Bullet 6 states that an application should include as low as is reasonably achievable (ALARA) program commitments to "regularly review and revise, when appropriate, the ALARA program goals and objectives and to incorporate, when appropriate, new approaches, technologies, operating procedures or changes that could reduce potential radiation exposures at a reasonable cost." Revise Section 4.2.2 of the application to state that

ALARA goals will "incorporate, when appropriate, new approaches, technologies, operating procedures, or changes that could reduce potential radiation exposures at a reasonable cost."

This information is required to verify compliance with 10 CFR 20.1101(b).

NFS Response

Section 4.2.2 will be revised as follows:

4.2.2 Measures Taken to Implement ALARA

Nuclear Fuel Services, Inc., is committed to the philosophy of ALARA. That commitment is manifested in:

- A published Radiation Safety policy, signed by the president of NFS, that declares, to all employees, the policy and intent of NFS to maintain exposure as low as reasonably achievable.
- NFS has developed a formal written ALARA Program Document, approved by senior level managers, which implement the NFS policy by:
 - (a) Requiring training in ALARA philosophy for all radiation workers,
 - (b) Requiring the development, approval, and implementation of specific ALARA goals for selected operating units and the designation of an ALARA Coordinator, as appropriate, for each group to review the progress toward the attainment of specific ALARA goals,
 - (c) Requiring the measurement and monitoring of progress toward goal achievement and the issuance of regular progress reports to management and supervision,
 - (d) Requiring the performance of specific ALARA reviews during the design phase of engineering projects for new facilities or facility and/or equipment modification,
 - (e) Defining, as appropriate, specific long-term ALARA goals. ALARA goals will incorporate, when appropriate, new approaches, technologies, operating procedures, or changes that could reduce potential radiation exposures at a reasonable cost.

RAI 4.3

NUREG-1520, Section 4.4.3.3, Bullets 1 and 5 state that an application should commit to establish and staff a radiation protection program such that the applicant will "appoint suitably trained radiation protection personnel and to identify their authority and responsibilities," and, "describe the minimum training requirements and qualifications for the radiation protection staff." Revise Section 2.3.5.2 of the application as necessary to state the authority and responsibility of appointed radiation protection personnel and their training requirements. Describe the guidance or other information used to establish the training and qualification requirements.

This information is required to verify compliance with 10 CFR 20.1101(a).

NFS Response

Refer to revision of Section 2.3.5.2 under RAI 4.1, specifically the last sentence of the section.

RAI 4.4

NUREG-1520, Section 4.4.3.3, Bullet 3 states that an application should "include commitments to appoint a suitably trained radiation protection program director (typically referred to as the radiation safety officer) who has direct access to the facility manager. . . ." Revise Section 2.3.5 or 2.3.5.2 of the application, as appropriate, to state that direct access to the facility manager (or equivalent function) is available to the radiation protection function manager and/or safety discipline manager.

This is required to verify compliance with 10 CFR 20.1101(a).

NFS Response

As shown in the response to RAI 4.1, the following statement has been added to Section 2.3.5.2 of the application in order to satisfy the above request.

The manager of the radiation protection function is responsible for administering the activities associated with radiological safety. He or she is responsible directly to the NFS President (or equivalent) in vital matters of radiological safety.

Also, Section 2.3.5 states the following:

"The Safety Discipline monitors operations to ensure they are conducted in compliance with federal, state, and local regulations, and is authorized to suspend operations, approve restart of operations, and/or require additional safety precautions when such measures are necessary in the interest of plant safety. The Safety Discipline is administratively independent of the Production Discipline, but both disciplines may report to a common management position."

RAI 4.5

NUREG-1520, Section 4.4.4.3, Bullet 2 states that an application should "specify how the radiation protection procedures will be prepared, authorized, approved, and distributed." Revise Section 11.4.6 of the application to clarify that all active, safety-related procedures are minimally reviewed or revised on a three-year period.

This information is required to verify compliance with 10 CFR 20.1101(a).

NFS Response

A similar statement already exists in the first sentence of Section 11.4.6. The first sentence of the section states:

"If an active operating or general safety procedure has not been revised within a three-year period, the chairman of the safety review committee may select individual committee members to review the procedure to ensure it remains current and relevant."

RAI 4.6

NUREG-1520, Section 4.4.6.3, Bullet 1 states that an applicant should install appropriately sized ventilation and containment systems. Revise Section 4.6, or other applicable section, to state the standards or guidance that will be followed for designing the ventilation and containment systems.

This information is needed to verify compliance with 10 CFR 20.1701.

NFS Response

A recent amendment to this section was submitted for our current license. Once approved, identical language will be added to this application. The amendment is included below with all changes underlined.

4.6.1 Occupied Area Ventilation

In buildings where special nuclear materials are handled:

- Air flow shall be designed to have flow from areas of low contamination potential to areas of increasing relative potential for radioactive contamination when uncontained radioactive material is present. Measurement checks will be performed at least monthly to insure compliance with this requirement.
- Ventilation for occupied areas shall be designed and installed to maintain average work station concentrations of airborne radioactive materials, during normal conditions, below the occupational derived air concentration values specified in 10 CFR Part 20, Appendix B.
- Ventilation for occupied areas shall be designed and installed to meet the intent of the company's ALARA (As Low As Reasonably Achievable) Program.
- In special circumstances where personnel occupation is limited, or during maintenance, decommissioning, equipment modification, facility shutdown, etc., where installation of such engineering controls is impracticable and/or infeasible, alternatives such as the use of portable containment, respiratory protection devices, or enhanced monitoring, shall be used to control exposure to radioactive materials.

4.6.2 Process Enclosure and Exhaust Ventilation

Process containment, enclosure, and/or exhaust ventilation designed to maintain average concentrations of airborne radioactive materials, under normal conditions, below the DAC shall be provided. Should failure or degradation of process ventilation occur whereby average concentrations greater than the DAC are experienced for seven days or more, investigation and corrective action shall be initiated.

4.6.3 Hoods and Glove Boxes

The design criteria for inward air flow through the open face of a hood or similar enclosure, used to handle radioactive material which has a propensity to suspend in air, shall be in accordance with ANSI/AIHA Standard Z9.5-2003 recommendations. NFS will determine the total air flow for each type of hood to ensure proper installation and function. The total flow will then be correlated to a proper average face velocity for the hood.

The average inward air flow through the open face of a hood, open box, or similar open face enclosure, used to handle radioactive material which has a propensity to suspend in air, shall be determined using methods based on ANSI/AIHA Standard Z9.5-2003 recommendations, except for the following:

- Enclosures designed to facilitate surface contamination control rather than provide airborne radioactivity containment
- Hoods and dryboxes where low radiotoxicity materials (radioactive material with a specific activity <2.4uCi/g) are handled
- Open face enclosures where excessive air flow interferes with sensitive analytical equipment or process operations

The minimum rate of flow into these hoods shall be established by internal procedures.

Any ventilated containment with an opening to the room shall be subject to these requirements, unless the opening is high efficiency particulate air (HEPA) filtered. Any ventilated containment with an open door or port through which uncontainerized radioactive material is routinely handled is also subject to these requirements (however, the intermittent opening of a door, glove port, etc. for the sole purpose of adding or removing contained material or equipment does not constitute handling).

Air flow measurement checks will be performed at least monthly on hoods, open boxes, or similar open faced enclosures, to insure compliance with these requirements. In addition, air flow measurements will be performed after significant modifications or changes to the ventilation system to ensure compliance.

Devices are provided to measure the differential pressure within a glove box or other closed system with respect to the outside atmosphere, except in glove boxes where the nature of an operation makes this requirement impractical for processing purposes.

Minimum differential pressure control levels are 0.5 inches water negative for high-enriched uranium, 233U and/or plutonium operations and 0.25 inches water negative for low-enriched uranium systems. These differential pressures will be checked when used to insure compliance with these requirements.

Inert atmosphere or positive pressure boxes will be maintained at pressures not to exceed 1.0 inch of water positive. These boxes will also be provided with over pressurization protection. Process air (air inside a glovebox or hood) that is routinely

discharged to the room air will be HEPA filtered and sampled via the airborne radioactivity monitoring program.

4.6.4 Filtration System Specifications

Exhaust systems where dry material is processed with potentially contaminated airborne effluents are either equipped with HEPA filter media (selected to maintain integrity when subjected to chemicals and solvents in the processes) or other appropriate effluent treatment systems. The HEPA filters are rated at least 99.97% efficient for removal of 0.3 micron particles and have a fire resistant rating of UL 586. All HEPA filters (both primary and secondary) in the exhaust system are equipped with a device for measuring differential pressure

HEPA filter integrity is evaluated when the differential pressure across the filter exceeds four inches of water. A HEPA filter is replaced following evidence of the inability of the filter or the exhaust system to perform its function properly. In no case will filters continue to be operated at differential pressure values which exceed the manufacturer's rating for the filter. These pressures are checked when used.

RAI 4.7

NUREG-1520, Section 4.4.6.3, Bullet 7 specifies that an application should "revise the written procedures for use of individual respiratory protection equipment as applicable, when processing, facility, or equipment changes are made." Revise Section 4.6.5.3 of the application to state that procedures for use of respiratory protection equipment will be revised appropriately when processes, facility, or equipment changes are made.

This information is required to verify compliance with 10 CFR 20.1703.

NFS Response

Section 4.6.5.3 will be revised as follows:

4.6.5.3 Respiratory Protection Procedures

Written operational and administrative procedures give program details on the following subjects:

- Responsibilities
- Proper selection and issuing of respiratory equipment
- Use of respiratory equipment
- Cleaning and sanitizing respiratory equipment
- Contamination checks, inspection, maintenance, recertification, and storage
- Medical qualification
- Fit Testing
- Records of the Respiratory Protection Program (including training for respirator use and maintenance)
- Respiratory Protection Audit

All respiratory protection equipment procedures will be reviewed and revised, as necessary, to address processing, facility, or equipment changes.

RAI 4.8

NUREG-1520, Section 4.4.6.3, Bullet 8 specifies that an application should commit to, "maintain records of the respiratory protection program, including training for respirator use and maintenance." Revise Section 4.6.5.3 (or 4.8.2) of the application to describe maintenance of records for the respiratory protection program including training and respirator use and respirator maintenance.

This information is required to verify compliance with 10 CFR 20.1703.

NFS Response

See response to RAI 4.7.

RAI 4.9

NUREG-1520, Section 4.4.7.3, Bullets 3 and 4 specify that an application should, "identify the criteria for worker participation in the external exposure monitoring and internal exposure monitoring programs." Revise Sections 4.7.5.1 and 4.7.6 of the application to specifically describe the criteria for inclusion of individuals in the internal exposure monitoring program and external exposure monitoring program respectively.

This information is required to verify compliance with 10 CFR 20.1502.

NFS Response

Revisions will be made to Sections 4.7.5.1 and 4.7.6 as detailed below.

4.7.5.1 General

The primary objective of the internal radiation monitoring program is to assure that significant internal radiation exposures are detected, properly evaluated, and recorded. The internal radiation monitoring program, including bioassay procedures, is designed to ultimately express measurements in terms of estimated dose (e.g., DAC-hrs, committed effective dose equivalent [CEDE]). Worker participation in the NFS internal radiation monitoring program follows the guidelines as set forth in Regulatory Guidance document 8.9 (1993) and 8.34 (1992). These requirements are also listed in section 4.7.5.3 of the license application.

4.7.6 External Radiation Exposure - Personnel Monitoring Program

Dosimetry devices, provided and processed by a NVLAP accredited vendor, are utilized at NFS for monitoring individual external radiation exposure. These devices (typically thermoluminescent dosimeters [TLDs]) provide the dose of record. Self reading dosimeters (SRDs) may be used in specific areas as an ALARA tool. Worker participation in the NFS external radiation monitoring program follows the guidelines as set forth in Regulatory Guidance document 8.34 (1992).

Individual dose monitoring is provided based upon the radiation protection function evaluation of the individual's potential for exposure. Beta/gamma sensitive dosimetry is provided for individual monitoring and is exchanged at specified frequencies. The range of these monitoring devices is typically 10 millirem to approximately 1,000 rem.

Where appropriate, as determined by evaluation of the specific operations, dosimetry may be used for monitoring extremity exposure.

RAI 4.10

NUREG-1520, Section 4.4.7.3, Bullet 5 states that an application should communicate, "compliance with the requirements of 10 CFR 20.1202 for summation of external and internal occupational radiation exposures through the use of procedures such as those outlined in Regulatory Guide (RG) 8.7 or 8.34." Revise Section 4.7.2 of the application, or similar section, to state that the licensee will sum external and internal exposures consistent with the requirements of 10 CFR 20.1202 and through procedures consistent with RG 8.7 or 8.34.

This information is required to verify compliance with 10 CFR 20.1202.

NFS Response

A statement will be added to section 4.7.2 of the license application that NFS will sum external and internal exposures consistent with the requirements of 10 CFR 20.1202 and through procedures consistent with Regulatory Guides 8.7 or 8.34.

4.7.2 Individual Monitoring

Individual monitoring includes the making of measurements by equipment carried on the person of workers and/or measurements of quantities of radioactive materials on or in their bodies or excreta, and the interpretation of those measurements. NFS will sum external and internal exposures consistent with the requirements of 10 CFR 20.1202 and through procedures consistent with Regulatory Guides 8.7 (2005) or 8.34 (1992).

RAI 4.11

NUREG-1520. Section 4.4.7.3, Bullets 9 and 10 specify that an application should commit to, "implement the facility's corrective action program when the results of personnel monitoring or contamination surveys exceed the applicant's administrative personnel contamination levels," or, "when any incident results in airborne occupational exposures to radiation exceeding the facility's administrative limits, or the dose limits in 10 CFR Part 20, Appendix B, or 10 CFR 70.61." Revise Sections 4.7.7.8 and 4.7.11.6 (or other appropriate section) of the application to clarify that the facility's corrective action program will be implemented if either personnel contamination levels exceed facility administrative action limits or an incident results in airborne exposures that exceed facility administrative action levels. While there are statements that corrective actions will be implemented, it is not clear if this is informal or through the facility's corrective action program with its associated quality assurance, tracking, and auditing.

This information is required to verify compliance with 10 CFR 20.1101(b).

NFS Response

Sections 4.7.7.8 and 4.7.11.3 will be revised as detailed below.

Section 4.7.7.8

An indication that any work station average airborne radioactivity concentration as averaged over a work shift (or over the sampling period, in areas where less frequent samples are collected) is in excess of the DAC, initiates the following actions:

- Confirmation of the continued existence of airborne radioactivity in the area through short-term high-volume air sampling. Determination of the number and identify of personnel who may have been exposed.
- Posting of the room, area, or building with signs indicating the need for respiratory protection equipment, as appropriate.
- Investigation to determine the sources of airborne radioactivity.
- Initiation of appropriate corrective action to control further releases of radioactivity.

