



NUCLEAR FUEL SERVICES, INC.
a subsidiary of The Babcock & Wilcox Company

- 1205 banner hill road ■ erwin, tn 37650 ■ phone 423.743.9141
- www.nuclearfuelservices.com

21G-11-0145
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ACF-11-0233

August 1, 2011

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 B. Marie Moore to the NRC, dated September 18, 2009, (21G-09-0141), Response to Request for Additional Information Concerning Section 11.8 of SNM-124 License Renewal Application
 - 4) Letter from NRC to Mark P. Elliott dated June 15, 2010, (TAC No. L32830), Request for Additional Information Concerning License Renewal
 - 5) Letter from Mark P. Elliott to NRC, dated August 16, 2010, (21G-10-0163), Response to the Request for Additional Information Concerning License Renewal for SNM-124

Subject: Revised Chapters 2, 7, 10, and 11 for Renewal of SNM License 124

Nuclear Fuel Services, Inc. (NFS) hereby submits the following revised chapters for the renewal of SNM License 124:

- Chapter 2 – Organization and Administration
- Chapter 7 – Fire Safety
- Chapter 10 - Decommissioning
- Chapter 11 – Management Measures

Attachments 1 through 4 contain proposed changes to incorporate the responses to the Request for Additional Information (Reference 5). Section 11.8 was previously updated (Reference 3) and is not shown as a "change" in this submittal. Changes are denoted with lines in the right hand margin of the pages.

In addition, the revised Chapter 11 includes proposed changes previously discussed with your staff to formally designate the Change Control Board (CCB) as being responsible for review of major changes. This resulted from experience gained while implementing Program enhancements in response to Configuration Management (CM) related commitments from License Amendment #82, dated May 22, 2008. One

additional change was made to Section 11.1.9 – detailed examples were removed to provide the flexibility to add/delete CM Program metrics as company needs change.

A brief summary of the changes is included below.

Chapter 2

- Throughout – removed references to vice-president because that terminology is no longer being used, and updated section references as needed.
- Section 2.3.1 – updated in response to RAI 2.2.
- Sections 2.3.2 and 2.3.4 – updated in response to RAI 2.1, and to reflect recent organizational changes.
- Section 2.3.4.1 – created a new subsection by moving existing content from Section 2.3.8 (Revision 0) to reflect a recent organizational change.
- Section 2.3.5.2 – updated in response to RAI 4.1, 4.3, and 4.4.
- Section 2.3.5.4 – added reference to “emergency response team,” and moved reference to the fire protection program to Section 2.3.5.5 to reflect recent organizational changes.
- Section 2.3.5.5 – moved reference to the fire protection program from Section 2.3.5.4 to reflect a recent organizational change.
- Section 2.4 – all changes in this section relate to the CCB changes mentioned above.
- Figure 2-1 – updated in response to RAI 2.1.

Chapter 7

- Section 7.2.1 – updated to reflect recent organizational changes.
- Section 7.4.1 – updated in response to RAI 7.1 and 7.2.

Chapter 10

- Section 10.2 – updated to reflect the most recent Decommissioning Cost Estimate submitted in December, 2009, and approved in May, 2011.
- Section 10.3.2 – updated to correct an omission.
- Section 10.5 – updated in response to RAI 1.6.

Chapter 11

- Section 11.1.5 (2nd to last paragraph) – updated to clarify actual responsibility.
- Section 11.1.9 – removed detailed examples to provide the flexibility to add/delete CM Program metrics as company needs change.
- Section 11.2.4 – updated in response to RAI 11.2.
- Section 11.4.6 – updated in response to RAI 4.5.
- All other changes shown in Chapter 11 relate to the CCB changes mentioned above.

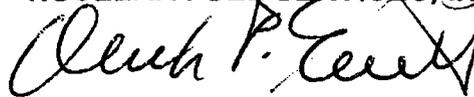
Finally, Attachment 5 contains supplemental information regarding the response to RAI 7.1.

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If you or your staff have any questions, require additional information, or wish to discuss this, please contact me, or Ms. Jennifer Wheeler, Licensing and ISA Manager, at (423) 743-5429. Please reference our unique document identification number (21G-11-0145) in any correspondence concerning this letter.

Sincerely,

NUCLEAR FUEL SERVICES, INC.

A handwritten signature in black ink, appearing to read "Mark P. Elliott", written over the printed name.

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

DML/pdj

- Attachment 1: SNM-124, Chapter 2, Revision 1, dated July 29, 2011
- Attachment 2: SNM-124, Chapter 7, Revision 1, dated July 29, 2011
- Attachment 3: SNM-124, Chapter 10, Revision 1, dated July 29, 2011
- Attachment 4: SNM-124, Chapter 11, Revision 1, dated July 29, 2011
- Attachment 5: RAI 7.1 (Additional Information Discussed at 1/13/2011 Meeting)

Copy:

Regional Administrator
U.S. Nuclear Regulatory Commission
Region II
245 Peachtree Center Ave., NE, Suite 1200
Atlanta, GA 30303-1257

Mr. John Pelchat
Project Inspector
U.S. Nuclear Regulatory Commission
Region II
245 Peachtree Center Ave., NE, Suite 1200
Atlanta, GA 30303

Mr. Kevin Ramsey
Project Manager
Fuel Manufacturing Branch
Fuel Facility Licensing Directorate
Division of Fuel Cycle Safety and Safeguards
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Mr. Galen Smith
Senior Resident Inspector
U.S. Nuclear Regulatory Commission

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Attachment 1

SNM-124, Chapter 2, Revision 1

dated August 1, 2011

(13 pages to follow)

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CHAPTER 2**

**ORGANIZATION AND ADMINISTRATION
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ORGANIZATION AND ADMINISTRATION

2.1 General Safety Policy and Responsibilities

It is NFS' policy that radiation exposures to employees and the general public be kept as low as reasonably achievable (ALARA). Responsibility for safety in the various production lines, processes, and services is delegated to the lowest practical level of supervision. Safety is the responsibility of each supervisor within his own area. Through training and periodic retraining, each individual, regardless of position, is made aware that safety in his work area is ultimately his responsibility.

2.2 Site Organization

The NFS corporate organization provides the management, administrative, and technical capabilities for ensuring that NFS site operations utilizing SNM are conducted in a manner that is protective of its workers, the public, and the surrounding environment, and remain in compliance with applicable Federal, State, and local regulations, licenses, and permits. This responsibility is implemented through the functional disciplines of production, decommissioning, engineering, safety, material control and accountability, security, and quality assurance, as described in the sections below, all of which have safety-related responsibilities. Figure 2-1 shows the current NFS functional organization.

The management positions for each discipline together have the delegated responsibility for plant safety and for compliance with conditions of SNM licenses and with federal, state, and local regulations and laws governing operation of a nuclear facility in order to maintain a safe work place for all employees. Each discipline management team is responsible for

- ensuring that all activities in their area are performed in a safe and effective manner;
- managing and directing operations within their discipline;
- ensuring that all operations under its guidance comply with safety and license conditions, requirements for quality-related safety activities, and safety-related configuration management requirements;
- being knowledgeable of the safety procedures and programs as they relate to their area of responsibility; and
- developing, approving, and implementing procedures that incorporate safety and quality controls and limits commensurate with the particular operation involved.

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2.3 Organizational Responsibilities, Authority, and Qualifications

This section describes the functional responsibilities, education, and experience of key positions required by this license.

Key personnel are those individuals who are responsible for safety and for safe operation of the site and include the president and the senior managers of the disciplines described in this section. Senior managers include discipline directors and managers that meet the qualifications specified below. Company policy requires written delegation of authority when senior managers are unavailable to perform their duties. The emergency plan delineates responsible management personnel and reporting relationships for handling site emergency situations.

The positions described in this section are intended to be generic in nature and do not reflect specific organizational titles or jobs. The responsibilities of the positions described may be fulfilled by one or more different organizational positions as long as the minimum position qualifications specified in this chapter are met.

2.3.1 President

The president, or the 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 director positions specified in Sections 2.3.2 and 2.3.5.

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.

2.3.2 Production

The Production Discipline is responsible for production-related activities involving the handling and processing of special nuclear material, including developing operating procedures and maintaining facilities and equipment in a safe operating condition. This discipline includes activities associated with product research and development, process engineering, enriched uranium processing, transportation and waste management, and related equipment installation, start-up, and maintenance. This discipline manages a majority of the hourly work

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force, and has line management responsibility for implementation of the safety programs and systems for conducting an active ALARA Program.

The qualifications for a production discipline director 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 supervisory position in the nuclear industry or reactor operations.

The minimum qualifications for a production discipline manager are a BS/BA degree and at least five years experience in production-related activities, two years of which have been in the nuclear fuel cycle.

2.3.3 Decommissioning

The Decommissioning Discipline develops plans for the decommissioning of facilities and equipment, writes and obtains approval of procedures to conduct decommissioning, obtains any special equipment and/or facilities needed for decommissioning, and assures that decommissioning activities are conducted in accordance with approved documents and in the spirit and intent of ALARA.

The minimum qualifications for a decommissioning discipline manager are a BS/BA degree and at least five years experience in decommissioning-related activities, two years of which have been in the nuclear fuel cycle.

2.3.4 Engineering

The Engineering Discipline designs and installs new and modified facilities and equipment; supplies maintenance and process engineering support; conducts activities associated with product research and development; and assures that all equipment and facilities have appropriate safety controls and have been evaluated within the spirit and intent of ALARA.

The minimum qualifications for an engineering discipline manager are a BS/BA degree in science or engineering and at least five years experience in engineering-related activities, two years of which have been in the nuclear fuel cycle.

2.3.4.1 Configuration Management

The Configuration Management function is responsible for establishing consistency among design and regulatory requirements, physical configuration, and facility configuration information; and for maintaining this consistency

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throughout the life of the facilities and activities until the point that CM is no longer needed.

The minimum qualifications for a CM function manager are a BS/BA degree and at least five years experience understanding CM requirements (understanding document control, equipment identification, change control, etc.), two years of which have been in the nuclear fuel cycle.

2.3.5 Safety

The Safety Discipline provides programs, procedures, and reviews to assure worker health and safety; environmental protection; and compliance with licenses and permits. These activities are conducted with the ALARA principle in mind. Functional areas include nuclear criticality safety, radiation protection, industrial safety, chemical safety, fire protection, environmental protection, emergency preparedness, licensing, and integrated safety analysis. 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 re-start 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. The Safety Discipline is responsible for overseeing the safety review committee, and as such provides a manager to fill the role of the chairman. The ISA process is supported by each functional area providing ISA Team members as needed.

The qualifications for a safety discipline director 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 supervisory position in the nuclear industry or reactor operations.

The qualifications for a safety discipline manager are a BS/BA degree in science or engineering with at least eight years experience in applied health physics and/or nuclear safety. An MS degree in radiological physics or nuclear engineering may be substituted for two years of the experience.