Routine operations are suspended if the airborne radioactivity concentration at the work station exceeds 100 times the DAC. Corrective action is initiated and documented for routine operations. Corrective actions will be implemented through the NFS' formal corrective action program and subject to tracking and auditing. Non-routine operations performed under an SWP requiring respiratory protection could continue if adequate measures are in place and approved by the area health physicist on a case-by-case basis.

4.7.11.3 Action Guidelines

Action guidelines are established to ensure appropriate corrective actions are taken for contamination control. Corrective actions will be implemented through the NFS' formal corrective action program and subject to tracking and auditing. The guideline levels are designed to be conservative in nature and are not to be regarded as the borderline between "safe" and "unsafe."

General guidelines for surface contamination are outlined in the following Table 4-7. Decontamination or access restriction is the action typically taken when the values in this table are exceeded.

If contamination in excess of the action guidelines occurs, the necessary remedial action (decontamination, stabilization, excavation, disposal, etc.) is based upon the particular circumstances and the behavior of the material involved.

Response is based on the need to avoid transfer of contamination to uncontrolled areas and to maintain exposures ALARA. Timeliness of the response is based on the above considerations and is set by internal procedures.

All areas are required to be surveyed for removable alpha and/or beta contamination (as appropriate for the radioactive material processed/stored) on routine frequencies. Areas in which the potential for surface contamination is high, or the probability for human intake from resuspension is high, are surveyed more frequently.

RAI 4.12

NUREG-1520, Section 4.4.8.3, Bullets 2 and 3 state that an application should commit to "establish a program to report to the NRC, within the time specified in 10 CFR 20.2202 and 10

CFR 70.74, any event that results in an occupational exposure to radiation exceeding the dose limits in 10 CFR Part 20," and "prepare and submit to the NRC an annual report of the results of individual monitoring, as required by 10 CFR 20.2206(b)." Clarify in Section 4.8.2 of the application that reports will be issued to the NRC, consistent with 10 CFR 20.2202 and 10 CFR 70.74, any event that exceeds the regulatory dose limits of 10 CFR 20. Also clarify, that an annual report of the results of individual monitoring will be submitted consistent with the requirements of 10 CFR 20.2206(b).

This information is required to verify compliance with the referenced regulations.

NFS Response

Section 4.8.2 will be revised for clarification as detailed below.

4.8.2 Records and Reports

Records appropriate to radiation protection activities, occupational exposure of personnel to radiation, releases of radioactive materials to the environment, and other pertinent activities are maintained in such a manner as to demonstrate compliance with commission license conditions and regulations.

Records associated with ALARA findings, employee training, personnel radiation exposures, and environmental activities are generated and retained in such a manner as to comply with the relevant requirements of 10 CFR 20. Any incident, in which the resulting dose exceeds either 10 CFR 20.2202 dose limits or reporting requirements per 10 CFR 70.74, will be referred to the corrective action program. A report will be generated and sent to the NRC. This report will include any taken or planned corrective actions, as well as a schedule to achieve compliance. See Table 4-11 for a more comprehensive listing. An annual report of the results of individual monitoring, consistent with the requirements of 10 CFR 20.2206(b), will also be submitted to the NRC.

Records related to safety results discussed in this chapter are periodically validated and microfilmed for permanent storage, when required.

Reports are made in accordance with internally established requirements and procedures. Formal reports are issued in accordance with the requirements of 10 CFR 20 and other applicable regulations.

RAI 4.13

NUREG-1520, Section 4.4.8.3, Bullet 4 states that an application should commit to "refer to the facility's corrective action program any radiation incident that results in an occupational exposure that exceeds the dose limits in 10 CFR Part 20, Appendix B, or is required to be reported per 10 CFR 70.74, and to report to the NRC both the corrective action taken (or planned) to protect against a recurrence and the proposed schedule to achieve compliance with the applicable license condition or conditions." Revise Section 4.8.2 or 11.6 (or other appropriate section) of the application to state that any incident resulting in either exceeding the dose limits in 10 CFR 20 and its appendices or required to be reported per 10 CFR 70.74 will be referred to the corrective action program and a report generated to the NRC along with any corrective actions taken or planned along with a schedule to achieve compliance.

This information is required to verify compliance with the referenced regulations.

NFS Response

Refer to response to RAI 4.12.

RAI 4.14

Clarify what is meant in Section 4.7.7.9, Paragraph 4 of the application when it refers to equations in Appendix B. Is the chapter missing this Appendix? Also, revise this section to state the guidance being followed to perform particle size determination.

NFS Response

Reference to Appendix B has been removed from Section 4.7.7.9 as shown in the excerpt below.

Excerpt from 4.7.7.9 Particle Size Adjustment:

As an indication of the goodness-of-fit for the final predicted (hypothesized) distribution as compared to the measured distribution, the chi-square statistic is used. The chi-square test statistic is calculated assuming $n-2$ degrees of freedom, where n is the number of stages including the back-up filter (i.e., $n = 7$). If a statistically good fit exists (as indicated by the p -value), the fractional activities represented by each underlying distribution and their associated activity median aerodynamic diameters [AMADs] (equivalent to the geometric mean for a lognormal distribution) are used to determine an appropriate adjustment factor to apply to the associated 1-micron based DAC, ALI, and CDE values in accordance with equations in ~~Appendix B to this chapter~~ ICRP 30. The level of confidence required to demonstrate goodness-of-fit will be " p " greater than or equal to 0.8, where " p " is the probability of obtaining a value equal to or less than the calculated chi-square statistic when the hypothesized distribution is true.

RAI 4.15

Clarify what is meant in Section 4.7.9.1 of the application when it states, "... use of the DAC/ALI values specified in ICRP 68 may be used independently from methods to adjust the DAC/ALI values based on the aerosol particle studies."

NFS Response

Section 4.7.9.1 will be revised as detailed below.

4.7.9.1 Internal Exposure Assessment

The concentrations of airborne radioactivity may be assessed, for the purpose of assigning effective doses to workers, using DAC/ALI values for an aerosol particle size of 5 microns specified in ICRP 68 in lieu of those contained in 10 CFR 20, Appendix B. In addition, use of the DAC/ALI values specified in ICRP 68 may be used independent from methods to adjust the DAC/ALI values based on 1 micron DAC and ALI values as published in 10 CFR 20 Appendix B through the implementation of aerosol particle studies.

RAI 4.16

Section 4.7.5.2 of the application states that the natural excretion rate of uranium for the NFS population is 0.3 micrograms per liter. Please revise this statement to commit to periodic evaluations of the baseline uranium excretion rate of a representative population as determined using the methods for bioassay analysis available at NFS.

NFS Response

Section 4.7.5.2 will be revised as detailed below.

4.7.5.2 Capabilities

On-site capability exists in dedicated facilities for the analysis of urine samples, nasal smears, and work place particle size determinations. An on-site in vivo chest counter was installed and operational in 1987. Contract laboratories are currently utilized, where appropriate, for urine and fecal isotopic analysis, lung solubility determinations on samples from the NFS work place, and quality assurance sample checks on the NFS urinalysis laboratory.

Natural dietary intake of uranium for the NFS population has been determined to result in an excretion rate as specified in internal NFS documents. Any result in excess of this value is considered a positive result. NFS will periodically evaluate this baseline excretion rate of a representative population as determined using methods for bioassay analysis available on plant site.

RAI 4.17

Section 4.7.5.5 of the application states that when bioassay exposure estimates are approximately equal to or less than those generated from air monitoring data, the air monitoring program is considered adequate. Please provide additional detail as to the criteria for determining that the data are "approximately" equal.

NFS Response

Section 4.7.5.5 will be revised to include acceptable methods of determining that air sampling results are representative of bioassay results.

4.7.5.5 Quality Control of Other Programs

A secondary objective of the bioassay program is to provide a quality control check to assure adequate protection of workers from internal radiation exposure. As such, bioassay results for workers whose annual intakes must be monitored under 10 CFR 20.1502(b) because intakes are likely to exceed 10% of an ALI and whose dose of record will be based primarily on air sampling are periodically used to verify the validity of the work place air monitoring program and the effectiveness of the respiratory protection program. The ratio of the sum of the intakes calculated from air sampling divided by the sum of the intakes calculated from bioassay measurements should exceed 0.7 when averaged for all workers included in the comparison. The ratio for each individual worker should exceed 0.5 for each individual worker. Respirator use protection factors are applied as appropriate. This program is separate from the other validity checks on the air sampling program discussed in this chapter.

RAI 4.18

Section 4.6.4 of the application states that exhaust systems where dry material is processed are either equipped with High Efficiency Particulate Absorbing filter media or "other appropriate effluent treatment systems." Please clarify what is meant by "other appropriate effluent treatment systems" and what criteria will be used to determine if it is appropriate.

NFS Response

Section 4.6.4 will be revised as follows:

4.6.4 Filtration System Specifications

Exhaust systems where dry material is processed with potentially contaminated airborne effluents are either equipped with HEPA filter media (selected to maintain integrity when subjected to chemicals and solvents in the processes) or scrubber/demister. These systems will meet the effluent requirements of SNM-124, Chapter 9. The HEPA filters are rated at least 99.97% efficient for removal of 0.3 micron particles and have a fire resistant rating of UL 586.

RAI 4.19

Section 4.7.9.1 of the application includes the provision currently specified in License Condition S-48. Specifically, it includes the exemption that notwithstanding the requirements in Appendix B of 10 CFR Part 20, the license may use the derived air concentration (DAC) values and the adjusted annual limit on intake (AU) values in Publication 68 of the International Commission on Radiation Protection (ICRP-68). Move this special authorization to use the ALI/DAC values from ICRP-68 to Section 1.2.5 of the application, Special Exemptions and Special Authorizations. It is important that we keep track of exemptions from the regulations.

NFS Response

A new subsection will be added to Section 1.2.5 as detailed below.

1.2.5.8 Use of ICRP 68 DAC and ALI Values

Notwithstanding the requirements, the derived air concentration (DAC) values and the annual limit on intake (ALI) values listed in Appendix B of 10 CFR Part 20, the licensee may use adjusted DAC values and adjusted ALI values specified in Publication 68 of the International Commission on Radiation Protection (ICRP-68). Additional information can be found in Section 4.7.9.1 of this application.

Chapter 5
Criticality Safety

NFS Response to RAI Concerning License Renewal for SNM-124

RAI 5.1

Explain the apparent discrepancy between your commitment to ANSI/ANS-8.3, as modified by RG 3.71, and the statement in Section 5.4.1 of the License Application which states that exemptions from the Criticality Accident Alarm System (CAAS) monitoring requirements include "situations where a criticality accident is determined to be not credible." The wording in Section 5.4.1 seems to restate the part of ANSI/ANS-8.3 that is not endorsed by the NRC as stated in RG 3.71.

This information is needed to verify compliance with 10 CFR 70.24 which requires that a CAAS be maintained in each area where SNM is handled, used, or stored for facilities authorized to possess greater than a critical mass of SNM.

NFS Response

NFS will remove from the license application the proposed allowance for "situations where a criticality accident is determined to be not credible."

RAI 5.2

Describe the "NCS Policy." Section 5.3.2 states that NFS employees receive instruction training regarding the "NCS Policy;" however, the key features of the policy are not defined in the application.

This information is needed to verify compliance with 10 CFR 70.62(a) which requires a safety program that demonstrates compliance with the requirements of 10 CFR 70.61.

NFS Response

The key features of the NCS Policy include the following:

- Line management responsibilities for maintaining knowledge and awareness of NCS requirements for their area of responsibility;
- Appropriate personnel training as an integral part of orientation;
- Maintaining a high quality and effective NCS program;
- Establishing limits and controls to ensure compliance with the double contingency principle;
- The preference for engineered controls over administrative controls;
- Documenting the basis for double contingency;
- The periodic review of NCS Evaluations and associated operations; and
- Maintaining a problem identification, resolution, and correction system.

RAI 5.3

Provide a demonstration that 10 centimeters and 2.5 centimeters of water (or "partial reflection") can be used to conservatively represent reflection in Section 5.5.2 for Multiple Portable Containers and Enclosures/Gloveboxes. In addition, provide an explanation as to where these reflectors will be placed in relation to the containers/enclosure/gloveboxes; it is not apparent what "side" of the container(s) the applicant is referring to in the License Application. The text is also confusing in this part, since it talks about "close-fitting" in one sentence, but then talks

about tangential slabs/boxes in another sentence. Also, provide the management measures that will be used to ensure the assumptions used for "partial reflection" are not exceeded. The NRC prefers compliance to be demonstrated with a 2.5 centimeter, close-fitting reflector for normal conditions and full reflection for accident conditions. Use of less conservative methods (partial reflection) should be limited to cases where compliance cannot be demonstrated using preferred methods. Define the limits that will be placed on the use of less conservative methods.

The use of a 2.5 centimeter, close-fitting reflector has historically been used to account for the reflection effects from personnel or nearby structural or transient materials near units that contain or may contain SNM. Explain how your models are as conservative as this method or can be ensured to be conservative for all normal and credible abnormal conditions. Also, explain how apparently reducing the margin of subcriticality is appropriate for your facility, especially since you may use highly enriched SNM in some processes. The NRC would expect these processes to have at least the same margin as what has historically been used, not less. Explain the reasoning for this apparent reduction in margin.

This information is needed to verify compliance with 10 CFR 70.61 (d). Demonstration of these assumptions, used in designing the facility, is necessary to ensure that the process remains subcritical under both normal and credible abnormal conditions.

NFS Response

The proposed reflection modeling requirements in the License Application Section 5.5.2 (11) are significantly more conservative than the 2.5 centimeter close fitting water for normal conditions. This includes at least 2.5 centimeters of water to account for an operator's hands and at least a 10 cm thickness to account for an operator's torso. This places at least 2.5 cm of water on some sides of the container(s)/equipment and at least 10 cm of water on the remaining sides. The proposed reflection requirements also commit to model any reflection conditions or credible upsets that can exceed these water reflection conditions.

RAI 5.4

In Sections 5.1.1 and 5.5.1 (and elsewhere), describe what is meant by the phrases, "where practicable" and "when practicable" when referring to the preferred hierarchy of controls. State whether there is a specified procedure for making the determination of practicability. Also, explain who decides what is practicable and describe how the determination is made.

This information is needed to verify compliance with 10 CFR 70.62(a) which requires that each licensee establish and maintain a safety program that demonstrates compliance with the requirements of 10 CFR 70.61. Nuclear criticality safety (NCS) is an important feature for the safety assessment of the design bases of the principal structures, systems, and components and for the safety program that demonstrates compliance with the 10 CFR 70.61 performance requirements. The term "practicable" is rather loose in this context. This information is necessary to ensure that the design bases will provide reasonable assurance of protection against a criticality accident.

NFS Response

The choice of the word "practicable" came from NUREG-1520. NFS attempted to maintain consistency with NUREG-1520; and, NUREG-1520 did not define what was meant by the term

and how determination is made. However, it is generally recognized and accepted within the established nuclear criticality safety community that as a class, Engineered Controls are preferred over Administrative Controls and Passive Controls are preferred over Active Controls. However, NFS recognizes that in practice and within the context of a commercially viable nuclear fuel processing facility, it is not "practicable" to implement passive or active engineered controls to limit every nuclear parameter or to protect against every credible criticality accident sequence. Consideration must be given to expense and complexity of an engineered control versus the consequences of the control failure. Competing and/or conflicting requirements of other safety disciplines must also be balanced against those of nuclear criticality safety when implementing controls. Often controls that are "ideal" for criticality safety may have negative or adverse impact on radiological, environmental or industrial safety. In these cases, a compromise must be reached that optimizes the overall safety envelope for the system or process. Sometimes, the complexity associated with the installation, operation, maintenance and testing of an active engineered system nullifies any perceived benefit or advantage such a system has over a simpler administrative control. In many instances, an administrative control can be as effective and reliable as its active engineered control alternative.

Criticality safety of a system or process is generally based on controlling one or more nuclear parameters (e.g., geometry, mass, moderation) to within established safe limits. Some nuclear parameters are more easily controlled by passive or active engineered means. At NFS, the geometry of fissile solution is routinely controlled by the size and shape of the vessels within which it is processed and stored, and by passive engineered leak paths and accumulation points. Active engineered controls prevent unintended transfers or misdirected flow of fissile solution by detecting and/or measuring temperature, pressure or concentration. In some instances, active engineered controls have been implemented to restrict the total mass of fissile material (primarily solids) introduced into a system.

The determination of the overall practicality of NCS controls is determined by consideration of the various control options, effectiveness and complexity of the control, consequences of control failure, safety margin, impact on other safety disciplines, and involvement by NCS Engineering, ISA, Project/Process Engineering, Operations, and other safety disciplines.

RAI 5.5

For all controlled parameters (especially mass, volume, and geometry), commit to consider the most reactive combinations of tolerances on the dimensions and material specifications.

This information is needed to verify compliance with 10 CFR 70.61(d) which requires that the process remains subcritical under both normal and credible abnormal conditions.

NFS Response

NFS considers the most reactive combinations of tolerances on dimensions and material specifications (especially mass, volume, and geometry). First, as stated in section 5.1.1 of the License Application, NFS recognizes that "the focus should be on understanding each credible change in process conditions and implementing the best overall controls to maintain subcriticality such that no single credible event or failure will result in a criticality accident." In section 5.5.2 of the License Application, NFS states the following: "When evaluating an SNM-bearing system for criticality safety, each of these parameters will be assumed to be at its optimum credible condition (i.e., most reactive credible condition) unless acceptable controls are

specified and implemented to limit the parameters to certain values." In addition, in section 5.5.2, item 1 of the License Application, NFS states the following: "Equipment relying upon favorable geometry for control include adequate factors of safety to ensure reliability under credible accident conditions. Before beginning an operation, all dimensions relied upon for geometry control are verified."

RAI 5.6

Clarify whether the use of moderation control requires dual independent sampling. In particular, clarify whether drawing and analyzing the samples must be done by two different individuals or using different instrumentation.

This information is needed to verify compliance with 10 CFR 70.61(d) which requires that all processes be shown to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section 5.4.3.4.2(12)(e), states that "When moderation is needed to be sampled, dual independent sampling methods are used." Section 5.5.2 of the License Application states that, when relying on moderation, "moderation is measured;" however, it is not made clear whether this measurement requires dual independent sampling and analysis.

NFS Response

NFS will revise the License Application to include a requirement for dual independent sampling methods when the NCS Organization requires samples to be taken and analyzed to determine compliance with moderation limits.

RAI 5.7

Describe the process and/or criteria that will be used to ascertain whether a change in process conditions is sufficiently "unlikely" to meet the double contingency principle (DCP), in License Application Section 5.1.1.

This information is needed to verify compliance with 10 CFR 70.64(a)(9) which requires that new processes and facilities must comply with the DCP. The DCP states that the changes in process conditions leading to criticality must be "unlikely." However the means of making this determination are not described in the application. This information is needed to ensure that the DCP will be met.

NFS Response

The means of making the determination of "unlikely" is not specified in NUREG-1520. However, the justification of unlikeliness will be specified in the Nuclear Criticality Safety Evaluation (NCSE).

RAI 5.8

Provide a commitment to indicate that two-parameter control is preferred over two controls on one parameter.

This information is needed to verify compliance with 10 CFR 70.64(a)(9) which requires that controls are chosen so as to ensure that criticality is made highly unlikely. NUREG-1520, Section 5.4.3.4.4(7)(a) states that, "The first method [two-parameter control] is the preferred

approach [over single-parameter control] because of the difficulty of preventing common-mode failure when controlling only one parameter."

NFS Response

Subcriticality is maintained for all normal and credible abnormal conditions. To support this overarching requirement, process designs incorporate sufficient factors of safety to require at least two unlikely, independent, and concurrent changes in process conditions before a criticality accident is possible. Sufficient redundancy and diversity should be implemented on changes in one process condition such that at least two unlikely, independent, and concurrent errors, accidents, or equipment malfunctions must occur before a criticality accident is possible. The focus should be on understanding each credible change in process conditions and implementing the best overall controls to maintain subcriticality such that no single credible event or failure will result in a criticality accident. When considering NCS accident sequences, guidance from ANSI/ANS-8.1-1998, Appendix A is used.

We believe that understanding how changes in the process condition might affect the neutron multiplication of the system and selecting the most reliable control is superior to relying on control of independent parameters.

RAI 5.9

Describe the method and program used to report and correct NCS deficiencies. The application does not discuss whether or not NCS deficiencies are reported to the NCS function nor does it describe the program details. Without this information it is not clear to the NRC staff that NCS personnel can provide a timely or adequate response to an NCS deficiency.

This information is needed to verify compliance with 10 CFR 70.62(a) which requires that each licensee establish and maintain a safety program that demonstrates compliance with the requirements of 10 CFR 70.61.

NFS Response

In section 5.2, item 4 of the License Application, NFS states the following: "NFS personnel shall report defective NCS conditions to the NCS function and perform response/corrective actions only in accordance with written, approved procedures. Unless a specific procedure deals with the situation, personnel shall report defective NCS conditions to the NCS function and take no action until the NCS function has evaluated the situation and provided recovery directions." These requirements are consistent with section 5.4.3.2 (5) of NUREG-1520. In addition, refer to Chapter 11, section 11.6 of the License Application for a description of the Corrective Action Program.

RAI 5.10

Describe whether there is a minimum reflection condition to account for the presence of nearby structural or transient materials (e.g., one inch tight fitting reflector). If this is not used, justify why the models are adequately bounding.

This information is needed to verify compliance with 10 CFR 70.61(d) which requires that all nuclear processes must be assured to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section 5.4.3.4.1 (10)(a), states that "NCS safety limits ... and limits

on NCS controlled parameters will be established assuming credible optimum conditions ... unless specified controls are implemented to control the limit to a certain range of values." Since there will always be some materials at some distance from the fissile system, unless specific controls are established to preclude them, criticality calculations must take them into account.

NFS Response

The base model described in the License Application section 5.5.2 (11) bounds the presence of nearby structural or transient materials (i.e., use of 2.5 cm and 10 cm of close-fitting water). This section also requires that the thickness and location of reflectors that are more effective than water (e.g., concrete) be considered in the model.

RAI 5.11

Clarify whether the justification for taking exception in certain instances to the preferred design philosophy in License Application Section 5.5.1 will be documented in Plant nuclear criticality safety evaluations (NCSEs). Describe how decisions are made to use an administrative control instead of an engineered control, or an active control instead of a passive control. Specify how the basis for these decisions will be documented.

This information is needed to verify compliance with 10 CFR 70.61(d) which requires that all nuclear processes must be assured to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section 5.4.3.4.2(3), states that, in addition to the preferred hierarchy of passive over active and engineered over administrative controls, "When using a control, the choice of the type and manner should be justified." This is necessary to ensure that the preferred design philosophy is adhered to the greatest extent practicable.

NFS Response

Refer to the response to question 5.4.

RAI 5.12

State whether the full range of interstitial moderation is considered in evaluating normal and abnormal conditions.

This information is needed to verify compliance with 10 CFR 70.61(d) which requires that all nuclear processes must be assured to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section 5.4.3.4.1(10)(a), states that "NCS safety limits ... and limits on NCS controlled parameters will be established assuming credible optimum conditions ... unless specified controls are implemented to control the limit to a certain range of values." License Application Section 5.4.5.1 states that "the possibility of full water reflection is considered when performing analyses." However, there may be instances (e.g., strongly coupled arrays) in which full flooding is not the most reactive case.

NFS Response

NFS recognizes that there may be instances in which full flooding is not the most reactive case (i.e., there may be instances in which full flooding is non-conservative) and consideration is given to these situations in Nuclear Criticality Safety Evaluations (NCSE). In addition, the License Application Section 5.5.2 (11) requires the interstitial water volume fraction be varied to bound conditions that may exist during sprinkler activation.

RAI 5.13

When using handbooks to derive subcritical limits, describe the amount of margin used (e.g., 90 percent of the minimum critical diameter). Describe how the handbooks are validated for use in setting subcritical limits.

This information is needed to verify compliance with 10 CFR 70.61(d) which requires that all nuclear processes must be assured to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section 5.4.3.4.1(7), states that the applicant should validate each methodology used for NCS, including "experimental data, reference books, hand calculations, deterministic computer codes, probabilistic computer codes, consensus standards."

NFS Response

When using handbooks to derive subcritical limits from critical values, the safety factors presented in Tables 5A-1 thru 5A-6 are applied to the critical values. In addition, maximum subcritical values may be used (e.g., maximum subcritical values provided in ANSI/ANS-8.1). This is stated in section 5.5.2 of the License Application. The margin is the fraction of the critical value. Validation of handbooks is not necessary as the margin (i.e., fraction of the critical value) accounts for any uncertainties in the data.

RAI 5.14

Explain how you will determine an adequate margin of subcriticality, including margins to protect against uncertainties in process variables and against limits being accidentally exceeded. Also, state whether these will be based on keff sensitivity studies and the ability of controls to maintain operating limits.

This information is needed to verify compliance with 10 CFR 70.61(d) which requires the risk of nuclear criticality accidents be limited by assuring that under normal and credible abnormal conditions, all nuclear processes are subcritical.

NFS Response

In section 5.1.1 of the License Application, NFS states the following: "The focus should be on understanding each credible change in process conditions and implementing the best overall controls to maintain subcriticality such that no single credible event or failure will result in a criticality accident." By understanding each accident sequence, the NCS Engineer will then be able to determine the most effective method of control. The NCS Engineer will also understand the impact of various uncertainties and variabilities. In addition, the NCS Engineer performs various sensitivity studies to determine such that the effect of changes can be understood such that an adequate margin of subcriticality is employed.

RAI 5.15

State how margin will be determined when standards or handbooks are used to determine subcriticality.

This information is needed to verify compliance with 10 CFR 70.61(d) which requires the risk of nuclear criticality accidents be limited by assuring that under normal and credible abnormal conditions, all nuclear processes are subcritical.

NFS Response

Refer to the response to question 5.13. The margin is the fraction of the critical value.

RAI 5.16

Commit to the ANSI/ANS-8 NCS standards as endorsed by the NRC in RG 3.71, Revision 1, which are applicable to activities at NFS. Alternatively, justify how the commitments in the License Application meet the intent of the standard. The specific version of each standard (e.g., ANSI/ANS-8.1-1998) must be indicated as part of the commitment.

Explain the commitments (or lack of commitments) to the following standards in the application:

- ANSI/ANS-8.7-1998. The License Application mentions this standard, but does not seem to fully commit to the standard when storing fissile material.
- ANSI/ANS-8.17-2004. The License Application does not mention this standard.

This information is needed to verify compliance with 10 CFR 70.22(a)(8) which requires that the License Application include proposed procedures to avoid nuclear criticality accidents. This information is needed to ensure that the procedures for NCS are adequate to protect public health and safety and minimize danger to life or property.

NFS Response

ANSI/ANS-8.7-1998 (Nuclear Criticality Safety in the Storage of fissile Materials) commits to this standard if it is applicable to NFS. NFS will add this commitment to the License Application. ANSI/ANS-8.17-2004 ("Criticality Safety Criteria for the Handling, Storage, and Transportation of LWR Fuel Outside Reactors") is not applicable to NFS as NFS does not handle LWR fuel.

RAI 5.17

Commit to maintain, at the facility, a documented evaluation that demonstrates that the CAAS meets the requirements of 10 CFR 70.24. NFS will add this commitment to the License Application.

This information is needed to verify compliance with 10 CFR 70.24 which requires a CAAS be maintained in each area where special SNM is handled, used, or stored for facilities authorized to possess greater than a critical mass of SNM.

NFS Response

NFS will maintain a documented evaluation that demonstrates that the CAAS meets the requirements of 10 CFR 70.24.

RAI 5.18

The License Application does not state that documented NCSEs establish the NCS bases for a particular system under normal and credible abnormal conditions. The License Application also does not state that NCSEs identify specific controls necessary for the safe and effective operation of a process. Amend the License Application to include these commitments.

In addition, address the following regarding these commitments:

- Commit to determine and explicitly identify in the NCSEs the controlled parameters and their associated limits upon which NCS depends.
- Commit to implement and maintain criticality safety controls that are capable of controlling these parameters within the limits identified in the NCSEs.
- Commit to demonstrate, within the NCSEs, that those criticality safety controls designated as items relied on for safety (IROFS) are sufficient to ensure that each process will remain subcritical under all normal and credible abnormal conditions regardless of any other controls which may be implemented.

This information is needed to verify compliance with 10 CFR 70.61(d) which requires that all nuclear processes be subcritical under both normal and credible abnormal conditions. 10 CFR 70.61(e) states that controls needed to comply with 70.61(d) shall be designated as IROFS.