2.3.5.1 Nuclear Criticality Safety Function

The nuclear criticality safety function has responsibility for the development and implementation of a comprehensive nuclear criticality safety program, as defined in Chapter 5. Key responsibilities include the performance of nuclear criticality evaluations of applicable SNM operations and proposed changes to those operations; establishing limits and controls based on those evaluations; assuring

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the proper incorporation of limits and controls into applicable procedures and work instructions; and monitoring plant compliance with the nuclear criticality safety requirements through inspections and audits.

The qualifications for the manager of the nuclear criticality safety function are a BS/BA degree in science or engineering and at least three years experience in nuclear criticality safety.

The qualifications for a nuclear criticality safety senior member are a BS/BA degree in science or engineering and at least three years experience in criticality safety work. The qualifications for a criticality safety junior member are a BS/BA degree in science or engineering and at least one year of experience in criticality safety work.

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

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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.

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

2.3.5.3 Environmental Protection Function

The environmental protection function has responsibility for establishing and maintaining the environmental protection program necessary to ensure the protection of the public and the environment, as defined in Chapter 9. Key responsibilities include identification of environmental requirements of federal, state, and local regulations governing NFS' operations; assurance of proper federal and state permits, licenses, and registrations for radiological and non-radiological discharges from the facility; analysis and approval of operations involving potential environmental releases and proposed changes to those operations; establishing environmental protection criteria, procedures, and training programs to monitor gaseous and liquid effluents; and monitoring plant compliance with the environmental protection criteria through inspections and audits.

The qualifications for the manager of the environmental protection function are a BS/BA degree in science, or equivalent experience, and at least three years experience in applied health physics or environmental protection.

The qualifications for an environmental protection analyst are a BS/BA degree in science, or equivalent experience, and at least one year of applied health physics or environmental protection experience.

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2.3.5.4 Industrial Safety Function

The industrial safety function has responsibility for industrial hygiene or chemical safety; industrial safety; respiratory protection; and the emergency response team. Key responsibilities include analysis and approval of operations involving industrial safety and proposed changes to those operations; establishing industrial safety criteria, procedures, and training programs to protect the workers from industrial hazards; and monitoring plant compliance with the industrial safety/hygiene program through inspections and audits.

The qualifications for the manager of the industrial safety function are a BS/BA degree in industrial hygiene, or safety, or other appropriate field, and at least three years industrial experience in fire protection, respiratory protection, industrial hygiene, or other closely related areas.

The requirements for advanced industrial safety specialist positions are a BS/BA degree with specialized training in environmental health, fire protection, industrial safety/hygiene, or closely related field, and at least three years of industrial safety experience. Lower level positions require at least two years of industrial safety or equivalent plant experience. Only personnel knowledgeable in hazards evaluation and control methods for chemical process safety will perform chemical process safety reviews.

2.3.5.5 Licensing and Integrated Safety Analysis Function

The licensing function has overall responsibility for acquiring and maintaining safety-related licenses as required to operate facilities at the NFS site, as well as the broad responsibility for interface with regulatory agencies.

The integrated safety analysis function has the overall responsibility for the ISA program, as defined in Chapter 3. Key responsibilities include the performance of chemical, radiological, and fire evaluations of applicable SNM operations and proposed changes to those operations; establishing IROFS based on those evaluations; assuring the proper incorporation of IROFS into applicable procedures and work instructions; coordinating updates to the ISA; and monitoring plant compliance with ISA requirements through inspections and audits. The ISA function also has responsibility for managing the Safety Related Equipment program for functionally testing IROFS on a periodic basis, as defined in Chapter 11, as well as the fire protection program defined in Chapter 7.

The qualifications for the manager of the licensing and/or ISA functions are a BS/BA degree in science or engineering and at least three years experience in

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licensing, regulatory compliance, safety, or safety analysis in the nuclear or another highly regulated industry.

2.3.6 Material Control and Accountability

The Material Control and Accountability (MC&A) Discipline maintains programs to assure that SNM is received, processed, stored, and transferred in accordance with federal regulations, and implements these functions through the areas of SNM safeguards, SNM accountability, shipping, receiving, and warehousing.

The minimum qualifications for an MC&A discipline manager are a BS/BA degree and at least five years experience in MC&A-related activities, two years of which have been in the nuclear fuel cycle.

2.3.7 Security

The Security Discipline provides on-site security forces which control access to protected and material access areas; administers facility and personnel security clearance programs and protects against material and equipment theft and unauthorized personnel entry.

The minimum qualifications for a security discipline manager are a BS/BA degree and at least five years experience in security-related activities, two years of which have been in the nuclear fuel cycle.

2.3.8 Quality Assurance

The Quality Assurance Discipline assesses systematic programs for indoctrination and training of personnel performing quality-related safety activities; for specifying during the design phase the extent of quality assurance or confidence necessary for quality-related safety structures, systems, and components; and for performing audits, surveillances, and assessments of quality-related safety activities. The quality assurance program is based on, but is not limited to, applicable requirements and guidance such as ASME NQA-1, MIL-Q-9858A, or other similar guidance. The quality assurance discipline is administratively independent of operations, and has no other duties or responsibilities unrelated to quality assurance that would interfere with carrying out the duties of this discipline.

The qualifications for a quality assurance discipline director are a BS/BA degree in science or engineering and ten years of experience in industry or nuclear

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reactor operations – five of which have been in a supervisory position in the nuclear industry or reactor operations.

The qualifications for a quality assurance discipline manager are a BS/BA degree and at least five years experience in quality assurance-related activities, two years of which have been in the nuclear fuel cycle.

2.4 Safety Review Committee

The safety review committee membership includes senior managers of the following disciplines:

- Production;
- Engineering;
- Safety;
- Material Control and Accountability; and,
- Security.

The chairman, other committee members, and their alternates, are appointed by the president, or the director authorized to be his alternate. At a minimum, the chairman is required to have the qualifications specified for a safety function manager, and the other committee members are required to have the qualifications specified for a discipline manager. Members of the safety review committee, as identified above, have completed training in incident investigation methods, and the completion of the training is documented.

The committee is responsible to the president, or the director authorized to be his alternate, who retains overall authority for the approval or disapproval of committee actions.

The authority and responsibilities of the full safety review committee include the following:

- Reviewing proposed license changes affecting safety, physical security, and/or material control and accountability before the associated license amendment applications are submitted to the NRC.
- Reviewing the ALARA program for at least the following:
 - ❖ Trends in air activity,
 - ❖ Cumulative exposure,
 - ❖ Engineering design and personnel work practices.
- Working with the safety discipline to implement the ALARA program.
- Reviewing results of safety inspections, audits, and investigations which the license requires be conducted.

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- Reviewing all violations of regulations or license conditions having safety significance.

The chairman of the safety review committee, with concurrence of the remaining committee members, is authorized to select individual committee members to review and approve new or revised operating and general safety procedures. However, the review and approval of such procedures, as described herein, include at a minimum the initiating discipline manager, the safety discipline manager, and the appropriate safety review committee members, as selected by the safety review committee chairman. If an active procedure has not been revised within a three-year period, the chairman may select individual committee members to review the procedure to ensure it remains current and relevant.

The committee will meet at the following frequencies:

- to discuss topics such as proposed license changes – as needed;
- to discuss ALARA considerations – at least semiannually;
- to review license-required safety inspections, audits, investigations, and violations of regulations or license conditions – at least quarterly.

Its proceedings, findings, and recommendations will be documented in writing and made available to the president, discipline directors, and discipline managers. Such reports will be retained for at least five years. Records of procedural changes will be maintained for a minimum of five years.

The chairman of the safety review committee, with concurrence of the remaining committee members, is authorized to select individual committee members to review and approve new or revised operating and general safety procedures. However, the review and approval of such procedures, as described herein, include at a minimum the initiating discipline manager, the safety discipline manager, and the appropriate safety review committee members, as selected by the safety review committee chairman. If an active procedure has not been revised within a three-year period, the chairman may select individual committee members to review the procedure to ensure it remains current and relevant. Records of procedural changes will be maintained for a minimum of five years.

Committee review of matters other than the bulleted items above may be conducted by either individual review or collectively at a meeting; however, individual members of the committee have the authority to request a meeting of the entire committee on any given matter.

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2.5 Administration

2.5.1 Reporting of Potentially Unsafe Conditions or Activities

A problem identification system is available for any person at the NFS site to report potentially unsafe conditions or activities to the Safety Discipline. The concern is entered in the system, and processed through a screening committee with Safety Discipline representation. The screening committee assigns the issue to an owner and defines follow-up investigation/evaluation requirements. Corrective actions are assigned and tracked to completion. The Corrective Action Program is discussed further in Chapter 11.

2.5.2 Management Measures

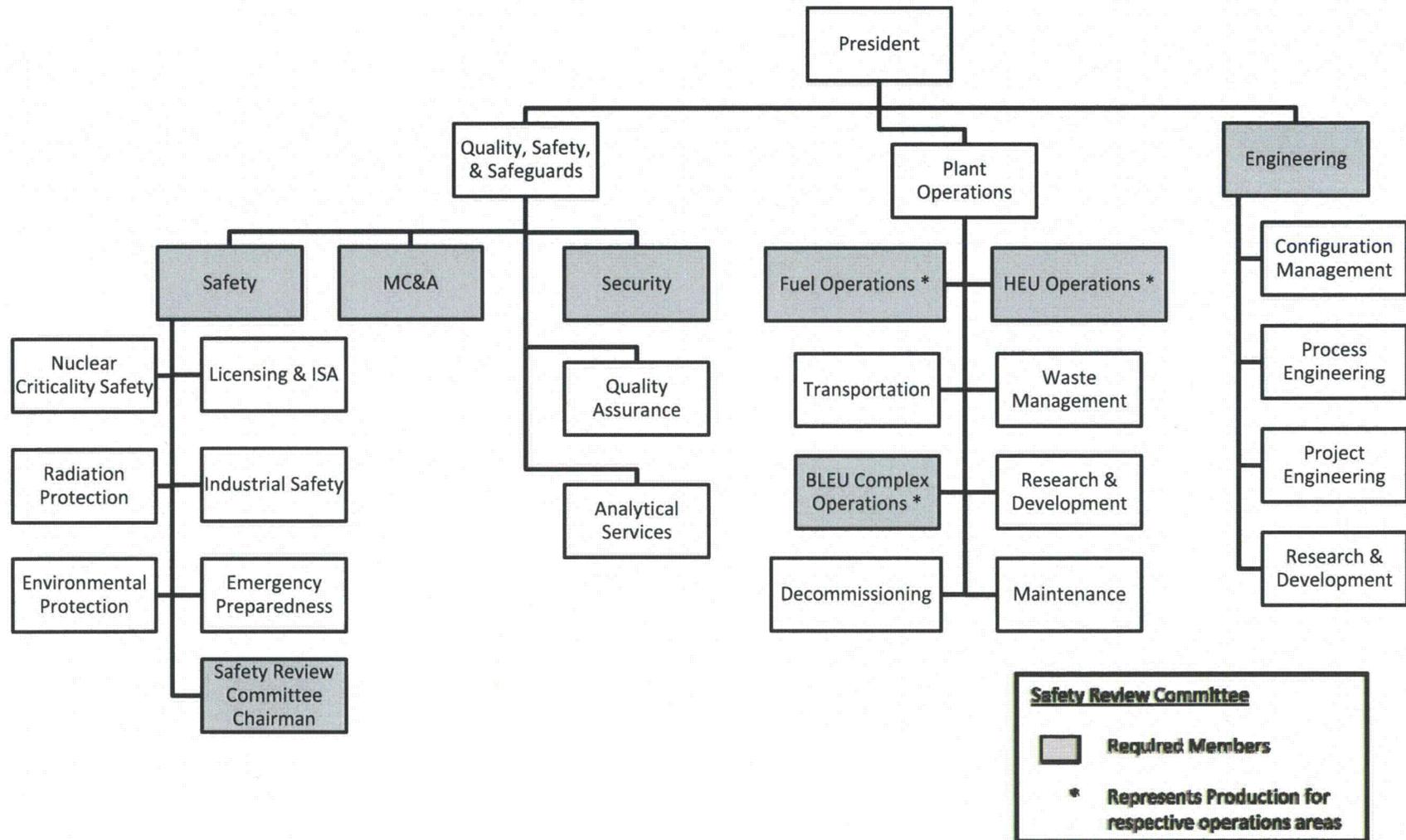
Management measures that ensure the reliability and availability of IROFS are established as described in Chapter 11.