NFS Response

Section 5.1.1 of the License Application states the following: Controls and barriers that are designated as Items Relied on for Safety (IROFS) to prevent an inadvertent nuclear criticality are documented in NCS Evaluations and the Integrated Safety Analysis (ISA) Summary as appropriate. Section 5.1.2 of the License Application also contains requirements for limits, controls, and IROFS. The Nuclear Criticality Safety Evaluations (NCSEs) document the criticality accident sequences, NCS limits, NCS controls, NCS-related IROFS, compliance with the Double Contingency Principle (DCP), and subcriticality for all normal and credible abnormal conditions.

RAI 5.19

Provide the most recent validation report for NFS as described in License Application Section 5.5.4 and a summary of the validation reports for other calculational methods (License Application Section 5.5.2) used at NFS. The summary should include a description of the validated areas of applicability, which are relevant to NFS activities, for each NCS calculational method.

This information is needed to verify compliance with 10 CFR 70.61(d) which requires that all nuclear processes be subcritical under both normal and credible abnormal conditions, including use of an approved margin of subcriticality for safety. NUREG-1520, Section 5.4.3.4.1(7)(b) states that the area of applicability of the code should be described. This information is needed to ensure that calculational methods are only used within valid bounds.

NFS Response

NFS will provide a copy of the most recent validation report by September 30, 2010.

RAI 5.20

Justify the use of a 0.015 minimum margin of subcriticality (License Application Section 5.5.4).

This information is needed to verify compliance with 10 CFR 70.61(d) which requires that all nuclear processes be subcritical under both normal and credible abnormal conditions, including use of an approved margin of subcriticality for safety.

NFS Response

The 0.015 minimum margin of subcriticality was specified by the NRC (Refer to NRC letter E.Q. Ten Eyck to T.S. Baer, "License Renewal" dated July 2, 1999, and associated Safety Evaluation Report and License Condition S-10).

Chapter 7
Fire Safety

NFS Response to RAI Concerning License Renewal for SNM-124

RAI 7.1

Section 7.4.3 of NUREG-1520, states that an application is acceptable if it includes commitments to specified standards. There is no commitment in Chapter 7, your application to National Fire Protection Association (NFPA) 10, "Standard for Portable Fire Extinguishers;" NFPA 25, "Standard for the Inspection, Testing, and Maintenance of Water Based-Fire Protection Systems;" NFPA 30, "Flammable and Combustible Liquids Code;" NFPA 70, "National Electrical Code;" NFPA 72, "National Fire Alarm Code;" NFPA 101 "Life Safety Code;" NFPA 220, "Standard on Types of Building Construction;" and NFPA 221, "Standard for High Challenge Fire Walls, Fire Walls, and Fire Barrier Walls." Please revise Chapter 7 of your application in the appropriate locations to provide this information or specific details that demonstrate an equivalent level of safety as provided by each of the previously referenced standards.

This information is needed to verify compliance with 10 CFR 70.62(a).

RAI 7.2

Section 7.4.3.3 of NUREG-1520, states that an application is acceptable if it includes information on design features to prevent physical security requirements from inadvertently delaying worker egress and fire fighter access. Please revise Section 7.4.1 of your application to provide this information.

This information is needed to verify compliance with 10 CFR 70.62(a).

NFS Response

Section 7.4.1 will be modified as follows to address the answers to RAI Questions 7.1 and 7.2. The topics covered by NFPA 220 and NFPA 221 are included in Chapter 7 of the International Building Code and Chapter 7 of the International Fire Code; therefore, they have not been included in the list of codes below.

7.4 Facility Design

7.4.1 Facility Design Criteria

NFS buildings are designed and built to the requirements of NFPA 801, as well as, any applicable state, and local building, electrical, and fire codes in effect at the time of their construction. Fire areas may subdivide specified processes or materials involving significant fire hazards to confine the spread of fire to the area of origin. In particular, the building areas are considered and fire barriers are provided as recommended by a fire hazard analysis.

For new construction and for renovations affecting 25% or more of the existing structure, NFS will comply with the NFPA codes or standards listed below when required by either (1) NFPA 801, "Standard for Fire Protection for Facilities Handling Radioactive Materials; or (2) The International Building Code, the International Fire Code, the Life Safety Code (NFPA 101), and/or the National Electric Code (NFPA 70), as adopted by the State of Tennessee and/or the Town of Erwin:

- NFPA 10 – Standard for Portable Fire Extinguishers
- NFPA 25 – Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems
- NFPA 30 – Flammable and Combustible Liquids Code
- NFPA 72 – National Fire Alarm Code

Design and construction criteria for facilities that process uranium include an evaluation to determine the proper methods to prevent, detect, extinguish, limit, and control fires and explosions. Fire-resistive and non-combustible materials are used as appropriate. Electrical installation, ventilation, lightning protection, fire water runoff, worker egress, and firefighter access are considered. The design features of physical security projects for the protection of SNM will be reviewed to prevent or minimize the inadvertent delay of either worker egress or fire fighter access during emergency situations.

If a planned new facility and/or new process meets any of the 10 CFR 70.72 criteria requiring a license amendment, baseline design criteria (BDC) and defense-in-depth requirements of 10 CFR 70.64 are addressed as they apply to fire protection.

RAI 7.3

Section 6.5.1 of your currently approved license Application provides details on a carbon dioxide fire suppression system in selected areas of the KAST Uranium Recovery Facility. Given the high safety significance of this system, please revise Section 7.6.3 of your application to provide similar details.

This information is needed to verify compliance with 10 CFR 70.62(a).

NFS Response

The current license states:

“6.5.1 Carbon Dioxide Fire Suppression System in KAST Uranium Recovery Facility
A carbon dioxide (CO₂) fire suppression system shall be maintained and operable in selected areas of the KAST Uranium Recovery Facility to mitigate the risk of criticality arising from a combustible liquid fire. Maintenance and testing of the suppression system shall be conducted in accordance with applicable portions of NFPA 12, Standard on Carbon Dioxide Extinguishing Systems.” In conjunction with the installation of this system, employee training on the associated emergency procedures and equipment shall be conducted to enhance the safety of personnel who may be working in the facility.

Should the CO₂ fire suppression system become inoperable, continued process operations involving combustible liquids within the solvent extraction area of the KAST Uranium Recovery Facility shall require instituting compensatory measures in accordance with requirements specified in the NFS procedure relating to impairments for fire protection equipment.”

The CO₂ fire suppression system in Building 302 is designated as SRE and is inspected and tested on a routine basis. Monthly routine inspections are conducted by Radiation Technicians

in accordance with NFS-HS-B-58, "Fire Suppression Systems Inspections." Routine testing is performed semi-annually by a qualified vendor and is documented through vendor documentation and through completion of the SRE test form.

Routine operations are outlined in NFS-GH-66, "Operation and Maintenance of the Building 302/303 Carbon Dioxide Fire Suppression System." Employee response to alarm conditions is outlined in NFS-HS-E-14, "CO2 Evacuation Alarm Response and Responsibilities." Sounding of the alarms is performed periodically to ensure employee awareness of various alarm tones.

Compensatory measures to be taken in the event of an inoperable CO2 system in Building 302 are outlined in NFS-GH-27, "Planned Impairments to Fire Protection Equipment."

As SRE, the CO2 System in Building 302 is routinely tested to ensure its readiness to perform the intended function. Approved NFS procedures contain requirements for compensatory measures and provide employee instruction on responding to alarms. As such, the original requirements of the license are currently addressed by approved NFS procedures and programs, and specific details for this particular suppression system are no longer needed in SNM-124.

RAI 7.4

Safety Conditions S-12, S-16, S-17, S-18, and S-19 of your current license require detailed features of protection to be provided by specific dates. Provide documentation that verifies that these Safety Conditions were completed, installed on time, and remain fully compliant with the conditions specified.

This information is required to verify compliance with 10 CFR 70.22 which requires, in part, that the application include information on the facilities and procedures to protect health and safety.

NFS Response

The Referenced Safety Conditions are as follows:

- **S-12** - Prior to August 15, 1999, NFS will implement fire protection procedures to minimize the threat of fire, explosions, or related perils to process control and safety systems which could lead to an unacceptable release of hazardous material related to SNM or radiation that would threaten workers, the public health and safety, or the environment, as committed to in Section 6.2 of the license application.

In its letter (21G-99-0119) to the NRC dated September 1, 1999, NFS stated that it had reviewed its fire protection program areas and identified six procedures which needed preparation or extensive revision to meet Section 6.2 of the license application. These procedures were completed as follows:

- NFS-HS-B-08, Rev. 8, "Fire Protection Equipment Inspection," approved 8/2/99
- NFS-HS-B-42, Rev. 6, "Quality Assurance and Maintenance of Respirators," approved 8/2/99
- NFS-HS-B-70, Rev. 0, "Fire Suppression," approved 8/2/99
- NFS-GH-22, Rev. 2, "Fire Doors, Barriers and Damper Inspection," approved 8/11/99
- NFS-GH-62, Rev. 0, "Control of Combustibles," approved 8/11/99

All referenced procedures are active and maintained current. However, NFS-HS-B-70 is now titled "Fire Detection" and covers only fire detection equipment, while the fire suppression equipment is referenced in NFS-HS-B-58, "Fire Suppression Systems Inspections."

Further evidence of completion is the ComTrack Report included on page 46.

- **S-16** - Prior to August 15, 1999, KAST Process fire walls will be upgraded to meet FHA recommendations, as described in NFS Document No. 21G-98-0198, NFS Response to Request for Additional Fire Safety Information for the KAST Process, dated December 8, 1998.

S-16 references recommendations described in an NFS letter to the NRC included on page 47. The acceptance letter to NFS from the NRC is also provided on page 48.

In its letter (21G-99-0119) to the NRC dated September 1, 1999, NFS stated that the KAST process fire walls had been upgraded to 2-hour rated fire walls. In order to attain this rating, wall penetrations were sealed with approved materials, plastic ventilation ductwork was wrapped with a material which will constrict to seal off in the event of a fire, dampers and fire rated roll up doors were provided where appropriate, and 1 ½-hour rated fire doors exist at areas leading out of the protected area. Additionally, a 1 ½-hour rated sample pass through door has been installed between the process area and wet chemistry lab. All of these items were completed by August 9, 1999, addressing the commitment made in our December 8, 1998 response.

Further evidence of completion is provided in the ComTrack Report included on page 52.

Currently, in accordance with SOP 392, "Work Request Procedure," the initiator of a work request must designate if the work to be performed will involve a fire wall penetration or will require a fire system impairment form in accordance with NFS-GH-27, "Planned Impairments to Fire Protection Equipment." NFS-GH-27 also addresses compensatory measures for impairments. NFS-GH-22, "Fire Door Barrier and Damper Inspection – Maintenance," details required inspections.

- **S-17** - Prior to December 31, 1999, NFS shall protect KAST process areas and special nuclear material vaults from lightning by installing a lightning protection system in accordance with the standard "Lightning Protection Code," NFPA 780.

Lightning protection was provided for the KAST process areas and special nuclear material vaults in accordance with NFPA 780. This condition was completed as stated in the ComTrack Report included on page 53.

The NFS Preventive Maintenance program contains a PM requiring a Lightning Suppression Inspection throughout Plant Facilities. This consists of a visual inspection to verify the conditions of lightning suppression related connections on NFS associated equipment. This visual inspection is performed for the 300 Complex Roofs, Bulk Chemical, the 308 Stack, and the 480 Building. The PM was last performed on March 31, 2010, and it is performed semiannually.

- **S-18** - See Sensitive Conditions [The associated text can be found in Attachment 2]

As of the due date of August 15, 1999, four fixed combustible gas detectors had been installed, calibrated and acceptance tested. Installation, calibration, and testing were completed on July 9, 1999, by Engineering personnel and Industrial Safety personnel. These detectors have an alarm light set at a "warning" level to signal the operator, and will sound an audible alarm when the actual alarm set point is reached. The detectors are connected to the plant's fire alarm system, which is monitored at a constantly manned Security station. The detectors are designated as SRE and are routinely calibrated and tested. Part of the SRE test is verifying that SAS received a supervisory alarm on the plant wide fire alarm system.

Additional evidence of completion is provided by the ComTrack Report on page 54.

- **S-19** - Prior to December 31, 1999, NFS will upgrade all process area sprinkler systems to alarm at a constantly manned location.

As of July 2, 1999, NFS had upgraded all process area sprinkler systems to alarm at a constantly manned location. Process Area Sprinkler Systems are SRE and are inspected and tested routinely. Radiation Technicians also perform routine inspections and tests as outlined in NFS-HS-B-58, "Fire Suppression System Inspections."

The only affected sprinkler was the N304BZWSPRINKLR. The ComTrack Report included on page 55 provides documentation.

ComTrack Report for S-12

ComTrack Report

15T-06-3247
 HEA-23

Item: (S-12) NFS will implement fire protection procedures to minimize the threat of 991 fire, explosions, or related perils to process control and safety systems which could lead to an unacceptable release of hazardous material related to SNM or radiation.

Closed
 09-03-1999

Agency: NRC-HQ Category: COMM
 Responsibility: _____
 Department: INDUSTRIAL SAFETY
 Individual: PARKER, JAMES, H. <16845>

Status: Complete Finished: Early

Effort: Unknown Priority: Unknown Level: 0

Planned	Actual	Variance	100	%
				Complete

Start	Complete	Required Date
01-05-1999	08-11-1999	08-15-1999

Duration: 218

- Source Docs Milestones
- Completion Docs Notes

Added: 07-07-1999 NULTY, LAUREL, S. <15949>

Note: None

Reference(s)

Type	Organization Date	Document Subject / Title	Reference No(s)	Part 1 Part 2
Lic-Cond	NRC-HQ 07-02-1999	License Renewal Document	TAC NO. L30873	

Note: None

Letter	NFS 09-01-1999	License Conditions S-5, S-12, S-14, S-16, S-18, and S-25	21G-99-0119 ACF-99-0197	
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Note: Fire protection procedures required to comply with this license condition were completed on or before 8/11/99. Procedure titles and approval dates are identified in the referenced letter to the NRC.

Milestone(s)

None

**Reference for S-16
NFS letter to the NRC**

T.S. Baer to Document Control Desk
December 8, 1998
Page 3

21G-98-0198
GOV-01-55
ACF-98-317

NRC QUESTION 8

In the KAST facility, estimate the fire rating (hrs.) of walls, roof, columns, beams, doors, and fire wall penetrations. Identify whether structural steel is exposed or fire protected. How long will the KAST process area roof last before collapsing in a large fire?