2.5.3 Off-Site Emergency Response Resources

Written agreements with off-site emergency response organizations are described in Chapter 8.

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Figure 2-1: Functional Organization Chart



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Attachment 2
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CHAPTER 7**

**FIRE SAFETY
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FIRE SAFETY

7.1 Fire Safety

The NFS fire protection program is designed to minimize the potential for and provide reasonable protection against fire and explosive hazards associated with the processing, handling, and storage of licensed materials during normal operations, anticipated operational off-normal occurrences, and credible accidents. As part of the integrated safety analysis (ISA) process described in Chapter 3, area operations are evaluated for the potential for, and consequences of, fire and explosive hazards. Where these consequences could exceed the performance requirements in 10 CFR 70.61, IROFS are assigned. These IROFS are identified and controlled as described in the ISA Summary and in written procedures.

In addition to the fire hazards analyses prepared to support the ISA process, NFS has a general fire safety program that includes general fire safety management measures, facility design requirements, and general fire protection and emergency response measures. Guidance from NFPA 801 and the following documents, as applicable, are used to develop the fire protection program: Southern and International Building Codes, NFPA Codes and Standards, and Code of Federal Regulations, Title 29, Parts 1910 and 1926 applicable to the year of construction. Applicable NFPA Codes are also used on the NFS site for installation, maintenance, and testing of fire protection systems and equipment.

7.2 Fire Safety Management Measures

7.2.1 Fire Safety Organization

The safety discipline director is the senior manager who has the authority and staff to ensure that fire safety receives appropriate priority. He/she serves as the Authority Having Jurisdiction (AHJ) for the fire protection program and is consulted regarding any NFPA code conflicts. Within the safety discipline, the responsibility for fire safety design bases, hazard analyses, and day-to-day fire protection program implementation is assigned to the ISA function. The responsibility for safety work permits, the emergency response team, pre-fire plans, and associated procedures is assigned to the Industrial Safety function. The organization structure and qualification requirements of these management functions are described in Chapter 2.

The manager of the ISA function is responsible for the day-to-day oversight of the fire protection program in all areas of the NFS site. This includes ensuring that the

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necessary fire safety training is provided to employees, making them aware of any applicable fire safety related IROFS, as well as the periodic testing and maintenance of fire detection and protection systems, in accordance with written procedures.

The configuration management program assures that any plant changes are properly evaluated with regard to the impact upon fire safety and documented within the plant safety bases. New facilities and processes are reviewed by the facility safety review committee.

7.2.2 Fire Prevention

7.2.2.1 Employee Training

General fire safety awareness training is administered to each employee as part of their general employee training. Applicable IROFS training is provided as part of job specific training.

7.2.2.2 Facility Audits and Inspections

Facility audits and inspections are performed routinely for facilities containing licensed materials in a quantity and form that could cause at least an intermediate consequence as defined in 10 CFR 70.61 if totally consumed by fire. These inspections are detailed in written procedures. Items identified are entered into the plant's problem identification system and tracked to closure.

7.2.2.3 Fire Prevention Procedures

NFS maintains written procedures for the administration of the general fire prevention program.

Fire safety procedures address areas such as the storage and handling of combustible, flammable, and pyrophoric materials; and the review and issuance of permits for all work performed in the plant which might provide a source of ignition, such as welding and cutting.

7.2.3 Inspection, Testing, and Maintenance of Fire Protection Systems

Procedural guidance is established for the inspection, testing, and maintenance of fire protection systems routinely performed by NFS personnel. These procedures are applied to fire detection, warning, and suppression systems. Records of these

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activities and of outside vendor inspections are maintained by the Industrial Safety function.

7.2.4 Emergency Response Organization

NFS maintains an emergency response organization in accordance with 10 CFR 70.22 and is described in written procedures. These procedures outline the overall emergency response program, including but not limited to staffing, training, drills and exercises, response measures, and offsite agency coordination. The Emergency Preparedness program, as described in Chapter 8, includes memorandums of understanding between NFS and off-site agencies, and addresses periodic off-site training and drills. The NFS emergency brigade is discussed in Section 7.6.8.

7.2.5 Pre-Fire Plans

NFS maintains pre-fire plans for each facility, or part thereof, that, if totally consumed by fire, could release SNM in a quantity and form that could cause at least an intermediate consequence as defined in 10 CFR 70.61. These pre-fire plans provide information needed by fire fighting personnel responding to the emergency and are located for ready access by the plant emergency response team and local fire departments who may respond to an emergency at NFS.

7.3 Fire Hazard Analyses

Fire Hazard Analyses (FHAs) are developed to address the requirement for facility-related FHAs as outlined in NFPA 801, "*Standard for Fire Protection for Facilities Handling Radioactive Materials.*" These documents are prepared for the NFS facilities that are involved in the processing or storage of nuclear materials in sufficient quantities and in a form that, if released in a fire, could result in an intermediate or high consequence event as defined in the ISA summary.

FHAs are a component of the ISA process, as described in Chapter 3. FHAs focus on bounding fire scenarios of fire areas within buildings and consider fire loading, the consequences and analysis of an unmitigated fire, and mitigating controls. Fire and/or explosion hazards which have the potential to create high or intermediate consequences as defined in 10 CFR 70.61 are controlled via the application of appropriate IROFS. These IROFS are documented in the ISA Summary as described in Chapter 3. Management measures that ensure the reliability and availability of IROFS are established as described in Chapter 11.

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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.

7.5 Process Fire Safety

Process fire safety is considered in the planning, design, and construction of new facilities and processes. The fire risk associated with new and existing process parameters are evaluated and documented by the ISA process. The ISA evaluates the special fire risk associated with:

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- Combustible, flammable, and pyrophoric process chemicals (solids, liquids, gases), in use and in storage;
- Exothermic reactions of uranium oxides;
- High temperature and/or high pressure equipment;

Process related fire hazards are controlled with IROFS to the extent necessary to meet the performance requirements of 10 CFR 70.61.

7.6 Fire Protection and Emergency Response

7.6.1 Water Supply

Plant fire protection water is provided through a loop system with two 8-inch connections to the City of Erwin Water Distribution System. Details of the fire protection water supply are contained in written procedures.

7.6.2 Hydrants and Hose Houses

Numerous hydrants are provided throughout the fire protection loop. Locations are such that they allow ready access for quick use when needed to assist in fire fighting. In addition, several hose houses are provided on major process building roofs and in inaccessible areas.

7.6.3 Fixed Fire Protection Systems

Fixed fire protection systems, including automatic sprinkler, carbon dioxide, and Halon systems, are utilized throughout the plant. Automatic systems are located in various facilities as detailed in written procedures.

7.6.4 Fixed Fire Detection Systems

Several areas within the plant are equipped with fixed fire detection systems. Fire detection systems located in various facilities are detailed in written procedures.

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7.6.5 Portable Fire Extinguishers

Portable fire extinguishers are located throughout the NFS site, and are maintained based on written procedures. The types of portable fire extinguishers available at the site include, but are not limited to, CO₂, dry chemical, and class D.

7.6.6 Plant General Alarm

In addition to the various fixed protection and detection systems, the plant has a plant-wide manual pull-box fire alarm capability. All plant-wide fire protection, detection, and alarm systems are integrated into the plant's central alarm panel. As a result, this system is equipped with an uninterruptible power supply (UPS).

7.6.7 Lightning Protection

The HEU Fuel and BLEU Production Facilities have been outfitted with lightning protection systems as specified in the Lightning Protection Code, NFPA 780.

7.6.8 Emergency Response Team

NFS maintains an emergency brigade which functions as an emergency response team. The emergency response team is an organized group of employees who are knowledgeable, trained, and skilled in basic fire-fighting operations, first aid techniques, and emergency response in accordance with NFPA 600. Training and education are provided for team members commensurate with those duties and functions that they are expected to perform. NFS relies on support from offsite firefighting resources when sufficient onsite emergency response team staffing is unavailable or when additional support is warranted.

The site Emergency Preparedness program, as described in Chapter 8, includes memorandums of understanding between NFS and off-site agencies, and addresses periodic off-site training and drills.

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Attachment 3
SNM-124, Chapter 10, Revision 1
dated August 1, 2011

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DECOMMISSIONING

10.1 Decommissioning Funding Plan (DFP)

NFS has a DFP that contains the elements called for in 10 CFR 70.25(e), including a decommissioning cost estimate; a description of the methods used to assure funds for decommissioning are available when needed; a means for adjusting the cost estimate and associated funding levels periodically over the life of the facility; and, when applicable, certification that financial assurance has been provided in amounts that cover the current estimates for decommissioning. The DFP addresses the decommissioning of facilities with potential for contamination with licensed materials at the Erwin, Tennessee site.

10.2 Decommissioning Cost Estimate

NFS will review and update the decommissioning cost estimate in accordance with 10 CFR 70.25(e) at an interval not to exceed three (3) years. NFS' Decommissioning Cost Estimate was most recently updated and submitted to NRC on December 1, 2009. NRC completed their review and accepted the updated estimate on May 27, 2011.

10.3 Financial Assurance for Decommissioning

Financial assurance for decommissioning-related activities will be provided by a method authorized in 10 CFR 70.25(f), and will be in place prior to introducing licensed material that could contaminate new equipment or facilities. An outline of the types of financial assurance methods currently in use by NFS is included below.

10.3.1 U.S. Government Funding Method

An exemption to the financial assurance requirements of 10 CFR 70.25(f) for decommissioning of certain facilities used for U.S. Government projects can be found in Chapter 1.

- a. Due to NFS contracts to manufacture items containing radioactive material for the U.S. Department of Energy (USDOE), the U.S. Government has agreed to pay expenses incurred in decommissioning NFS' facilities and grounds. A copy of the relevant clauses from the NFS/USDOE Contract which sets forth the U.S. Government assumption of liability for decommissioning NFS' facilities is included as Appendix 10A.

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- b. Due to NFS contracts to manufacture items containing radioactive materials, pursuant to the U.S. Department of Energy (USDOE) and Tennessee Valley Authority (TVA) Interagency Agreement, the U.S. Government has agreed to pay expenses incurred in decommissioning of certain NFS equipment and facilities related to the BLEU project. A copy of the relevant clauses from the USDOE/TVA Interagency Agreement which sets forth the U.S. Government assumption of liability for decommissioning NFS' equipment and facilities is included in Appendix 10B.

10.3.2 Surety Method – Letters of Credit

NFS has Letters of Credit and Standby Trust Agreements in place for decommissioning of the following facilities or portions thereof:

- Building 333 (BPF)
- Buildings 510, 520, 530 (BLEU Complex)
- Building 301 (CDL)
- Building 440 (LEU Dilution and Loading Facility)

10.4 Recordkeeping for Decommissioning

In accordance with 10 CFR 70.25(g), NFS will maintain records important to the decommissioning of the facilities on the site until the site is released for unrestricted use.

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:

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- 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).

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APPENDIX 10A

**EXCERPTS FROM NFS/DOE CONTRACT
No. DE-NR00003**

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APPENDIX 10A

**EXCERPTS FROM NFS/DOE CONTRACT
No. DE-NR00003**

H.18.2 Decommissioning Escrow Account

The Contractor is authorized to retain \$5,000,000 in the Source and Special Nuclear Material Decommissioning Escrow Fund as a revolving account for the acquisition of certain capital assets or for other purposes as approved by the Contracting Officer. Capital acquisitions from this account must meet NFS' disclosed accounting practices and either be directly related to completing the decommissioning work or required to maintain facilities needed for support of the decommissioning work. The Contractor will depreciate these assets in accordance with its disclosed accounting practices and funds received from payment of depreciation charges will be deposited in the Source and Special Nuclear Material Decommissioning Escrow Fund. This revolving account will continue in existence until the Government has satisfied its obligation under Paragraph H.18.5. At that time, the balance in the revolving account, including all income earned, will be paid to the Government as directed by the Contracting Officer.

H.18.5 Statement of Government Liability

- (a) As part of the consideration for the manufacture and delivery of all items under this contract, the Government hereby assumes the obligation to pay the expenses incurred in decommissioning NFS' facilities as required by NFS' License with the Nuclear Regulatory Commission (NRC). The government's liability for said payments is subject to the availability of appropriated funds at the time a contingency occurs. When said event occurs, the DOE will pursue the necessary funding, however, nothing in this contract shall be construed as implying that the Congress will, at a later date, appropriate funds sufficient to meet said deficiencies.
- (b) In making such payments, the Contractor shall use reasonable and prudent fiscal and operational judgments to reduce the overall cost of decommissioning activities. Any disagreement between the parties concerning this provision shall be considered a dispute within the terms of the "Disputes" clause of this contract.
- (c) This provision shall survive the completion of the contract and shall continue until decommissioning is completed as determined by the NRC

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or any successor agency, or until alternative arrangements are agreed by the parties, in separate contracts, or otherwise.

**H.18.7 Memorandum of Understanding (MOU) Concerning
Decommissioning of the NFS Erwin Facilities**

(a) The following clarifies responsibilities under Paragraph H.18.5 (and earlier contracts containing this same provision) with regard to future activities of NFS that may affect the decommissioning of the NFS Erwin facilities as required by NFS' license with the Nuclear Regulatory Commission (NRC):

(1) The Government is not obligated and shall not be liable under Paragraph H.18.5 for the expenses related to:

(i) Decommissioning any NFS Erwin facilities which are acquired or added to the NFS site after March 1, 1992, and which are utilized for non-Naval Reactors activities;

(ii) Decommissioning any currently non-contaminated portion of the NFS Erwin facilities where non-Naval Reactor activities occurring after December 8, 1992, give rise to the need for decommissioning;

(iii) Decommissioning any NFS Erwin facility that has been decommissioned in accordance with the provisions of H.18.5 and is subsequently recontaminated due to the use of this facility for non-Naval Reactors activities.

(2) In the event:

(i) DOE has the necessary appropriated funds available to decommission the NFS Erwin facilities in accordance with the Paragraph H.18.5 decommissioning schedules; and,

(ii) NFS elects to continue utilizing a particular portion of the Erwin facilities for non-Naval Reactors purposes; and,

(iii) Such use would delay the decommissioning activities delineated in the decommissioning schedules;

then, the parties will negotiate in good faith to determine the Government's specific liability for the decommissioning costs for that portion of the facilities.

(3) In the event:

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- (i) NFS uses, subsequent to the March 1, 1992, an NFS Erwin facility or facilities for non-Naval Reactors purposes; and,
- (ii) The Government is otherwise responsible for decommissioning that facility under Paragraph H.18.5 of the Contract Schedule; and,
- (iii) Such use by NFS increases the scope of the decommissioning work;

then, the parties will negotiate in good faith to determine what the Government's specific liability for decommissioning would have been absent NFS' subsequent use of the facility.

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APPENDIX 10B

**EXCERPTS FROM DOE PRIME CONTRACT
No. DE-SA09-01SR18976/TVA No. P-01N8A-249655-001**

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APPENDIX 10B

**EXCERPTS FROM ARTICLE V FROM THE INTERAGENCY AGREEMENT
BETWEEN THE DOE AND TVA FOR THE OFF-SPECIFICATION FUEL
PROGRAM (DE-SA09-01SR18976/TVA No. P-01N8A-249655-001)**

Clause Article V from the DOE/TVA Contract DE-SA09-01SR18976/TVA No. P-01N8A-249655/001

Article V – DOE Delivery of Highly Enriched Uranium to TVA

- (c) The Department of Energy (DOE) shall reimburse the Tennessee Valley Authority (TVA) for the Actual Cost(s) incurred to process and blend down the 7,400 Kg U of HEU in the form of U-Al alloy ingots and 5,900 Kg U of HEU in various chemical forms. Actual Costs shall include DOE's share of decontamination and decommissioning costs associated with the processing, recovery, and blend down of U-Al alloy ingots and the HEU in various other chemical forms. DOE's share of decontamination and decommissioning costs shall be limited to equipment and facilities used solely for processing and blending down of the 13,300 Kg U of HEU. TVA shall not finalize its contract with its contractor for this service until after TVA has submitted the relevant portion of the contract and price justification to DOE for review and has received DOE's written concurrence. TVA shall invoice DOE for the Actual Cost(s) incurred for such HEU processing, recovery, and downblending. DOE shall promptly pay such invoices within 30 days of receipt.

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Attachment 4
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MANAGEMENT MEASURES

Management measures are applied to activities involving the handling of SNM, generally on a continuing basis, to ensure protection of the safety and health of workers, the public, and the environment. As specified in 10 CFR 70.62(d), management measures are also applied to items relied on for safety (IROFS) to provide reasonable assurance that they remain available and able to perform their functions when needed.

The ISA Summary identifies IROFS applied to plant operating systems to assure those systems function within the performance requirements of 10 CFR 70.61. IROFS may be engineered controls (passive or active), enhanced administrative controls (active features that prompt a person to take an action), or administrative controls (actions of people). Management measures are applied to IROFS using a graded approach based on the type of control and the reduction of risk credited to that control. Methods used to select and assign management measures to IROFS are documented in written procedures.

11.1 Configuration Management

NFS maintains a Configuration Management (CM) Program to ensure the following objectives are met for selected structures, systems, and components (SSCs), processes, and activities managed by NFS:

- To establish consistency among design and regulatory requirements, physical configuration, and facility configuration information (FCI);
- To maintain this consistency throughout the life of the facilities and activities, particularly as changes are made, until the point that CM is no longer needed, and
- To help assure ongoing protection of the safety and health of workers, the public and the environment.

The NFS CM Program meets the requirements of 10 CFR 70.62(d), 10 CFR 70.64, and 10 CFR 70.72, the objectives and expectations of NUREG-1520, *Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility*, and incorporates key programmatic concepts recommended in ANSI/NIRMA CM 1.0-2007, *Configuration Management of Nuclear Facilities*, and DOE-STD-1073-2003, *Configuration Management*.

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11.1.1 CM Policy

The NFS CM Policy requires establishment of an effective CM Program with clear objectives, defines the scope of the CM Program, documents NFS senior management commitment to CM, designates key NFS organizations with responsibility for implementing the CM Program, and describes the key CM Program functions. The Policy requires that, prior to implementation, changes to IROFS must be evaluated in accordance with the requirements of 10 CFR 70.72(a)(1)-(6), to determine if a license amendment is required in accordance with 10 CFR 70.72(b), and to determine if NRC approval is required in accordance with 10 CFR 70.72(c)(1)-(4). Per 10 CFR 70.72(d)(2), a brief summary of major changes that required revision of the applicable safety or environmental bases will be submitted within 30 days after the end of the calendar year during which the changes occurred.

The CM Program applies to IROFS contained in the Integrated Safety Analysis (ISA) and other structures, systems and components (SSCs) that are required to:

- Physically process, store or transfer more than 350 grams of U-235 as Special Nuclear Material (SNM) contained within the SSC at any given time. Specifically included are the active SNM processing facilities, the SNM storage vaults, the Waste Water Treatment Facility, associated Process Off-Gas Ventilation systems, and bulk chemical and gas storage and supply systems.
- Protect off-site and on-site personnel from nuclear and other hazards, as defined by the facility's ISA;
- Meet regulatory requirements for the physical protection of SNM;
- Protect the environment from significant damage or to satisfy environmental requirements or permits;
- Avoid substantial unplanned interruption of operations having significant cost or quality impact.

CM of computer programs and software applications is not within the scope of the CM Program with the exception of software contained in Programmable Logic Controllers (PLCs). CM of computer programs and software are addressed through the NFS Software Quality Assurance Program (SQAP) which is based on the sections of ASME NQA-1, *Quality Assurance Requirements for Nuclear Facility Applications*, applicable to software.

The IROFS and SSCs that are managed and controlled under the CM Program are identified as Configuration Items (CI). FCI to be managed under the CM Program includes information that reflects the design bases and requirements, performance criteria, physical characteristics, and regulatory requirements (as applicable) of IROFS and SSCs. FCI represents documents, drawings, procedures, and database information that are essential to operate, maintain, test, modify, repair and/or

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replace, and substantiate the safety function(s) or operational/functional requirements of IROFS and SSCs.