NFS Response:

The walls around the KAST facility will be designated as fire walls to provide a 2-hour fire rating. The rating is based upon the fluid dynamics computer fire modeling performed for the FHA and the documentation contained in the Uniform Building Code and the UL Fire Protection Directory for a similar type of construction. In order to provide this rating, penetrations will be sealed with approved materials, plastic ductwork penetrating walls will be wrapped with a material which will constrict to seal off in the event of a fire, and dampers will be installed, where appropriate, in ventilation ductwork. Fire doors will be provided to meet a 1-1/2 hour fire rating, including the sample pass through door located between the KAST facility and the lab. These modifications will be completed prior to the initiation of full production currently scheduled for August 1, 1999.

Smoke detectors will be installed in Building 302, the tube cleaning room and Area 800 prior to the initiation of full production, in order to provide rapid fire detection and initiate the response process. As a result of additional evaluation, it has been determined that dry chemical extinguishers will be permitted, and an ample number will be installed within the facility prior to the initiation of full production. The pre-fire plans will be updated as modifications are completed to reflect fire protection upgrades for the area.

The roof for the facility is FM Class I, without internal supporting columns. The roof has an external steel supporting structure which has been calculated to withstand the entire duration of the postulated fire, based on the available combustible loading in the KAST facility. While roof collapse is not anticipated, it is recognized that the potential does exist for partial "burn through" of the roof and fire protection measures for the facility were developed with this concern in mind.



Nuclear Fuel Services, Inc.
1205 Banner Hill Road
Erwin, TN 37650

(423) 743-9141

www.atnfs.com

Reference for S-16
NRC response to NFS

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

21G-99-0119
GOV-01-55-04
LIC-01
ACF-99-0197

September 1, 1999

Director
Office of Nuclear Material Safety and Safeguards
U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

References: 1) Docket No. 70-143: SNM License 124
2) SNM-124 License Renewal, E. Q. Ten Eyck to T. S. Baer, dated July 2, 1999

Subject: LICENSE CONDITIONS S-5, S-12, S-14, S-16, S-18, AND S-25

Dear Sir:

Nuclear Fuel Services, Inc. (NFS) requests the deletion of License Conditions S-12, S-14, S-16, and S-18, having met the requirements stated in Reference 2. Attached is a discussion of each license condition and what NFS has completed to meet the condition. Additionally, NFS requests NRC to correct typographical errors and omissions in License Conditions S-5 and S-25.

License Condition S-5 references Section 15.4 of the license application as describing the 300 Complex incinerator. The 300 Complex incinerator is described in Section 15.1, not Section 15.4.

As issued, the license requires NFS to comply with both Section 2.4 of the license application and License Condition S-25. Many of the steps are duplicative, but require different documentation. Demonstrating compliance with both will be time consuming and unnecessarily tie up resources that could be better utilized. NFS requests the phrase "Notwithstanding Section 2.4 of the license application regarding safety significant changes," be inserted as the lead-in phrase of License Condition S-25.

REEL # _____ FRAME # _____

21G-10-0163
GOV-01-55-04
ACF-10-0230

T. S. Baer to NMSS Director
Page 2

21G-99-0119
GOV-01-55-04
LIC-01
ACF-99-0197

If you or your staff have questions or wish to discuss this matter further, please contact me or Mr. Rik Droke, Licensing and Compliance Director, at 423-743-1741. Please reference our unique document identification number (21G-99-0119) in any correspondence concerning this letter.

Sincerely,

NUCLEAR FUEL SERVICES, INC.



Thomas S. Baer, Ph.D.
Vice President
Safety & Regulatory

JHP/pdj
Attachment

cc: Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
Atlanta Federal Center
61 Forsyth Street, SW
Suite 23T85
Atlanta, GA 30303

Mr. William Gloersen
Project Inspector
U. S. Nuclear Regulatory Commission
Region II
Atlanta Federal Center
61 Forsyth Street, SW
Suite 23T85
Atlanta, GA 30303

Mr. Gary Humphrey
Senior Resident Inspector
U. S. Nuclear Regulatory Commission

LICENSE CONDITION RESOLUTION

S-12 Prior to August 15, 1999, NFS will implement fire protection procedures to minimize the threat of fire, explosions, related perils to process control and safety systems which could lead to an unacceptable release of hazardous material related to SNM or radiation that would threaten workers, the public health and safety, or the environment, as committed to in Section 6.2 of the license application.

NFS reviewed its fire protection program areas and identified six procedures which needed preparation or extensive revision to meet Section 6.2 of the license application. These procedures were completed as follows:

NFS-HS-B-08, Rev. 8, "Fire Protection Equipment Inspection," approved 8/2/99.

NFS-HS-B-42, Rev. 6, "Quality Assurance and Maintenance of Respirators," approved 8/2/99.

NFS-HS-B-58, Rev. 1, "Fire Suppression," approved 8/2/99.

NFS-HS-B-70, Rev 0, "Fire Detection," approved 8/2/99.

NFS-GH-22, Rev. 2, "Fire Doors, Barriers and Damper Inspection," approved 8/11/99.

NFS-GH-62, Rev. 0, "Control of Combustibles," approved 8/11/99.

S-14 The 200 and 300 Complex vaults will be protected by barriers with an equivalent two hour fire resistance rating.

As evaluated by NFS' fire protection engineering consultant, the 200 and 300 Complex vault walls provide a two hour fire resistance rating and are identified as such in the drawings for their respective Fire Hazard Analyses (FHA). Industrial Safety personnel have visually inspected each wall to assure all penetrations have been properly sealed. The vault doors were evaluated by our fire protection engineering consultant and equivalency ratings of 1½ hours were assigned as documented in Poole Fire Protection Engineering letters to NFS dated March 3, 1999. The provision of 2-hour rated walls, in conjunction with 1½-hour doors, provides a 2 hour fire barrier assembly for the vaults.

S-16 Prior to August 15, 1999, KAST process fire walls will be upgraded to meet FHA recommendations, as described in NFS Document No. 21G-98-0198, *NFS Response to Request for Additional Fire Safety Information for the KAST Process*, dated December 8, 1998.

KAST process fire walls have been upgraded to 2-hour rated fire walls. In order to attain this rating, wall penetrations have been sealed with approved materials, plastic ventilation ductwork has been wrapped with a material which will constrict to seal off in the event of a fire, dampers and fire rated roll up doors have been provided where appropriate, and 1½ hour rated fire doors exist at areas leading out of the protected area. This work was completed on August 9, 1999. Additionally, a 1½ hour rated sample pass through door has been installed between the process area and wet chemistry lab. This work was completed and inspected by Industrial Safety personnel by March 10, 1999. Completion of these items addresses the commitment made in our December 8, 1998, response.

S-18 Prior to August 15, 1999, fixed combustible gas detectors in the 600 and 800 Areas shall be capable of alarming locally and at a constantly manned location.

A total of four (two in Area 600 and two in Area 800) fixed combustible gas detectors have been installed, calibrated and acceptance tested. Installation, calibration, and testing were completed on July 9, 1999, by Engineering personnel and Industrial Safety personnel. These detectors have an alarm light set at a "warning" level to signal the operator, and will sound an audible alarm when the actual alarm set point is reached. These detectors are connected to the plant's fire alarm system, which is monitored at a constantly manned Security station.

ComTrack Report for S-16

ComTrack Report

15T-06-3248
 HEA-23

Item: (S-16) KAST Process fire walls will be upgraded to meet FHA recommendations, 992 as described in NFS Document No. 21G-98-0198, dated Dec. 8, 1998.

Closed
 09-03-1999

Agency: NRC-HQ	Category: COMM	Status: Complete	Finished: Early
Responsibility: Department: INDUSTRIAL SAFETY	Individual: PARKER, JAMES, H. <16845>	Effort: Unknown	Priority: Unknown
Level: 0	Planned	Actual	Variance
Start: 01-20-1999	Complete: 08-09-1999	Duration: 201	Required Date: 08-15-1999
<input checked="" type="checkbox"/> Source Docs <input checked="" type="checkbox"/> Milestones <input checked="" type="checkbox"/> Completion Doc <input checked="" type="checkbox"/> Notes			
Note: None			

Added: 07-07-1999 NULTY, LAUREL, S. <15949>

Reference(s)

Type	Organization Date	Document Subject / Title	Reference No(s)	Part 1 Part 2
Lic-Cond	NRC-HQ 07-02-1999	License Renewal Document	TAC No. L30873	
Letter	NFS 09-01-1999	letter to Director NMSS entitled "License Conditions S-5, S-12, S-14, S-16, S-18, and S-25."	21G-99-0119 ACF-99-0197	

Note: None

Note: KAST process walls have been upgraded to meet 2 hour fire rated assembly requirements as outlined in the referenced letter to the NRC.

Milestone(s)

None

ComTrack Report for S-17

ComTrack Report

15T-06-3249
 HEA-23

Item: (S-17) NFS shall protect KAST process areas and special nuclear material vaults
 993 from lightning by installing a lightning protection system in accordance with
 NFPA 780. Closed
01-04-2000

Agency: NRC-HQ Category: COMM

Responsibility: Status: Complete Finished: Early

Department: INDUSTRIAL SAFETY

Individual: PARKER, JAMES, H. <16845>

Effort: Unknown Priority: Unknown Level: 0

	Planned	Actual	Variance	100	%
Start	10-04-1999	10-04-1999	0		Complete
Complete	12-31-1999	12-20-1999	-11		Required Date
Duration	88	77			12-31-1999

Source Docs Milestones
 Completion Docs Notes

Added: 07-07-1999 NULTY, LAUREL, S. <15949>

Note: None

Reference(s)

Type	Organization Date	Document Subject / Title	Reference No(s)	Part 1 Part 2
Lic-Cond	NRC-HQ 07-02-1999	License Renewal Document	TAC NO. L30873	
Other	NFS 12-20-1999	Application for lightning protection certification, Underwriters Laboratories	UL Application serial # 65159	

Note: None

Note: The installation of lightning protection for fuel related areas of the 300 Complex has been completed. Application for UL certification of the system verifying completion by both the system installer, Thompson Lightning Protection of Pensacola, FL and the system Owner, NFS Engineering has been made to the UL. UL representatives will inspect the system and provide the final UL certification.

Milestone(s)

None

ComTrack Report for S-18

ComTrack Report

15T-06-3250
 HEA-23

Item: (S-18) Fixed combustible gas detectors in the 600 and 800 Areas shall be capable of alarming locally and at a constantly manned location.

Closed
 09-03-1999

Agency: NRC-HQ Category: COMM

Responsibility: Status: Complete Finished: Early

Department: INDUSTRIAL SAFETY

Individual: PARKER, JAMES, H. <16845>

Effort: Unknown Priority: Unknown Level: 0

Planned	Actual	Variance	100	% Complete
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Start: 04-14-1999 Required Date: 08-15-1999

Complete: 07-09-1999

Duration: 86

Source Docs Milestones
 Completion Doc Notes

Added: 07-07-1999 NULTY, LAUREL, S. <15949>

Note: None

Reference(s)

Type	Organization Date	Document Subject / Title	Reference No(s)	Part 1 Part 2
Lic-Cond	NRC-HQ 07-02-1999	License Renewal Document	TAC NO. L30873	

Note: None

Letter	NFS 09-01-1999	Letter to Director, NMSS, entitled "License Conditions S-5, S-12, S-14, S-16, S-18, and S-25"	21G-99-0119 ACF-99-0197	
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Note: A total of four combustible gas detectors have been installed in the facility. These detectors will alarm locally and send an alarm signal to a constantly manned location via the site fire alarm panel.

Milestone(s)

None

ComTrack Report for S-19

ComTrack Report

15T-06-3251
 HEA-23

Item: (S-19) NFS will upgrade all process area sprinkler systems to alarm at a
 995 constantly manned location.

Closed
 01-05-2000

Agency: NRC-HQ Category: COMM

Responsibility _____ Status _____
 Department: INDUSTRIAL SAFETY Complete Finished: Early

Individual: FARKER, JAMES, H. <16845>

Effort: Unknown Priority: Unknown Level: 0

Planned	Actual	Variance	100	%
				Complete

Start 06-01-1999 Required Date _____
 Complete 12-31-1999 12-31-1999

Duration 213

- Source Docs
- Milestones
- Completion Doc
- Notes

Added: 07-07-1999 NULTY, LAUREL, S. <15949>

Note: None

Reference(s)

Type	Organization Date	Document Subject / Title	Reference No(s)	Part 1 Part 2
Lic-Cond	NRC-HQ 07-02-1999	License Renewal Document	IAC NO. L30873	

Note: None

WR	NFS	see note		
	12-31-1999			

Note: Work requests # 48405, 48403, 48401, 48402, and 46696 were written to re-plumb some of the flow switches which were improperly plumbed and tie all flow switches to the central fire alarm panel. All work was completed and the flow switches tied in by 12/31/99. Industrial Safety maintains a file of the work request documentation.

Milestone(s)

None

Chapter 9
Environmental Protection

NFS Response to RAI Concerning License Renewal for SNM-124

RAI 9.1

Clarify the frequency of air sampling for process areas, inactive process areas and decommissioning areas.

Section 9.1.1.1 of the application states that, at a minimum, all radioactive sample points are collected and analyzed weekly. Please clarify if this includes all airborne effluents (as noted above) that are not sampled continuously (potential to release airborne concentrations greater than or equal to 10 percent of the values in 10 CFR 20, Appendix B, Table 2, Column 1). Please revise Sections 9.1.1 & 9.1.1.1 to include this information.

This information is needed to determine compliance with 10 CFR 20.1501(a) which requires surveys that may be necessary for evaluating concentrations or quantities of radioactive material and the potential radiological hazards as are reasonable under the circumstances.

NFS Response

Sections 9.1.1 and 9.1.1.1 of the license application will be revised as follows:

9.1.1 Airborne Effluents

~~All process stacks and vents with the potential to release airborne radioactivity at concentrations greater than or equal to 10 percent of the values in 10 CFR 20, Appendix B, Table 2, Column 1 are sampled continuously.~~ Flow rates on all process ventilation stacks are checked annually and whenever any process changes occur that have the potential to significantly alter the flow rate. Each individual effluent discharge point is evaluated for isotopic distribution based upon process knowledge, and historical characterization data. Any significant change to the materials processed will be re-evaluated using isotopic analysis to verify accuracy of characterization data.

9.1.1.1 Source-Point Sampling of Airborne Effluents

Effluent sampling is representative of the total discharge. ~~The frequency of sample collection is based upon processing schedule, isotopic characterization, and desired minimum detectable activity. At a minimum, all radioactive effluent sample points are collected and analyzed weekly.~~ All process stacks and vents with the potential to release airborne radioactivity at concentrations greater than or equal to 10 % of the values in 10 CFR 20, Appendix B, Table 2, Column 1, are sampled continuously, with the exception of equipment malfunctions, during processing of radioactive materials. Samples are collected daily from active processing areas and at least weekly from decommissioning areas and inactive processing areas.

To minimize effects of radon progeny on measured activity, air sample results may be decay-corrected for radon progeny or a waiting period may be used to eliminate the interference. Samples are routinely analyzed for gross alpha/beta activity and compared against action points for early detection and investigation of potential problems.

RAI 9.2

Describe how NFS practices encompass the known or expected concentrations of radionuclides in effluents.

NUREG-1520, Section 9.3.2.2, Bullet 2 states that the applicant's practices should encompass the following: "known or expected concentrations of radionuclides in effluents." Justify the screening levels used and the actions taken when radionuclides are detected. Please revise Sections 9.1.1 and 9.1.2 to include this information.

This information is needed to determine compliance with 10 CFR 70.23(a)(3) and (a)(4) which require that equipment and procedures are adequate to protect health and minimize danger to life or property.

NFS Response

Section 9.1.1 will be amended as follows:

9.1.1 Airborne Effluents

~~All process stacks and vents with the potential to release airborne radioactivity at concentrations greater than or equal to 10 percent of the values in 10 CFR 20, Appendix B, Table 2, Column 1 are sampled continuously. Flow rates on all process ventilation stacks are checked annually and whenever any process changes occur that have the potential to significantly alter the flow rate. Each individual effluent discharge point is evaluated for isotopic distribution based upon process knowledge, and historical characterization data. Any significant change to the materials processed will be re-evaluated using isotopic analysis to verify accuracy of characterization data.~~

Screening levels are based on the gross alpha and gross beta analyses performed onsite from the daily collected gaseous and liquid effluents, as well as historical knowledge of the process and material. Characterization data is used to determine if there is a significant change in the primary dose contributors. An offsite isotopic analysis will re-evaluate the characterization data. When radionuclides are detected above the action levels, the following will occur: notification of the environmental protection function manager and the responsible process engineering personnel, an investigation will be undertaken to identify the cause of the exceedance, and appropriate corrective action(s) will be initiated to reduce observed levels that are above the action levels and to minimize the likelihood of a recurrence.

The requested information for Section 9.1.2 is covered in Section 9.1.2.1 as follows:

The WWTF treats and discharges process waste water on a batch basis. Prior to discharge, each batch is sampled and analyzed for gross alpha and gross beta radioactivity. A monthly composite sample is collected and analyzed for isotopes of uranium. The monthly composite is analyzed for other radionuclides if materials in addition to uranium are suspected to be present in process wastewater at levels exceeding 10% of the concentration values in Appendix B, Table 2, Column 2, 10 CFR Part 20. The chemical parameters prescribed in the State of Tennessee NPDES permit are also analyzed at least on the frequency specified in the permit. Samples of the treated waste water are collected from the final neutralization or storage tank prior to discharge.

RAI 9.3

Clarify whether any effluent discharge points have inputs from two or more contributing sources.

NUREG-1520, Section 9.4.3.2.2, Section (1)(c) states that an acceptable program will sample each contributing source to a discharge point. Identify any effluent discharge points that have inputs from two or more sources. If so, describe the sampling performed on each contributing source. Please revise Section 9.1.2.1 to include this information.

This information is needed to verify compliance with 10 CFR 70.23(a)(4) which requires that procedures are adequate to protect health and minimize danger to life or property.

NFS Response

Discussion of this issue with NRC is suggested. The dose to the public from all effluent pathways over the past five years has been significantly less than 0.1 mrem/yr. Gaseous effluents from all processing areas are monitored continuously at each discharge point. A series of administrative action levels provides early detection of upset conditions. Individual process indicators are provided primarily through programmable logical controllers and differential pressure gauge readings. In addition to routine monitoring of control parameters, specialized monitoring such as CAMs, In-line detection systems, and alarming chemical detectors are utilized on a graded approach as early indicators.

For liquid effluents, process wastes are transferred to the WWTF for treatment. The waste is batch processed, sampled, and analyzed prior to discharge. Control samples for gross alpha and beta are performed on each batch and composited monthly for isotopic analysis. The only other liquid effluent is storm water run-off which generally flows to the northern area of the site where Martin Creek crosses the property. The majority of storm water run-off is channeled through two discharge points into Martin Creek. Storm water from the AREVA, BLEU facility is channeled to a culvert on the western edge of the property which discharges into Martin Creek also. The primary sampling point is located at the point where Martin Creek leaves plantsite and is collected on a weekly basis. Samples from Martin Creek upstream are also taken on a quarterly basis for comparison purposes. Grab samples will be collected from each of the two major discharge points from NFS at Martin Creek and at the AREVA, BLEU facility boundary on a quarterly basis. Samples are routinely analyzed for gross alpha and beta. Silt samples are also collected from Martin Creek upstream and downstream on a quarterly basis.

RAI 9.4

Provide information on the minimum detectable concentrations (MDCs) for liquid and airborne effluents and environmental media sampling points.

NUREG-1520, Section 9.3.2.2, Bullet 6 states that the applicant's effluent and environmental monitoring practices should include: "sampling collection and analysis procedures, including the minimum detectable concentrations of radionuclides." While the License Application discusses sampling collection and analysis procedures, it does not state the MDCs of radionuclides. Provide a list of the MDCs or specify the limits within which the MDCs will be maintained. Provide MDC information for airborne and liquid effluents for both gross alpha and beta. Provide MDC information for gross alpha and beta with respect to ambient air and groundwater;

and MDC information for gross alpha for soil, silt/sediment, and vegetation. Please revise Sections 9.1.1.2 and 9.1.2.2; and 9.2.1 through 9.2.6.

This information is needed to determine compliance with 10 CFR 70.23(a)(3) and (a)(4) which require that equipment and procedures are adequate to protect health and minimize danger to life or property; and 20.1501 which requires surveys that may be necessary for evaluating concentrations or quantities of radioactive material and the potential radiological hazards as are reasonable under the circumstances.

NFS Response

The typical MDCs were omitted from the original submittal for renewal to allow for changes in regulations and / or changes to laboratory technologies over the period of the license. Detectable concentrations are based upon the objective of the sample and its use (i.e. Control sample versus data used for dose calculations to the public).

Typically, MDCs used for dose calculations for liquid and air effluents are < 10% of the action level. The limits for Control Samples are designed for early detection and prevent exceeding the regulatory limits. The typical MDCs are established by procedural guidance.

RAI 9.5

Describe action levels for effluents and environmental media sampling points.

NUREG-1520. Section 9.3.2.2, Bullet 7 states that the applicant's effluent and environmental monitoring practices should specify: "action levels and actions to be taken when the levels exceeded." While the application describes some of the action taken when levels are exceeded, the actions levels were not provided, but it was stated that these levels are in procedural guidance. Please describe these action levels for airborne and liquid effluents and environmental sampling (ambient air, soil, silt/sediment, vegetation, and groundwater). In addition, please clarify if these action levels are reviewed periodically to determine if they are still appropriate. Please revise Sections 9.1.1.2 and 9.1.2.2; and 9.2.1 through 9.2.6 to include this information.

This information is needed to determine compliance with 10 CFR 70.23(a)(4) which requires that procedures are adequate to protect health and minimize danger to life or property.

NFS Response

The action levels were omitted from the original submittal for renewal to allow for changes in regulations over the period of the license.

Two tiers of action levels (notification and investigation) exist within procedural guidance and are reviewed periodically. Action levels for airborne effluents are based on site dose modeling and action levels for liquid effluents and ambient air are based on 10 CFR 20, Appendix B. The basis of gross alpha action levels for soil, silt/sediment, and vegetation are based on the NRC Policy/Guidance Directive FC 83-23 and for gross beta are based on ANSI/HPS N13.12-1999. The basis for groundwater action levels are from 40 CFR 141.66 and 40 CFR 141.26.

RAI 9.6

Provide a description of waste minimization techniques implemented at NFS.

The License Application states that waste minimization practices are implemented at NFS; however, it does not describe any techniques to minimize waste. Provide a description of waste minimization techniques NFS performs currently or plans to perform in the future. Please revise Section 9.4 to include this information.

This information is needed to determine compliance with 10 CFR 20.1101(b) which requires procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are ALARA.

NFS Response

Waste minimization techniques implemented through the NFS Hazardous and Mixed Waste Reduction Plan include recycling and/or reusing obsolete computer equipment and electronic components through donations to schools and disposal through licensed recycle facilities, off site shipment of out-of-spec diesel fuel for fuel blending and recycling, shipment of non hazardous oil for recycling, off site thermal destruction of mixed PCB waste burned for energy recovery, recycle of non hazardous oil, reuse of Isopropyl Alcohol as much as technically allowed, and off site shipment of Universal waste (i.e., mercury HID lamps, ballasts, batteries) for recycling. The Plan is updated annually and is available for review. Including this level of detail in Section 9.4 would be an undue burden in the overall management of the program.

NFS has also created the HEU Material Handlers group in the Transportation and Waste Management department. This new group is responsible for all waste handling and packaging functions in the plant. Implementation of this group has helped to control and reduce the volume of waste.

RAI 9.7

Clarify and describe the procedure for monitoring effluents in storm water.

Section 9.1.2 (Liquid Effluents) of the application states that storm water from NFS' Blended Low Enriched Uranium Complex drains into a culvert which parallels the northwest Plant boundary and subsequently empties into Martin Creek. It also states that storm water runoff is monitored by the weekly collection of grab samples from Martin Creek. Describe how often storm culverts are sampled and justify the frequency. For samples taken downstream of the Plant, describe the dilution factor used to estimate the effluent concentration at the Plant boundary. In addition, please describe the action levels are being used for sample results and how those action levels compare to the limits set forth in 10 CFR Part 20, Appendix B.

This information is needed to determine compliance with 10 CFR 20.1302 which requires monitoring of effluents to demonstrate compliance with public dose limits; and 10 CFR 70.23(a)(4) which requires that procedures are adequate to protect health and minimize danger to life or property.

NFS Response

Reference response to RAI 9.3

RAI 9.8

Clarify the sampling type and frequency for soil, vegetation, and silt/sediment.

Table 9-2 of the application for soil, vegetation, and silt/sediment notes measuring only for gross alpha; but the text states that gross alpha and gross beta analysis will be performed (Sections 9.2.2, 9.2.3, and 9.2.4). If NFS is sampling and analyzing for gross beta for soil, vegetation, and silt/sediment, what is the sample type and collection frequency? Please revise the text and/or table to reflect this information.

NFS Response

Table 9-2 has been revised to include gross beta.

**Table 9-2
 Summary Table of Environmental Radiological Surveillance Program
 of Environmental Media**

Sampling Point	Sample Type/ Collection Frequency	Parameters Analyzed
Ambient Air	Continuous/Weekly	Gross Alpha <u>Gross Beta</u>
	Composite/Quarterly	Isotopic U
	Composite/Annually	Isotopes of concern
Soil	Grab/Quarterly	Gross Alpha ¹ <u>Gross Beta</u>
Silt/Sediment	Grab/Quarterly	Gross Alpha ¹ <u>Gross Beta</u>
Vegetation	Grab/Quarterly	Gross Alpha ¹ <u>Gross Beta</u>
Groundwater	Grab/Quarterly	Gross Alpha ¹ <u>Gross Beta</u>

NOTE:

¹ If an action level specified by procedural guidance is exceeded for this media, isotopic analysis will be performed on the sample (or a sample from the same location if the initial sample volume is insufficient).

RAI 9.9

Clarify monitoring of wells adjacent to the underground storage tanks holding liquid effluents.

The Safety Evaluation Report prepared for the last License Renewal (1999) stated that NFS monitored the groundwater adjacent to the underground storage tanks. Please clarify if NFS is continuing to monitor groundwater from one up-gradient well and one down-gradient well

adjacent to 6000-gallon underground storage tanks holding radioactive effluents prior to transfer to the waste water treatment facility. Please revise Section 9.2.6 to include this information.

This information is needed to determine compliance with 10 CFR 20.1501(a) which requires surveys that may be necessary for evaluating concentrations or quantities of radioactive material and the potential radiological hazards as are reasonable under the circumstances.

NFS Response

The underground storage tanks have been removed from service. Wells LD1A and LD2A were abandoned after the tank was no longer in use.

RAI 9.10

The staff would be interested in the current status of groundwater monitoring required by other agencies. Although not required to demonstrate compliance with NRC requirements, it was addressed in the Safety Evaluation Report for the last License Renewal. The information would help the staff answer questions from the public.

NFS Response

There are no specific wells or number of wells required to be sampled by the State or Environmental Protection Agency. However, the Facility Action Plan with the State stipulates that groundwater will be monitored routinely on site for the groundwater remediation project, and at off site locations (Facility Action Plan, January 28, 2010). Currently, according to NFS procedure NFS-HS-B-41, 2 monitoring wells are sampled monthly and 19 wells are sampled quarterly on the NFS site as part of the routine groundwater program. According to NFS procedure NFS-DC-126, 18 injection wells are sampled annually, 12 monitoring wells are sampled semi-annually, and 2 monitoring wells and 5 injection wells are sampled quarterly for tracking the progress of the groundwater remediation project near the maintenance shop area. According to NFS procedure NFS-DC-104, 8 monitoring wells and 3 surface water locations are on a semi-annual basis for monitoring at the Riverview Industrial Park (Off-Site).

RAI 9.11

Describe the total number of monitoring wells available at the NFS site, and explain why the groundwater monitoring commitment in the application is adequate.

Section 9.2.6 of the application (Groundwater Monitoring) states that, at a minimum, 11 wells are monitored quarterly. Please clarify how many other wells are present; and describe any monitoring conducted at the wells. Explain why the commitment to monitor 11 wells is adequate to demonstrate compliance with NRC regulations.

This information is needed to determine compliance with 10 CFR 20.1302 which requires monitoring of effluents to demonstrate compliance with public dose limits and 20.1501 which requires adequate monitoring/surveying to characterize the radiological hazard.

NFS Response

The total number of monitoring wells currently available at the NFS site is 45. Twenty-three injection wells and 1 piezometer are also available. These numbers reflect the number of wells available on the NFS site, CSX property, Impact Plastics property, and the Tennessee

Department of Transportation property. This number is expected to go up in the near future once backfill activities are completed at the North Site as wells will be installed to evaluate the effect of the soil removal on the groundwater plumes in the North Site vicinity, and remediation is planned if required. The groundwater monitoring commitment in the application is adequate as the NFS plant boundary is adequately covered and NFS has been exceeding this commitment on its own for routine monitoring purposes and groundwater remediation.

RAI 9.12

Describe how the radiation protection program is being reviewed. For example, trends in data, changes in design/operations needed to meet ALARA goals, and environmental monitoring.