The CM Program utilizes a graded approach to apply a level of resources and CM Program elements that are appropriate to the degree of risk to safety. Grading is used: (1) to help define which SSCs, facilities, processes, and activities will be subject to CM, and (2) to define the extent to which CM will be applied, e.g. the degree, rigor and extent to which applicable CM elements and requirements are applied to IROFS, SSCs, facilities, processes, and work activities. Application of the graded approach is based on:

- magnitude of any hazards involved
- magnitude of risks and consequences associated with design basis events
- relative importance of an IROFS to safety (risk and consequence reduction) and security
- importance of an SSC (or administrative control) to continued production operations
- type and technical characteristics of a facility or process
- facility or process operational status
- programmatic and technical issues
- existing programs and procedures

The CM function manager is responsible for the NFS CM Program and has direct responsibility for implementation and ongoing management of the program. All NFS employees, contractors, and organizations including Engineering, Safety, Production, Maintenance, Security, Quality Assurance, Training & Qualification, and Decommissioning are responsible for complying with the CM Program objectives and implementing Program requirements as an integral part of their respective areas of operation.

11.1.2 CM Program

The NFS CM Program includes the following seven (7) elements that are addressed in the following sections:

- Program Management
- Design Requirements
- Change Control
- Information Control
- Assessments
- Training
- Program Metrics

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11.1.3 Program Management

The Program Management element identifies the NFS organizations and associated responsibilities for implementing and managing the CM Program. A CM function manager has been designated to assure the program is effectively implemented and maintained. The CM function is independent of the Production discipline.

The CM Program is applicable to all NFS organizations, including contractors, who perform construction, operation, maintenance, modification, and decommissioning activities associated with NFS facilities, SSCs and processes. Implementation of the CM Program is accomplished through procedures and instructions that delineate the responsibilities and actions of personnel to effectively implement the CM Program elements.

The Change Control Board (CCB) reviews change requests (CRs) to ensure that proper review and identification of items affected by changes have occurred. Typically the CCB serves as a "go/no go" decision maker and may approve, reject, defer or require alternative solutions for changes. The board is chaired by a senior manager and is comprised of other managers representing the Engineering, Safety, and Production disciplines. The chairman, other CCB members, and their alternates, are designated in writing. All CCB members, including the chairman, are required to have the qualifications specified for a discipline manager, as described in Chapter 2.

Other disciplines and organizations such as Material Control and Accountability (MC&A), Decommissioning, and Security are members of the CCB as ad hoc members, and are charged with review of change requests for potential impact to FCI and CI within their areas of expertise.

11.1.4 Design Requirements

The objectives of the Design Requirements element of the CM Program are to: 1) establish, document, maintain and communicate the design requirements and design bases associated with the CI managed under the CM Program, and 2) establish a design control process that effectively translates design inputs (design requirements and bases) into design outputs to implement approved changes and to control changes to design requirements and bases.

The CM Program defines design requirements as engineering or technical requirements reflected in design output information (documents and/or data) that define the form, fit and function of CI (including capabilities, capacities, physical sizes and dimensions, limits, setpoints, etc.) specified and/or approved by the Design Authority and derived from the design bases. The design bases are the set

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of high-level functional requirements, interfaces and expectations of a facility or CI that are based on regulatory requirements, performance requirements and/or analyses. Each design requirement has a design basis whether documented or not.

The design requirements for CI for existing facilities are identified and documented both in electronic databases and/or in hard copy files, and will ultimately reside in a single electronic database. Where the design bases for the design requirements of existing CI may not be fully documented or readily available, the development and/or assembly (reconstitution) of the design bases is determined on a case-by-case basis in accordance with the graded approach discussed in Section 11.1.1 above.

For new facilities, processes/systems, and new CI, design requirements (and design bases) are required to be developed, reviewed, approved, and documented before input of SNM. As a minimum, the baseline design criteria (BDC) identified in 10 CFR 70.64(a) are addressed for IROFS.

Design requirements for CI are reviewed for adequacy (completeness, accuracy, and level of documentation available) when initially established or during changes when design requirements information must be developed. Design requirements (and bases) are approved by the engineering discipline manager as the Design Authority after completion of review and resolution of comments, as applicable, and concurrence by affected stakeholders, e.g., applicable Safety organizations. Review and approval of changes to design requirements (and bases) is conducted in accordance with the CM Program Change Control process (Section 11.1.5).

The level of review for design basis changes assures that all safety and technical aspects of proposed changes do not adversely affect the credited safety functions of IROFS or the operating and/or functional requirements of other CI. Where a change in design requirements does not affect the safety or design basis, the CM Program does not require a new design analysis to be performed; however, the affected design requirements are required to be updated, and the associated design bases must support any changes.

11.1.5 Change Control

The objective of the Change Control Process is to maintain consistency among design requirements, the physical configuration, and the related FCI, even as changes are made. The Change Control Process is used to ensure CI and FCI changes are properly reviewed, approved and implemented to assure that all impacts of proposed changes are identified and evaluated, design requirements (and bases) are maintained or appropriately revised, and changes are coordinated across the various NFS organizations and personnel responsible for activities and programs at NFS facilities.

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Requests for proposed changes to CI and FCI are required to be effectively documented. This is procedurally accomplished by use of formal Change Requests (CRs) The Change Control Process assures that the following items are addressed prior to implementing the change:

1. Description and reason for the change;
2. The technical basis for the change;
3. Identification of all CI and FCI impacted by the proposed change;
4. Modifications to existing operating procedures including any necessary training or retraining before operation;
5. Impact of the change on safety and health, or control of licensed material;
6. Authorization requirements for the change;
7. For temporary changes, the requested duration (e.g., expiration date) of the change;
8. The impacts or modifications to the ISA, ISA Summary, or other safety program information developed in accordance with 10 CFR 70.62; and
9. An evaluation per 10 CFR 70.72 as to whether or not a license amendment must be approved by the NRC prior to implementation of the change.

Requests for proposed changes to CI and FCI are required to be effectively documented, and this is procedurally accomplished by use of formal change requests (CRs). The Change Control Process is applied in a graded manner which categorizes changes as administrative, minor, and major changes. Administrative changes include inconsequential changes to FCI and pre-approved equivalent replacements of CI. Minor changes include initial equivalent replacements of CI, and addition, deletion, and modification of CI in existing process systems where the design requirements, safety bases, and process function(s) are not affected. Major changes include substantial modifications to existing licensed facilities and/or processes, new licensed facilities, or new processes in existing licensed facilities. Any change requiring a license amendment is also considered a major change. Each CR is reviewed for completeness and accuracy, and a review is conducted to assure it is properly categorized. Non-CM and administrative CRs are approved by the CM function and do not require CCB review. The Engineering discipline manager/designee may approve minor CRs on behalf of the CCB, provided the change does not impact the safety or design bases. All major CRs are reviewed by the CCB.

The CCB may request review by other organizations as required, e.g., Security, QA, Decommissioning, MC&A, etc., depending on the level (minor or major) of change(s) to assure appropriate reviews are obtained. The need for safety reviews, e.g., radiological, nuclear criticality, industrial, fire, and environmental, for a proposed change is determined using a graded approach based on the type of CI(s) involved, associated risks, and type and extent of the proposed change.

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Upon approval of a CR, a Change Control Package (CCP) is prepared based on the approved CR. The CCP is prepared consistent with the design control process (as applicable) and includes the approved CR, drawings, analyses, procedure changes, instructions, and/or other documents needed to properly review, implement, verify, and validate the proposed change. The CCP also defines the methods and acceptance criteria for applicable post-modification testing. CCPs are revised, updated, and supplemented as necessary during the review process, and contain a copy of all approvals. Any changes to the approved CCP that may be required are prepared, reviewed, and approved at the same level as the original CCP.

Each CCP is formally reviewed which includes a technical review, a safety review, and a management review. Other reviews may be performed as needed for such items as meeting regulatory or contractual requirements, cost/benefit, or schedule impact.

The CM function manager is responsible for ensuring that CCPs are completed and stored in an information control system. The CM function manager is also responsible for tracking the changes to associated FCI to assure they are completed and documents are updated.

Operational configuration is defined in the NFS CM Program as the "state" (e.g., on/off, open/closed, operating/not operating) of facility SSCs and processes at a particular point in time. Operational configuration information is that FCI which describes the acceptable SSC or process configurations when variable configuration conditions may exist based on operational or other needs. The CM Program requires that all variable IROFS, SSC, and process configurations (e.g., allowable "states"), together with their associated FCI, be reviewed and approved prior to use or implementation to assure they are within approved design requirements at all times. Any configuration changes, whether temporary or permanent, not covered by procedures (i.e., not pre-approved) are treated as changes which must go through the Change Control Process. Technical, independent, and safety reviews of the change, including procedures and other related FCI, specifically assure that the facility SSC or process will continue to operate safely and provide adequate protection to workers, the public, and the environment, and that IROFS are not prevented from performing their expected safety functions and/or sufficient compensatory measures are established.

11.1.6 Information Control

The objective of the Information Control element is to identify and manage FCI (both electronic and documents) related to the physical configuration and design requirements. Information control helps ensure that:

- important facility documents and information are properly stored;

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- revisions to FCI are controlled, tracked, and completed in a timely manner;
- revised documents and information are formally distributed or made available to designated users; and
- information concerning pending revisions is readily available.

The most typical FCI documents and information include:

- ISAs and ISA Summaries
- Process Hazard Analyses (PHAs)
- Documents that identify or define design requirements
- Documents that demonstrate compliance with design and licensing requirements
- Design specifications and/or calculations
- Safety analyses (ACE, FHA, NCSE, etc.)
- IROFS
- Physical item databases
- Change process documentation
- Software logic and manuals for operation and maintenance of critical software (e.g., Programmable Logic Controllers or PLCs)
- Key operating and test procedures
- Key drawings
- Audit and assessment results
- Vendor technical information

An information control system is established to create, control, and track documents within the CM Program. Only the most recently approved versions of FCI are used in the process of operating, maintaining, and modifying the SSCs, facilities, and processes. As controlled information is updated to reflect changes to the requirements and/or physical installation, the CM Program ensures that updated FCI documents are uniquely identified, include a revision number and/or date, and any outdated documents and information are replaced by the latest approved versions.

FCI documents, drawings, and copies are maintained in accordance with procedures that facilitate retrievability and use, control classified information, and meet record keeping requirements. Electronic versions of classified and unclassified FCI are maintained on secure servers and made available to authorized users.

11.1.7 Assessments

The objective of the CM Program Assessment element is to detect, document, determine the cause of, and initiate correction of inconsistencies among design requirements, FCI, and physical configuration. The assessments help identify inconsistencies between these areas, evaluate the root causes for these problems, and prescribe improvements to avoid similar inconsistencies in the future.

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The effectiveness of different aspects of the CM Program is assessed through physical configuration assessments, design assessments, post-implementation inspections and tests, and periodic performance assessments. Where practical, CM related reviews and assessments are combined with other periodic assessments of facilities, processes, and activities for efficiency and cost-effectiveness. All or part of the assessment of the adequacy of CM for an activity or process may be integrated into broader management and performance assessments. The results of these assessments are documented and maintained in accordance with written procedures.

NFS assures that the persons performing the assessment activities are qualified, and that any NFS personnel performing assessments have sufficient authority and freedom from line management to objectively conduct the assessments.

Assessment findings are documented as open items in the corrective action program as CM issues if they are validated to involve contradictory information among different FCI, unanswered technical questions, and/or missing, undocumented or inaccurate information.

11.1.8 Training

The objective of the CM Program Training element is to provide adequate assurance that facility personnel are aware of the CM concepts, terminology, definitions and procedures. Training will ensure that workers have an understanding of how their actions impact CM and that they are able to properly carry out their work in a way that helps NFS achieve its objective to maintain consistency between the design requirements, the FCI and the physical configuration.

11.1.9 Performance Metrics

The CM function manager tracks CI and FCI changes in progress. The status, rate of change, and backlogs are periodically reviewed to demonstrate CM Program efficiency and effectiveness.

CM-related issues entered into the corrective action program are also reviewed to determine trends and CM Program effectiveness.

11.2 Maintenance

NFS has a maintenance program designed to ensure that IROFS are maintained in a manner so as to ensure they are capable of performing their intended function

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when called upon. An essential element of the maintenance program requires that all maintenance activities, including functional testing of IROFS, are authorized by written procedures and/or written instructions to which appropriate personnel have been trained. Steps are included within the maintenance procedures for the notification of all affected parties before and at the completion of all maintenance activities.

The maintenance program consists of several key program elements including management systems that provide the scheduling and documentation of the following maintenance elements when applied to IROFS:

- 1) Surveillance and Monitoring,
- 2) Corrective Maintenance,
- 3) Preventive Maintenance, and
- 4) Functional Testing.

Maintenance skills training for mechanics performing maintenance activities involving IROFS is also required. Maintenance skills training is further addressed in Section 11.3. Contractors that perform work on IROFS will meet the same guidelines for IROFS training or will be under direct supervision of NFS-trained personnel that are qualified and knowledgeable of the particular IROFS involved.

11.2.1 Surveillance and Monitoring

NFS utilizes established surveillance activities to monitor the current and long-term performance of IROFS. These activities include preventive maintenance (11.2.3), functional testing (11.2.4), and follow-up to corrective maintenance (11.2.2). IROFS found to be out-of-tolerance or unable to perform their intended function are reported in a timely manner to the safety discipline through the corrective action program.

Reports of IROFS failures are entered into the corrective action program which provides a means to evaluate the failure of IROFS, identify the cause of failure, and assign appropriate corrective actions to be initiated. Records of IROFS performance issues and corrective actions are maintained within the maintenance and corrective action programs, as applicable. Records for failures of IROFS are maintained in accordance with 10 CFR 70.62(a)(3) within the corrective action program.

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11.2.2 Corrective Maintenance

Corrective maintenance is performed using a planned, systematic, integrated, and controlled approach to ensure that IROFS and other systems necessary for the safe operation of the facility are properly repaired and restored to service in a manner that maintains facility safety and the function of the safety system. Maintenance activities are performed on IROFS in a manner that minimizes or eliminates the recurrence of unacceptable performance deficiencies.

Corrective maintenance is authorized, initiated, and documented through a formally established process that includes steps requiring coordination between the maintenance and operating organizations. The process also includes an evaluation to determine if IROFS have been, or may be, affected by the equipment failure/malfunction or the ensuing maintenance and whether post-modification functional testing of IROFS is required.

11.2.3 Preventive Maintenance

Preventive maintenance (PM) is performed in a preplanned and scheduled manner to refurbish or overhaul IROFS to ensure that they continue to perform their intended function. PM activities are appropriately balanced against the objective of minimizing unavailability of IROFS. After conducting PM, and before returning a safety control to service, a functional test may be required to provide reasonable assurance that the safety control performs as designed and provides the safety action expected.

A schedule for performing PM on IROFS is maintained as specified in written procedures, and frequencies are established based on operating history, manufacturer and industry guidance, feedback from surveillance and maintenance activities, and/or recommendations from the corrective action program.

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

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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 maintained as "records pertaining to safety" as specified in Section 11.7.

11.3 Training and Qualification

The NFS Training and Qualification Program provides workers with the knowledge and skills to safely perform their job function, recognize the importance of IROFS, effectively deal with the hazards of the workplace, and properly respond to emergency situations. The qualification aspect of this program ensures that operations and maintenance are performed only by properly trained personnel.

Requirements and methods for the training and qualification programs are approved by NFS site management, who also provide ongoing evaluation of the effectiveness of the programs. Training records, including those related to IROFS, are maintained for a minimum of two years.

This training typically falls into one of two categories:

- 1) General safety training not specific to a particular work station or activity; and
- 2) Training to assure proper performance for positions and work activities that are relied on for safety, in particular those designated as IROFS.

11.3.1 General Safety Training

The NFS Training and Qualification Program requires that all personnel who are granted unescorted access to the protected area receive formal safety orientation training. Safety orientation training covers plant safety rules, radiological, nuclear criticality, industrial, and environmental safety topics as appropriate to the job function of the individuals being trained. In addition, this training covers proper response to emergencies.

Previously trained employees receive formal refresher training in safety on an annual basis. The content of safety training is evaluated biennially by a member of the safety discipline, as appropriate for the subject of the training, to ensure it remains current and relevant. Additional details regarding periodic evaluation of the Radiation Protection Training Program is discussed in Chapter 4.

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11.3.2 Training and Qualification for Activities Involving the Handling of SNM

The Training and Qualification Program includes work training for operating personnel and others who directly handle greater than laboratory sample quantities of special nuclear material. Work training typically includes classroom, on-the-job, and guided-work-experience training necessary to provide the desired knowledge and/or skill. It covers the operating procedures, alarms, emergency response actions, and radiological, nuclear criticality, industrial, and environmental safety controls and limits specific to the particular work assignment.

Work training includes appropriate reinstruction for previously qualified individuals prior to implementation of a process change or procedural modification. When changes are made relative to safety or emergency response requirements, provisions are made to assure that affected employees are appropriately informed and instructed on the changes. Previously qualified individuals are required to undergo a re-qualification process for applicable work assignments every three years (maximum interval not to exceed 42 months). Additional details about the work training program are provided in approved written procedures.

The Training and Qualification Program provides for the instruction and training of mechanics involved in maintenance activities at NFS. Maintenance skills training may include such topics as basic math, precision instrument reading, laser alignment, vibration analysis, basics of programmable logic controllers (PLC), welding, industrial electricity (basic, intermediate, and advanced), and machine tool operation, as appropriate. The type and level of training is commensurate with the job assignments.

Organization and Management of Training

The responsibility for the assurance of properly trained and qualified personnel resides with the discipline management team and pertinent line management. Support to line management for the development, implementation, and administration of the facility Training and Qualification Program is provided by the Training function. Implementation of the Training and Qualification Program is accomplished in accordance with written procedures.

All training is conducted by, or under the supervision of, individuals recognized by management as possessing the necessary knowledge and skills to conduct the training. Exemptions from training are only authorized as described in approved written procedures.

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Identification of Activities Requiring Training

Positions impacting the availability/reliability of IROFS are assessed, based on a graded approach that considers the hazards and the safety responsibilities associated with each position. Input from subject matter experts, with support from the training function, is utilized as appropriate.

Position Training Requirements

Objectives and requirements for training programs are jointly agreed upon by NFS management based upon plant needs and input provided by the training function and the appropriate discipline.

Each NFS position involving personnel assigned to SNM process operations is evaluated to determine the specific requirements that apply to the defined job function. The requirements are defined in an on-line computer database. Personnel must remain current on the defined set of requirements to maintain job qualifications.

Bases for Training

The objective of training is to ensure safe and efficient operation of the facility and compliance with applicable established regulations and requirements. Learning objectives are established for those positions/activities impacting the safety of licensed material operations, and in particular the availability/reliability of designated IROFS. Objectives include, as applicable, the knowledge, skills, and abilities the trainee should demonstrate; the conditions under which required actions will take place; and the standards of performance the trainee should achieve upon completion of the training activity.

Training Materials

Lesson plans and other training guides (for both classroom and on-the-job training) developed for activities relied on for safety are based on learning objectives developed from specific job performance requirements. Information provided by various safety disciplines is included in the content of training elements with clearly defined objectives. The lesson plans also provide reasonable assurance that training is conducted in a reliable and consistent manner. The Configuration Management Program provides a means to assure that design changes and modifications to IROFS are accounted for in the training.

Evaluation of Trainee Accomplishment

Trainee understanding and command of learning objectives are evaluated. The evaluation may be accomplished through a combination of observation/skills

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demonstration, written tests, or oral examinations. The results of trainee evaluations are documented.

On-the-Job Training (OJT)

OJT requirements for activities relied on for safety and listed in the ISA Summary, if applicable, are specified as part of pertinent position training requirements. Completion of OJT may be demonstrated by actual task performance (preferred) or task simulation. Completion of OJT requirements are documented.

Training Program Review

The effectiveness of the Training and Qualification Program is assessed on a periodic basis. Work assignments involving the handling of SNM are evaluated for needed re-current training and/or re-evaluation of qualification activities.

11.4 Procedure Development and Implementation

Activities involving the handling of SNM and/or IROFS are conducted in accordance with written procedures as defined in this section. NFS procedures also address the following activities: design, configuration management, procurement, construction, radiation safety, maintenance, quality assurance, training and qualification, audits and assessments, incident investigations, records management, nuclear criticality safety, fire safety, chemical process safety, and reporting requirements.

The process for the development and implementation of procedures is defined in written procedures. These procedures address how procedures are developed, reviewed, approved, distributed, revised, and deleted. The system ensures that the most current revisions of procedures are readily available to workers within their work areas (operating procedures), or in a centralized location accessible to all affected personnel (general safety and support group procedures), that any necessary training and qualification requirements are identified, and that the timeframe for which the procedure is valid is defined.

The safety review committee is responsible for reviewing and approving new and revised operating and general safety procedures, as defined below, and per Section 2.4 requirements. Support group procedures, including those developed to support management measures, are approved by the discipline manager for the originating group and by the appropriate safety function manager(s) if the procedure contains safety-related information.

Changes and/or revisions to procedures covering licensed material operations and/or IROFS are reviewed by the safety functions, as appropriate, in accordance with the requirements of the CM program, as discussed in Section 11.1, to ensure

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that all associated activities and documentation (safety analyses, reviews, testing, training, etc.) are completed before procedural changes are implemented.

11.4.1 Operating Procedures

Operating procedures are documents written to authorize a) the processing of radioactive material or b) a decommissioning activity; and, within these documents, detailed instructions for operation of equipment used in the process or activity, instructions for disposition of radioactive wastes, and limits and controls established for safety purposes, including IROFS, are identified. Operating procedures may take various forms (e.g., standard operating procedures, special work instructions, etc.).