This information is needed to determine compliance with 10 CFR 20.1101(c) which requires that, at least annually, the radiation protection program content and implementation is reviewed. Please add a Section to Chapter 9 to include this information or reference Chapter 4 (Radiation Protection).

NFS Response

The "Introduction" at the beginning of Chapter 9 will be modified as follows.

Introduction

Effluent releases from the NFS site can occur via two pathways: airborne or liquid. The control systems for each of these pathways are addressed in the following sections. In addition, periodic reviews of the radiation protection program, including effluent control and environmental monitoring, are described in Sections 4.1 and 4.2.

RAI 9.13

Clarify the meteorological data used in the assessment of the maximum concentration at the site boundary and maximum offsite dose.

Section 9.1.1.4 of the application states that site-specific meteorological data, when available, or conservative meteorological parameter values are used in the assessment of the maximum concentration at the site boundary and the maximum offsite dose. Describe how site-specific meteorological data is obtained, and explain why it might be unavailable. Also describe the conservative values that are used, and provide the basis for using those values. Please revise Section 9.1.1.4 to include this information.

This information is needed to determine compliance with 10 CFR 20.1302, which requires monitoring of effluents to demonstrate compliance with public dose limits, and 10 CFR 20.1501, which requires adequate monitoring/surveying to characterize the radiological hazard.

NFS Response

Assessment of the maximum concentration at the site boundary and maximum off-site dose is performed using the Comply Code (U.S. Environmental Protection Agency [EPA]), the CAP88-PC Computer Code 3.0 or higher (U.S. Department of Energy [DOE]), or an equivalent methodology. Site specific meteorological data is used in the assessment when available. Meteorological data may be unavailable if technical or physical issues occur. Otherwise,

conservative values are used for meteorological parameters. Meteorological data is recorded from the site specific meteorological system into a database and maintained for emergency dose reconstruction. Air samples may be analyzed for uranium lung solubility class and enrichment in order to characterize the material released. Otherwise, conservative values are used for solubility class and enrichment. The conservative values that are used are assuming all particle sizes are within respirable range with a particle size of one micrometer (1 μm) Activity Median Aerodynamic Diameter (AMAD). And the most conservative solubility for the isotopes are used. NFS follows procedural documents to perform the calculations. Parameter values used in modeling are based on data collected during the assessment period, previous monitoring history, or the professional judgment of an environmental scientist or health physicist.

RAI 9.14

Clarify the action levels used for monitored constituents in sewer discharges and other surface water effluents.

Section 9.1.2.2 of the application states that actions levels for sewer discharges and other surface water effluents are at or below concentrations listed in 10 CFR 20 Appendix B, Table 2, Column 2. For an action level to be effective, it should be set below the regulatory limit such that action can be taken before the limit is exceeded.

Commit to an upper limit for the action levels (i.e., no more than X percent of the regulatory limit). Please revise Section 9.1.2.2 to include this information.

This information is needed to determine compliance with 10 CFR 20.1302 which requires monitoring of effluents to demonstrate compliance with public dose limits, and 10 CFR 20.1501 which requires adequate monitoring/surveying to characterize the radiological hazard.

NFS Response

The action levels were omitted from the original submittal for renewal to allow for changes in regulations over the period of the license.

Two tiers of action levels (notification and investigation) exist within procedural guidance with the notification level set lower than the investigation level. Action levels for liquid effluents (sewer and surface water) are based on 10 CFR 20, Appendix B.

Chapter 10
Decommissioning

NFS Response to RAI Concerning License Renewal for SNM-124

RAI 10.1

Provide an amended Schedule A for the Citibank Standby Trust dated February 6, 2009. The amended schedule should address the following concerns under the section titled *Cost Estimate for Regulatory Assurances Demonstrated by this Agreement*:

- In the line that reads "SNM-124 -\$7,225,637.00," the dash immediately preceding the dollar amount implies a negative cost estimate. Replace the dash immediately preceding the dollar amount with a colon or similar mark.
- The date is missing from the line that reads, "The cost estimate listed here was last adjusted and approved by the NRC on [insert date]." Insert the date of the most recently approved cost estimate.

This information is needed to verify compliance with 10 CFR 70.25(f) which requires financial assurance to be provided by an approved funding method.

NFS Response

The latest estimate of the total cost to decommission the NFS site was submitted to NRC on December 1, 2009 (21G-09-0180), and a subsequent revision to the estimate was submitted to NRC on February 26, 2010 (21G-10-0029). The NRC accepted the revised estimate for review on May 20, 2010, and assigned Technical Assignment Control Number L32974. The NRC issued a "Request for Additional Information" letter, specific to the revised cost estimate, on July 27, 2010.

As discussed previously with NRC staff, NFS will provide funding mechanisms with adjusted dollar amounts, updated standby trust agreement(s), and a certification of financial assurance for decommissioning after the U.S. Nuclear Regulatory Commission confirms that the cost estimate dollar amounts are acceptable. The corrections as noted in Question 10.1 will be made at that time and then submitted to NRC.

RAI 10.2

Provide a master list of every contaminated area of the site that is unsuitable for unrestricted release. This list should include all legacy areas that require additional remediation before the license is terminated (i.e., Southwest burial trenches, former Building 234 site, etc.). For each contaminated area, provide the latest estimate of the total cost to decommission the area including a reference to the letter which submitted the detailed cost estimate to the NRC. In addition, specify the mechanism which assures the funds for decommissioning each contaminated area including a reference to the letter which submitted the mechanism to the NRC. The master list should address the following issues where applicable:

- The status of any funding mechanisms submitted previously which are no longer needed.
- For each prepayment mechanism, provide a recent bank statement or other documentation which confirms the current balance in the account.

- For each surety mechanism, specify the trust to which the funds are payable, including a reference to the letter which submitted the trust documents to the NRC.

This information is needed to verify compliance with 10 CFR 70.25(e) which requires a cost estimate for decommissioning and a description of the method of assuring funds.

NFS Response

The latest estimate of the total cost to decommission the NFS site was submitted to NRC on December 1, 2009 (21G-09-0180), and a subsequent revision to the estimate was submitted to NRC on February 26, 2010 (21G-10-0029). The NRC accepted the revised estimate for review on May 20, 2010, and assigned Technical Assignment Control Number L32974. The NRC issued a "Request for Additional Information" letter, specific to the revised cost estimate, on July 27, 2010.

The revised estimate splits the total decommissioning obligation for the NFS site into three categories – Department of Energy (DOE), NFS, and Joint Venture. A site map, included in Attachment 2, has been color coded to illustrate information presented in the revised estimate, specifically

- The areas of the NFS site that may require remediation before the license is terminated; and
- The category of decommissioning obligation used to assure the funds for decommissioning.

For further clarification, the following information is provided for each of the three categories.

Decommissioning Obligation Category	Type of Funding Mechanism	Standby Trust Agreement Required per NUREG-1757?
DOE	U.S. Government Funding Method (SNM-124, 1.2.5.5 and 10.3.1)	No
NFS	Surety Method – Letter of Credit (SNM-124, 10.3.2)	Yes
Joint Venture	Surety Method – Letter of Credit (SNM-124, 10.3.2)	Yes

As discussed previously with NRC staff, NFS will provide funding mechanisms with adjusted dollar amounts, updated standby trust agreement(s), and a certification of financial assurance for decommissioning after the U.S. Nuclear Regulatory Commission confirms that the cost estimate dollar amounts are acceptable.

Status of Funding Mechanisms Submitted Previously

The only funding mechanism currently in effect, and that is no longer needed, is a performance bond issued by ACSTAR Insurance Company. In a letter dated July 14, 2010 (21G-10-0139), NFS submitted a request to the NRC to release the bond.

Prepayment Mechanisms

No prepayment mechanisms are currently in effect to assure funds for decommissioning at the NFS site.

Surety Mechanisms

As discussed previously with NRC staff, NFS will provide funding mechanisms with adjusted dollar amounts, updated standby trust agreement(s), and a certification of financial assurance for decommissioning after the U.S. Nuclear Regulatory Commission confirms that the cost estimate dollar amounts are acceptable.

RAI 10.3

Submit a revised Certification of Financial Assurance that reflects the master list information requested above.

This information is needed to verify compliance with 10 CFR 70.25(e) which requires a certification of financial assurance.

NFS Response

The latest estimate of the total cost to decommission the NFS site was submitted to NRC on December 1, 2009 (21G-09-0180), and a subsequent revision to the estimate was submitted to NRC on February 26, 2010 (21G-10-0029). The NRC accepted the revised estimate for review on May 20, 2010, and assigned Technical Assignment Control Number L32974. The NRC issued a "Request for Additional Information" letter, specific to the revised cost estimate, on July 27, 2010.

As discussed previously with NRC staff, NFS will provide funding mechanisms with adjusted dollar amounts, updated standby trust agreement(s), and a certification of financial assurance for decommissioning after the U.S. Nuclear Regulatory Commission confirms that the cost estimate dollar amounts are acceptable.

RAI 10.4

For each contaminated area identified in response to Item 10.3 above, provide the following information:

- Are principal activities (as defined in 70.4) still being conducted? If not, when did principal activities cease?
- Is an NRC-approved decommissioning plan working (provide reference), planned, or not required (provide basis)?
- When will decommissioning of the area be complete? If principal activities have ceased, but final decommissioning is being delayed, provide justification for the delay.

This information is needed to verify compliance with 10 CFR 70.38 which requires, in part, that NRC approve a decommissioning plan for certain activities and that decommissioning be conducted in a timely manner.

NFS Response

Yes, principal activities (as defined in 70.4, as well as in SNM-124) are still being conducted in all facilities on the NFS site.

An NRC-approved decommissioning plan is currently in use for the former Ponds and Radiological Burial Ground areas as stated in SNM-124, 10.5 and is titled "North Site Decommissioning Plan, Revision 3, March 2006." The excavation of radiological soils was completed in June 2010, and Final Status Survey activities will be ongoing until NRC reviews are complete.

Upcoming work planned for the Wet Cell Excavation Project was reviewed by NFS against the criteria in 70.38(g)(1), and it was determined that a Decommissioning Plan was not required for these activities. NRC was provided a briefing on the project details on November 24, 2009, and additional information was provided in a letter dated February 3, 2010 (21G-10-0005). NRC documented their agreement with the NFS conclusions in a letter dated March 30, 2010. The project is currently planned to start the third quarter of 2010, and the project is expected to take two years.

Other future plans may include building demolition and additional equipment removal that currently falls under SNM-124, 1.6 (Renewal 1.2.5.6), and License Condition S-26; therefore, a decommissioning plan would not be required.

Chapter 11
Management Measures

NFS Response to RAI Concerning License Renewal for SNM-124

RAI 11.1

License Renewal Application Section 11.2.1 describes the surveillance and monitoring program for the facility. This section, however, does not discuss the methodology used to establish the surveillance frequency for IROFS and whether the approach is graded. Describe this methodology and, if graded, the basis for grading.

This information is needed to determine compliance with requirements of 10 CFR 70.62(d).

NFS Response

As stated in Section 11.2.1, surveillance and monitoring activities include preventive maintenance and functional testing. Frequencies for both preventive maintenance and functional testing are established using a graded approach based on safety, engineering, or maintenance considerations. Some of the factors considered include:

- component function, including required operating range and instrument drift
- potential consequences of component failure
- facility and component operating history
- industry guidance
- manufacturer's recommendations regarding component reliability, accuracy, and failure rates
- operating environment
- materials of construction

Although multiple items from the list may apply to a component, the most representative item(s) should govern the final selection of the frequency, given the particular operating environment in which the component is used.

RAI 11.2

License Renewal Application Section 11.2.4 describes the functional testing and test result documentation for the facility. It states that the results of functional testing are documented and maintained as specified in Section 11.7, "Records Management." However, Section 11.7 does not address functional testing documentation. Describe how the results of functional testing will be recorded.

This information is needed to determine compliance with requirements of 10 CFR 70.62(d).

NFS Response

A computerized management system is used to control the development, approval, scheduling, and distribution of functional tests. When a test is due to be performed, operations personnel print the latest approved test revision from the management system, carry the printed test copy to the testing location, and record the results of the testing on the printed test copy. The format used when printing the latest approved test revision is unique, and it is the only format in the management system that provides space to enter the date and time the test was performed, as well as the test performer's signature. Finally, the completed test results are logged in to the management system, to allow for tracking and trending, and the next test is scheduled.

In order to clarify the intent of Section 11.2.4, the following change will be made.

11.2.4 Functional Testing

Functional testing of IROFS under the Safety Related Equipment program is performed using approved, written instructions prior to startup of facilities or process operations involving IROFS and at periodic intervals during operations to provide reasonable assurance that the safety control performs as designed and provides the desired safety action. Functional testing of IROFS will be performed prior to restart if the process operation has been inactive for more than 120 days.

Functional test instructions and frequencies are approved by, and cannot be modified without the approval of, the safety review committee, and are based on operating history, manufacturer and industry guidance, risk assessment, feedback from surveillance and maintenance activities, and/or recommendations from the corrective action program. Minor changes to functional test instructions, as defined in a written procedure, are allowed to be approved by the safety review committee chairman on behalf of the entire committee. During process operations, compensatory measures are used as appropriate while functional testing is performed on IROFS. The results of functional testing are documented, and the documentation is and maintained as "records pertaining to safety" as specified in Section 11.7.

RAI 11.3

License Renewal Application Section 11.4.6 states that periodic reviews of procedures will be done. Describe the methods used to ensure that procedures will be periodically reviewed and, if necessary, revised.

This information is needed to determine compliance with requirements of 10 CFR 70.62(d).

NFS Response

A computerized management system is used to track periodic procedure reviews. Reviewers are notified when a review is due, and their comments are logged in the system electronically. When a procedure undergoes revision, the management system is checked to ensure that comments logged against the procedure are incorporated.

RAI 11.4

License Renewal Application Section 11.1 does not provide information on reconstitution of design bases and requirements. Describe whether the need for reconstitution was investigated. If a reconstitution was done, describe the approach used and how the new or revised documentation was incorporated into the configuration management system.

This information is needed to determine compliance with requirements of 10 CFR 70.72.

NFS Response

The design reconstitution process is described in Section 11.1.4, "Design Requirements." The License Application is consistent with the current safety analysis baseline, which was updated in 2004 to meet the 10 CFR 70, Subpart H, ISA requirements. Updates are ongoing as plant

changes are implemented, and have been submitted annually since 2005 to the NRC as required by 10 CFR 70.72(d)(3) and License Condition S-25. This commitment is included in Section 3.1.4 in the new version of SNM-124. Therefore, design reconstitution was not required.