Operating procedures include provisions to place process operations in a safe condition if a step of the procedure cannot be performed as written. Work place posting of limits and controls, training, and other communication devices are used, if appropriate, to enhance comprehension and understanding of operating procedures.

During operating procedure development, the technical accuracy is verified. Changes to existing operating procedures are evaluated to determine if the scope of the change warrants a walk-down and/or an independent verification/validation. New operating procedures are validated by operations staff through walk-downs to ensure that they can be performed as written. An independent verification/validation review may also be performed to provide additional assurance that the technical information, including formulas, set points, and acceptance criteria, is all there and is correct, and may include a tabletop walkthrough or a walk-down of the procedure in the field.

11.4.2 General Safety Procedures

General safety procedures outline health and safety practices that help maintain occupational radiation exposures at levels as low as reasonably achievable (ALARA). These procedures are generally applicable on a plant-wide basis such as those governing the collection of bioassay samples, contamination control, emergency evacuation, and other similar matters. Included in this category are the Emergency Plan implementing procedures and the Criticality control procedures. General safety procedures are reviewed and approved by the safety review committee and such other discipline managers as deemed necessary by the safety discipline vice president.

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11.4.3 Support Group Procedures

Support group procedures are documents written to authorize the conduct of activities that are not directly involved in the processing of radioactive material or a decommissioning activity, but may involve radioactive material (e.g., laboratory analytical procedures, safety monitoring procedures, material control and accountability procedures, etc.); and, within these documents, the activities are described and any special safety precautions are identified.

11.4.4 Maintenance Procedures

Significant maintenance activities are conducted under formal work packages (FWPs) which are reviewed by the safety functions, as appropriate, prior to initiation of the work. Each FWP prescribes the controls necessary to provide for safety. Items such as the release of airborne radioactivity; unusual exposure of personnel; draining, disassembling, modifying, or routing of lines to equipment that may contain special nuclear material are considered during the review.

Although FWPs are not considered to be operating procedures as defined in this section, a written and safety review committee approved procedure is in place to give instructions when an FWP is required and whose approval is required.

The following methods/practices, as applicable, are incorporated into programs, systems, or written procedures regarding maintenance of IROFS:

- Authorized maintenance instructions with identification of the IROFS;
- Parts list for IROFS;
- As-built or red-lined drawings;
- Pre-maintenance review of work to be performed on unique or complex IROFS, including procedure reviews to ensure accuracy and completeness;
- Notification before conducting repairs/maintenance or removing an IROFS from service, including notification instructions and the functional discipline(s) that will be notified;
- Safe Work Practices/Permits (e.g., lock-out/tag-out; confined space entry; nuclear, radiation, environmental, fire, and chemical safety issues);
- Requirements for replacement of like-kind parts and control of new or replacement parts;
- Compensatory measures while performing work on IROFS;
- Procedural control of removal of components from service for maintenance and for return to service;
- Ensuring safe operations during removal of IROFS from service; and,
- Notification to operations personnel that repairs have been completed.

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11.4.5 Temporary Procedures

Approved temporary procedures (i.e., Letter of Authorization (LOA)) are used when permanent procedures do not exist to:

- 1) Direct operations during testing, maintenance, and modifications;
- 2) Provide guidance in unusual situations not within the scope of permanent procedures; or,
- 3) Provide assurance of orderly and uniform operations for periods of short duration when the plant, a system, or a component is performing in a manner not covered by existing permanent procedures, or has been modified or extended in such a manner that portions of existing procedures do not apply.

Temporary procedures are controlled, reviewed, and approved as specified by a written procedure and will not change an ISA except as authorized under 10 CFR 70.72. The review and approval process required for temporary procedures is the same as for other procedures, and a timeframe is defined for which the procedure is valid.

11.4.6 Periodic Reviews of Procedures

If an active operating or general safety procedure has not been revised within a three-year period, the procedure will be reviewed to ensure it remains current and relevant. The chairman of the safety review committee may select individual members to perform the review, rather than the entire committee, to ensure it remains current and relevant. The selection process is described in Section 2.4. Any general safety procedure meeting this condition will also be reviewed by the appropriate safety function manager(s). Support group procedures are periodically reviewed in accordance with the Audits and Assessments program (see Section 11.5). Emergency procedures are reviewed per the Emergency Plan required in Chapter 8.

The corrective action program includes provisions to assess the role of procedures in adverse conditions or events evaluated within the program. Corrections of procedural deficiencies are tracked to completion within the system.

11.5 Audits and Assessments

NFS has a program for conducting audits and assessments of activities significant to facility safety and environmental protection that identifies responsibility for:

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- 1) Determining the appropriate utilization of internal and/or external personnel for particular audit and assessment activities;
- 2) Assuring audit and assessment personnel have the expertise and background sufficient to successfully conduct audit and assessment activities;
- 3) Assuring audit and assessment personnel are sufficiently independent of the area being reviewed; and,
- 4) Verifying the utilization of an effective corrective action program to address findings of audits and assessments.

Written guidance and procedures used to perform the audits and assessments contain the following information:

- Activities to be reviewed;
- Frequency of reviews;
- Applicable guidance to be used in conducting the reviews;
- Responsibilities for each phase of the reviews;
- Instructions for recording the results, and recommending and approving actions to be taken; and,
- The levels of management to which results are reported.

Results, including findings and observations, are captured in the corrective action program. Corrective actions to prevent recurrence are assigned to owners, documented, and tracked to completion in accordance with the requirements specified in the corrective action program.

11.5.1 Audits

Audits are compliance-based evaluation activities with an objective of verifying compliance of operations with established regulatory requirements, license commitments, and standard industry practice. As a minimum, audits apply to the programs presented below.

Members of each safety function perform audits of activities involving the handling of SNM, including support areas, on a quarterly basis.

The Emergency Preparedness Program is audited by the Quality Assurance discipline on an annual basis. The following management measures are audited on a biennial basis by the Quality Assurance discipline:

- Maintenance;
- Procedures;
- Configuration Management;
- Training and Qualifications;
- Incident Investigations;

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- Records Management; and
- Quality Assurance elements for IROFS.

Members of the Quality Assurance discipline periodically audit safety programs as directed by the president and/or a discipline vice-president/director.

11.5.2 Assessments

Assessments are performance-based evaluation activities conducted to assess the effectiveness of health, safety, and environmental compliance functions in achieving their designated purpose, particularly in providing reasonable assurance of the availability and reliability of IROFS.

As a minimum, assessments apply to each of the safety function programs and configuration management. Assessments in these areas are performed on a triennial basis. The need for assessments of maintenance, procedures, training and qualifications, incident investigations, records management, and Quality Assurance elements for IROFS will be determined at the discretion of the president and/or a discipline vice-president/director after considering plant activities and the results of periodic audits of these areas.

11.6 Corrective Action Program

11.6.1 Corrective Action Program

NFS maintains a corrective action program to investigate, document, and report events as required by 10 CFR 70.50, 70.62, and 70.74 for operations involving special nuclear materials. Events are reported, investigated, tracked, and corrective actions are assigned through a formal corrective action program. A systematic and structured approach is used to determine the specific or generic root cause(s) and generic implication of events.

A multi-disciplinary committee reviews these events in accordance with written guidance to determine the safety significance of the event. A graded, risk-based approach is applied to the assignment of the level of investigation based on severity or potential severity of the event. Levels of investigation, as well as reviews and approvals, are assigned for events in accordance with written procedures.

11.6.2 Incident Investigations

The guidance for conducting an investigation contains the following elements:

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1. A documented plan for investigating an event. This plan is separate from any required Emergency Plan. The investigation of an event should begin as soon as possible, commensurate with ensuring the safety of the investigative team, after the event has been brought under control.
2. A description of the functions, qualification, and responsibilities of the individual who would lead the investigative team and those of the other team members; the scope of the team's authority and responsibilities; and assurance of the cooperation of management.
3. Assurance of the team's authority to obtain all the information considered necessary and its independence from responsibility for or to the functional area involved in the incident under investigation.
4. Procedures requiring maintenance of all documentation relating to events for two years (or for the life of the operation), whichever is longer.
5. Guidance for personnel conducting the investigation on how to apply a reasonable, systematic, structured approach to determine the specific or generic root cause(s) and generic implications of the problem. The level of investigation is based on a graded approach relative to the severity of the event.
6. Requirements to make available original investigation reports to NRC on request.
7. A system for monitoring the completion of appropriate corrective actions.
8. Direction for ensuring that documented corrective actions are taken within a reasonable period to resolve findings from event investigations.

An investigation will be initiated for those events specified in 10 CFR Parts 70.50, 70.62, and 70.74 within 48 hours of discovery, or sooner, based on the safety significance of the event.

The team will include at least one individual knowledgeable of the area being investigated (as applicable) and at least one team member will be trained in root cause analysis. In addition, the investigation process and investigating team will be independent of the line management, and participants are assured of no retaliation for participating in investigations.

Corrective actions are documented and monitored through completion. Corrective actions generated from investigations are used to make corrections and improvements (i.e., "lessons learned") necessary to prevent or minimize single or

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common-mode failures. Details of the accident event sequence(s) will be compared with accident sequence(s) already considered in the ISA, and the ISA Summary will be modified to include evaluation of the risk associated with accidents of the type actually experienced.

Auditable records and documentation related to events, investigations, and root cause analysis are maintained as described in written procedures. For each event utilizing a team investigation, the incident report will include a description of the event, contributing factors, a root cause analysis, and findings and recommendations. Relevant findings are communicated to affected personnel. A database of events, investigations, and corrective actions is maintained for tracking, trending, and documentation purposes.

Trends involving failure of IROFS are reviewed to determine effectiveness of safety systems and to provide feedback to management for establishment of actions to minimize and/or prevent recurrence.

11.7 Records Management

A records management system, as applied to safety (i.e., ISA, radiation protection, nuclear criticality safety, chemical process safety, fire safety, emergency preparedness, and environmental protection), decommissioning, and quality assurance activities, is maintained in accordance with written procedures. Information related to 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 license conditions and the relevant regulatory requirements of 10 CFR 20.

All records pertaining to safety will be retained for at least two years unless longer retention is required by other regulatory or license specifications. For example, records of major changes implemented under 10 CFR 70.72 will be maintained until termination of the license. Major changes are defined in 11.1.5.

Records relevant to IROFS that are maintained include the following:

- Construction specifications,
- Facility and equipment descriptions and drawings,
- Design criteria requirements,
- Records of facility changes,
- Safety analyses, reports, and assessments, including the ISA and ISA Summary,
- Procurement, including specifications for IROFS,
- Configuration Management (physical configuration of process designs, validation records for computer software, as appropriate),

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- Maintenance (calibration, preventive/corrective maintenance [including schedules, test data for IROFS]),
- Training and Qualification,
- Procedures,
- Audits and Assessments/Inspections,
- Incident Investigations (investigation reports), and
- Failures of IROFS.

Records management procedures (a) assign responsibilities for records management, (b) specify the authority needed for records retention or disposal, (c) specify which records must have controlled access and provide the controls needed, (d) provide for the protection of records from loss, damage, tampering, theft, or during an emergency, and (e) specify procedures for ensuring that the records management system remains effective.

A functional organization is in place to ensure prompt detection and correction of deficiencies in the records management system or its implementation. The records management procedures shall provide the following instructions to ensure that:

- Records are prepared, verified, characterized, and maintained;
- Records are legible, identifiable, and retrievable for their designated lifetimes;
- Records are protected against tampering, theft, loss, unauthorized access, damage, or deterioration for the time they are in storage; and,
- Procedures are established and documented specifying the requirements and responsibilities for record selection, verification, protection, transmittal, distribution, retention, maintenance, and disposition.

Records are categorized by their relative importance to safety and/or regulatory compliance to identify record protection and storage needs and to designate the retention period for individual kinds of records.

For computer codes and computerized data used for activities relied on for safety, as specified in the ISA Summary, procedure(s) are established for maintaining readability and usability of older codes and data as computing technology changes. The procedures should include transfer of the older forms of information (e.g., punched cards or paper tapes) and codes for older computing equipment to contemporary computing media and equipment.

In addition, records of IROFS failures must be kept and updated in accordance with 10 CFR 70.62(a)(3). Record revisions necessitated by post-failure investigation conclusions should be made within 5 working days of the completion of the investigation.

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11.8 Other QA Elements

The NFS quality system consists of the organizational structure, procedures, processes, and resources needed to implement quality management. The following elements, as appropriate, are applied on individual projects using a graded approach based on the degree of importance to safety.

1. **Organization and Responsibilities**
Chapter 2 provides the commitments associated with the organizational structure, authority, and responsibilities to ensure that activities involving the handling of SNM and/or IROFS are performed safely and in compliance with license and regulatory requirements.
2. **Quality Assurance Program**
NFS maintains a QA Program that is structured on ASME NQA-1 (*Quality Assurance Program Requirements for Nuclear Facilities*) under the overall responsibility of the Quality Assurance discipline. Aspects of this program may be applied to IROFS using a graded approach based on the degree of importance to safety.
3. **Design Control**
Design control is an element of the Configuration Management Program as described in Section 11.1. Information control of items such as design inputs, analyses, and other design documentation and records is discussed in Section 11.1.6.
4. **Procurement Document Control**
The Purchasing Program has provisions to ensure that applicable design bases and other requirements necessary to provide reasonable assurance of quality are included or referenced in documents for procurement of items or services relied on for safety. To the extent necessary, suppliers are required to have QA consistent with the quality level of the item or service to be procured.
5. **Instructions, Procedures, and Drawings**
Section 11.4 includes the commitment that “activities involving the handling of SNM and/or IROFS are conducted in accordance with written procedures”. This section also describes the process for developing and implementing procedures. Drawings are controlled under the Configuration Management Program as described in Section 11.1.6.

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6. Document Control
A process is in place for developing, implementing, and revising documents to provide reasonable assurance that the appropriate documents are in use (refer to Sections 11.1 and 11.4). Document changes are reviewed for adequacy and approved for implementation by authorized personnel.
7. Control of Purchased Items and Services
The Purchasing Program has provisions for purchase specifications that define the necessary requirements for controlling purchased material. The program provides reasonable assurance of conformance with specified requirements, and it also allows for appropriate receipt inspection, storage, and shelf life requirements for materials.
8. Identification and Control of Items
The Configuration Management and Purchasing Programs have provisions for identifying and controlling items, including IROFS, to provide reasonable assurance that incorrect or defective items are not used.
9. Control of Special Processes
Section 11.4 includes the commitment that “activities involving the handling of SNM and/or IROFS are conducted in accordance with written procedures”. This commitment also applies to special processes such as welding, nondestructive testing, and chemical cleaning. Such activities are performed by qualified personnel using approved procedures and equipment.
10. Inspection
Acceptance testing and/or inspection is a part of the Configuration Management Program which ensures that IROFS meet specified requirements prior to initial use. The Surveillance and Monitoring, Preventive Maintenance, and Functional Testing functions, as described in Section 11.2, provide assurance that IROFS continue to meet specified requirements by assuring that these testing and inspection activities are scheduled and implemented.
11. Test Control
Acceptance testing and/or inspection is a part of the Configuration Management Program which ensures that IROFS meet specified requirements prior to initial use. The Surveillance and Monitoring, Preventive Maintenance, and Functional Testing elements, as described in Section 11.2, provide assurance that IROFS continue to meet specified requirements by assuring that these testing and inspection activities are scheduled and implemented.

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12. **Control of Measuring and Test Equipment**
The Calibration Program has provisions to provide reasonable assurance that tools, gauges, instruments, and other measuring and testing devices are properly identified, controlled, calibrated, and adjusted at appropriate intervals to maintain performance within required limits.
13. **Item Handling, Storage, and Shipping**
The spare parts program has provisions to ensure that items are stored in such a manner as to prevent damage, loss, or deterioration caused by environmental conditions. Testing conducted prior to initial use should detect potential damage incurred during shipping, handling, or storage.
14. **Inspection, Test, and Operating Status**
Acceptance testing and/or inspection is a part of the Configuration Management Program which ensures that IROFS meet specified requirements prior to initial use. The Surveillance and Monitoring, Preventive Maintenance, and Functional Testing elements, as described in Section 11.2, provide assurance that IROFS continue to meet specified requirements by assuring that these testing and inspection activities are scheduled and implemented. The Configuration Management and Purchasing Programs have provisions for identifying and controlling items, including IROFS, to provide reasonable assurance that incorrect or defective items are not used.
15. **Control of Nonconforming Items**
The Configuration Management and Purchasing Programs have provisions for identifying, segregating, and controlling items, including IROFS, to provide reasonable assurance that incorrect or defective items are not used.
16. **Corrective Action**
Reports of conditions adverse to safety are promptly identified and entered into the Corrective Action Program (see Section 11.6), which provides a means to evaluate the problem, identify the cause of the problem, assign appropriate corrective actions to be initiated, and track the corrective actions to closure. Prompt identification and effective corrective actions should provide reasonable assurance that repetition of the problem will be minimized.
17. **Quality Assurance Records**
The Records Management Program, as described in Section 11.7, has provisions for the identification, retention, retrieval, and maintenance of records that furnish evidence of the control of quality of IROFS.
18. **Audits**
Section 11.5 includes the commitments for scheduling and implementing audits and assessments.

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19. Updates of QA Documents

The management positions for each discipline are responsible for reviewing and updating quality program documents, as applicable, based on reorganizations, revised activities, lessons learned, changes to applicable regulations, and other quality program changes.

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Attachment 5

RAI 7.1

(Additional Information Discussed at 1/13/2011 Meeting)

(2 pages to follow)

RAI 7.1

RAI 7.1 (Additional Information Discussed at 1/13/2011 Meeting)

NRC asked where the application commits to test and maintain existing fire protection systems. NFS referred to Section 7.2.3 of its application. In addition, NFS will add a description of the testing frequency of its fire suppression systems to its RAI response. NRC agreed that, pending review and acceptance of the testing/inspection frequency, the information would close the issue.

NFS Response

NFS has engineered fire suppression systems that include Carbon Dioxide, Halon, Wet Chemical, and Water-Based suppression systems. In order to ensure that these systems will function as designed, NFS performs inspection, testing, and maintenance on its fire suppression systems in accordance with applicable Occupational Safety and Health Administration regulations and National Fire Protection Association consensus codes and standards, as listed below.

- 29 CFR 1910, Subpart L – *General Industry Regulations, Fire Protection*
- NFPA 12 - *Standard on Carbon Dioxide Extinguishing Systems*
- NFPA 12 A - *Standard on Halon 1301 Fire Extinguishing Systems*
- NFPA 17 - *Standard for Wet Chemical Extinguishing Systems*
- NFPA 25 - *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*

NFS has established procedures to ensure that inspection, testing, and maintenance of fire protection systems are performed in accordance with regulations and standards. NFS-HS-B-58, *Fire Suppression Systems Inspections*; NFS-HS-A-16, *Safety Audits and Inspections*, Attachment 6; and the SRE Management System provide instructions, methods for documentation, and frequencies for performing inspection, testing, and maintenance activities on fire suppression systems. The following information is a brief outline of the periodicity of inspections, testing, and maintenance for the types of suppression systems that NFS currently utilizes for fire protection; detailed information is provided in the NFS procedures referenced above.

Carbon Dioxide System

Inspection:	Control Panel Inspection (Weekly)
	Tank Pressure Readings (Weekly)
	Tank Volume (Weekly)
	Valve Orientation & Locks (Weekly)
	Manual Operation Initiating Devices (Weekly)
	Automatic Operation Initiating Devices (weekly)
Testing:	Control Panel Operation (Semi-Annually)
	Valve Operation (Semi-Annually)
Maintenance:	As required, per inspection and testing findings

Halon Systems

Inspection: Control Panel Inspection (Monthly)
Tank Pressure Readings (Monthly)

Testing: Control Panel Testing and Electronic Continuity Testing by Vendor (Annually)

Maintenance: As required, per inspection findings

Wet Chemical Extinguishing System

Inspection: Visual Pressure Check (Monthly)
Visual Discharge Piping and Nozzle Inspection (Monthly)
Inspection of Cylinders, Discharge Piping, & Nozzles by Vendor (Semiannually)
Foam Solution Inspection by Vendor (Semiannually)

Testing: Hydrostatic test on cylinders (5 years)

Maintenance: Foam Solution Replacement by Vendor (3 years)
As required, per inspection and testing findings

Water-Based Suppression Systems (Wet)

Inspection: Gauge and Pressure Inspection (Monthly)
Hydraulic Data and Riser Plate (Monthly)
Sectional Valves are Open and Locked/Sealed (Monthly)
System Piping and Seismic Bracing (Annually)
Building Conditions (Annually)
Sprinkler Head Inspection (Annually)

Testing: Water Flow/Main Drain and Alarm Test (Quarterly)
Sectional Valves Tested/Cycled (Annually)

Maintenance: Sectional Valves Greased (Annually)
As required, per inspection and testing findings

Water-Based Suppression Systems (Dry)

Inspection: Gauge and Pressure Inspection (Weekly)
Hydraulic Fata and Riser Plate (Monthly)
Sectional Valves are Open and Locked/Sealed (Monthly)
System Piping and Seismic Bracing (Annually)
Building Conditions (Annually)
Sprinkler Head Inspection (Annually)

Testing: Water Flow/Main Drain and Alarm Test (Quarterly)
Dry Valve Trip Test (Annually)
Sectional Valves Test/Cycled (Annually)

Maintenance: Sectional Valves Greased (Annually)
As required, per inspection and testing findings