Chapter 12
Material Control and Accountability

NFS Response to RAI Concerning License Renewal for SNM-124

Note: The existing license conditions contain a large number of exemptions from the regulations. The following items request justification for keeping those exemptions. For each exemption that is justified, add a non-sensitive description of the exemption to Section 1.2.5 of the application, Special Exemptions and Special Authorizations.

RAI 12.1

Provide justification for keeping each of the following safeguards conditions in the license:

- SG-1.1
- SG-2.1
- SG-4.1
- SG-4.2
- SG-4.5
- SG-4.10
- SG-4.11
- SG-4.12
- SG-4.14
- SG-4.18

This information is needed to determine compliance with the requirements of 10 CFR Part 74.

NFS Response

- **SG-1.1**

Safeguards condition SG-1.1 continues to be applicable to NFS' operations. This safeguards condition documents the understanding between the NRC and NFS for processes that are exempt from process monitoring as described in the HEU FNMC Plan Section 1.1.5.2. 10 CFR 74.53 (a)(1),(2),(3), and (4) provide specific criteria for exemption that is used in Annex A, Table 11 of the HEU FNMC Plan.

- **SG-2.1**

Safeguards condition SG-2.1 is not applicable to NFS' current operations. Safeguards condition SG-2.1 may be removed from the license.

- **SG-4.1**

Safeguards condition SG-4.1 continues to be applicable to NFS' operations. This safeguards condition documents the understanding between the NRC and NFS that an isotopic abundance measurement traceable to the area of generation may be used for determination of the element content of SNM of NDA measurements.

- **SG-4.2**

Safeguards condition SG-4.2 continues to be applicable to NFS' operations. This safeguards condition documents the understanding between the NRC and NFS for using one and two scale divisions as the 0.05 and 0.001 levels of significance for mass measurements.

- **SG-4.5**

Safeguards condition SG-4.5 continues to be applicable to NFS' operations. This safeguards condition documents the understanding between the NRC and NFS for measurement of

process exhaust ventilation material holdup quantity in accordance with the HEU FNMC Plan Section 4.5.3.5.

- **SG-4.10**

Safeguards condition SG-4.10 continues to be applicable to NFS' operations. This safeguards condition documents the understanding between the NRC and NFS of actions to be taken when replicate measurement data exceeds a 0.001 control limit in accordance with the HEU FNMC Plan Section 4.4.1.7.3.4.

- **SG-4.11**

Safeguards condition SG-4.11 continues to be applicable to NFS' operations. This safeguards condition documents the understanding between the NRC and NFS to combine data from equivalent scales without statistical testing.

- **SG-4.12**

Safeguards condition SG-4.12 is not applicable to NFS' current operations. Safeguards condition SG-4.12 may be removed from the license.

- **SG-4.14**

Safeguards condition SG-4.14 continues to be applicable to NFS' operations. This safeguards condition documents the understanding between the NRC and NFS that control standards for point calibrated, bias free systems need not be measured or monitored for bias.

- **SG-4.18**

Safeguards condition SG-4.18 continues to be applicable to NFS' operations. This safeguards condition documents the understanding between the NRC and NFS to exclude limit of error data on DOE/NRC Form-741 associated with waste shipments.

For each exemption that was justified above, a non-sensitive description will be added to Section 1.2.5, "Special Exemptions and Special Authorizations" as shown below.

1.2.5.9 Material Control & Accountability

This section documents the understanding between NRC and NFS on the following topics.

1. Abrupt Loss Detection (For SSNM only)
Notwithstanding the requirement of 10 CFR 74.53(b)(1) to have a process detection capability for each unit process, the process units listed in Section 1.1.5.2 of the Plan identified in Condition SG-5.1 shall be exempt from such detection capability, and the licensee's process monitoring system shall be comprised of the control units described in Section 1.3 (and all sub-sections therein) of the above mentioned Plan.
2. Quality Assurance
 - a. Notwithstanding the requirements of 10 CFR 74.31(c)(2) for LEU and 10 CFR 74.59(d)(1) for SSNM to maintain a system of measurements to substantiate both the element and fissile isotope content of all SNM received, inventoried, shipped or discarded, SNM measured by the licensee for U-233, U-235, or Pu-239 by non-destructive assay techniques need not

- be measured for total element if the calculated element content is based on the measured isotope content which, in turn, is traceable to an isotopic abundance measurement at the area of generation.
- b. Notwithstanding the requirement of 10 CFR 74.59 (e)(8) to establish and maintain control limits at the 0.05 and 0.001 levels of significance for all HEU related measurements, the licensee may use one and two scale divisions as being equivalent to the 0.05 and 0.001 control levels, respectively, for mass measurements.
 - c. Notwithstanding the requirements of 10 CFR 74.59(f)(1) and 74.59(f)(2)(viii) to measure and inventory all SSNM, the licensee may determine process exhaust ventilation system inventory quantities in accordance with Section 4.5.3.5 of the Plan identified in Condition SG-5.1.
 - d. Notwithstanding the requirements of 10 CFR 74.59(e)(8) relative to actions to be taken when replicate measurement data exceed a 0.001 control limit, the licensee shall comply with Section 4.4.1.7.3.4 of the Plan identified in Condition SG-5.1.
 - e. Notwithstanding the requirement of 10 CFR 74.59(e)(4) that allows the pooling of data which has been shown to be not significantly different on the basis of appropriate statistical tests, the licensee may pool data from equivalent scales without testing.
 - f. Notwithstanding the requirement of 10 CFR 74.31(c)(3) and of 10 CFR 74.59(e)(3)(i) to measure control standards for all measurement systems for the purpose of determining bias, and notwithstanding the requirement of 10 CFR 74.31(c)(4) and of 74.59(e)(8) to maintain a statistical control system to monitor such control standard measurements, the licensee need not measure nor monitor such control standards for point calibrated, bias-free systems. To be regarded as bias-free, a measurement system must be calibrated by one or more measurements of a representative standard(s) each time process unknowns are measured, and the measurement value assigned to a given unknown is based on the associated calibration.
 - g. Notwithstanding the requirement of 10 CFR 74.15 to include limit of error data on DOE/NRC Form-741 for all SNM shipments, the licensee is exempt from including such data on 741 Forms associated with waste burial shipments.
 - h. Notwithstanding the requirements of 10 CFR 74.59(f)(2)(vii) to remeasure, at the time of physical inventory, any in-process SSNM for which the validity of a prior measurement has not been assured by tamper-safing, the licensee may book for HEU physical inventory purposes:
 - (1) process holdup quantities determined by NDA measurements in manufacturing facilities performed prior to the start of an inventory, in accordance with the controls described in Section 4.5.2.3.2 of the Plan identified in Condition SG-5.1; and
 - (2) pre-listed material introduced to process in the manufacturing facilities prior to the start of an inventory, in accordance with the controls described in Section 4.5.2.3.2.
 - i. Notwithstanding the requirement of 10 CFR 74.59(f)(1)(i) to calculate the SEID associated with each HEU inventory difference (ID) value, the licensee need not determine such SEID for MBA-7 whenever its ID is less than 300 grams U-235.

- j. The licensee is exempted from calculating the standard error of inventory difference (SEID) and measurement system biases associated with LEU physical inventories provided that the calculated inventory difference does not exceed 1,000 grams U-235.

RAI 12.2

Provide information to update the following safeguards conditions:

- SG-4.4 - Identify which buildings should be included and which subparts should remain. Justify why this condition is necessary in its updated form.
- SG-5.1: Identify which chapters and annexes should be listed and the dates for the most current revisions of those chapters. Also, remove the reference to SG-5.5 if that safeguards condition is no longer needed.
- SG-5.2: Identify which chapters and annexes should be listed and the dates for the most current revisions of those chapters.

This information is needed to determine compliance with requirements of 10 CFR Part 74.

NFS Response

- **SG-4.4**

Safeguards condition SG-4.4 continues to be applicable to NFS' Fuel Manufacturing operations and the BLEU Prep Facility (BPF) operations for NDA of process holdup and pre-listed materials to be introduced prior to the inventory listing. Since Building 301 is no longer associated with 302/303 inventory (Fuel Manufacturing), the third condition may be removed. The reference to buildings may be combined as "Manufacturing Facilities" as stated in Section 4.5.2.3.1 of the FNMC Plan. NFS proposes the current safeguards condition be reworded and added as Item "h" under 1.2.5.9 as shown in the response to RAI #12.1.

- **SG-5.1**

The following revisions and sections of the Subpart E FNMC Plan should be included in SG-5.1: General Discussion Rev. 9 (dated September 2009)
Section 1 – Process Monitoring Rev. 25 (dated September 2009)
Section 2 – Item Monitoring Rev. 8 (dated August 2006)
Section 3 – Alarm Resolution Rev. 9 (dated November 2008)
Section 4 – QA & Accounting Rev. 19 (dated September 2009)

The Annexes should not be included in SG-5.1. The Annexes are provided for information purposes only per NUREG 1280, "In those cases where a demonstration of a specific capability is called for, such information should be included in an annex to the plan which will not be incorporated as a condition of license."

Safeguards condition SG-5.5 is no longer applicable and may be removed from the license.

- **SG-5.2**

The following revisions and sections of the Subpart C FNMC Plan should be included in SG-5.2: Section 1 – General Discussion Rev. 6 (dated January 2008)

Section 2 – SNM Confirmation and Tracking Rev. 4 (dated August 2004)
Section 3 – Management Structure Rev. 9 (dated July 2009)
Section 4 – MC&A Measurements Rev. 6 (dated August 2006)
Section 5 – Physical Inventories Rev. 4 (dated January 2005)
Section 6 – Item Control Rev. 5 (dated August 2006)
Section 7 – Resolving Shipper/Receiver Differences Rev. 2 (dated January 2002)
Section 8 – Periodic Assessment of the MC&A System Rev. 4 (dated July 2009)
Section 9 – Record Keeping Rev. 1 (dated February 1993)

The Annex should not be included in SG-5.2. The annex is provided for information purposes only per NUREG 1065, "The annex (or appendix) of an FNMC plan should provide supplementary and general information about the facility and the MC&A system ... The annex will not be incorporated as a condition of license and will not be the basis for inspection."

RAI 12.3

The following safeguards conditions may be removed from the license through amending the approved Fundamental Nuclear Material Control Plans (FNMCP) mentioned in Safeguards Conditions 5.1 and 5.2. Amend the appropriate FNMCP to incorporate the following safeguards conditions, or identify where the details of the safeguards condition may be found within the FNMCP:

- SG-4.8
- SG-4.9
- SG-4.15
- SG-4.15.1
- SG-4.16
- SG-4.17
- SG-4.34

This information is needed to determine compliance with the requirements of 10 CFR Part 74.

NFS Response

The FNMCPs mentioned below are currently being revised, and current plans are to submit them to the NRC in September 2010.

- **SG-4.8**

This safeguards license condition will be incorporated in Section 4.3, Revision 20 of the HEU FNMC Plan and Section 4.1, Revision 7 of the LEU FNMC Plan.

- **SG-4.9**

The 4th paragraph in Section 5.9, Revision 5 will be removed from LEU FNMC Plan. Remove from the Plan "Biases associated with an inventory difference having a net total of less than 9000 grams U-235 for a plant need not be applied as a correction to the inventory difference."

- **SG-4.15**

This safeguards license condition and SG-4.15.1 will be incorporated in Section 4.11, Revision 20 of the HEU FNMC Plan and Section 1.5, Revision 7 of the LEU FNMC Plan.

- **SG-4.15.1**

This safeguards license condition will be incorporated in Section 4.11, Revision 20 of the HEU FNMC Plan and Section 1.5, Revision 7 of the LEU FNMC Plan.

- **SG-4.16**

This safeguards license condition will be incorporated Section 4.3, Revision 20 of the HEU FNMC Plan.

- **SG-4.17**

This safeguards license condition will be incorporated in Section 4.3, Section 4.4, Section 4.4.1.6.3 and Section 4.5.4.5.1, Revision 20 of the HEU FNMC Plan.

- **SG-4.34**

This safeguards license condition will be incorporated in Section 4.7.1, Revision 20 of the HEU FNMC Plan.

RAI 12.4

The following safeguards conditions appear to have expired or no longer be needed. Confirm that these safeguards conditions may be removed from the license:

- SG-3.1
- SG-4.3
- SG-4.21 through SG-4.33
- SG-4.35
- SG-4.36
- SG-5.3 through SG-5.5

This information is needed to determine compliance with the requirements of 10 CFR Part 74.

NFS Response

NFS confirms the license conditions have expired or are no longer needed and may be removed from the license.

RAI 12.5

For safeguards conditions SG-4.13 and SG-4.20, justify why these conditions are necessary; and explain what effect these conditions have on the overall standard error of the inventory difference for the facility.

This information is needed to determine compliance with the requirements of 10 CFR Part 74.

NFS Response

Safeguards conditions SG-4.13 and SG-4.20 continue to be applicable to NFS' operations. This safeguards condition documents the understanding between the NRC and NFS regarding SEID. The effect of these safeguards conditions on the overall SEID for NFS is insignificant. NFS proposes the current safeguards condition wording be added as Items "i" and "j" under 1.2.5.9 as shown in the response to RAI #12.1.

RAI 12.6

Justify the need for safeguards condition SG-4.14, and either amend the FNMCPs described in SG-5.1 and SG-5.2 to define what qualifies a system to be bias-free or identify where this information can be found in the FNMCPs.

This information is needed to determine compliance with the requirements of 10 CFR Part 74.

NFS Response

Safeguards condition SG-4.14 continues to be applicable to NFS' operations. The definition of bias-free is described in the 4th paragraph of Section 4.4.1.10 of the HEU FNMC Plan and Section 4.3.2 of the LEU FNMC Plan. NFS proposes the current safeguards condition working be added as Item "f" under 1.2.5.9 as shown in the response to RAI#12.1. The HEU FNMC Plan is currently being revised, and current plans are to submit it to NRC in September 2010.

RAI 12.7

Evaluate the need for SG-4.19 to remain as a safeguards condition. Determine if this procedure is explained in the approved "Physical Safeguards Plan" and whether this information could be incorporated into the FNMCPs referenced in SG-5.1 and SG-5.2. If it is necessary to keep SG-4.19 as a safeguards condition, provide justification.

This information is needed to determine compliance with the requirements of 10 CFR Part 74.

NFS Response

Safeguards condition SG-4.19 continues to be applicable to NFS' operations. This safeguards license condition will be incorporated in Section 4.11, Revision 20 of the HEU FNMC Plan. The safeguards condition may be removed from the license. The HEU FNMC Plan is currently being revised, and current plans are to submit it to NRC in September 2010.